CONSTANTINOPOLITAN GLAZED WHITE WARES (7^{th} -13^{th} CENTURIES): AN INTERDISCIPLINARY APPROACH TO A GROUP OF EARLY MEDIEVAL CERAMICS

VOLUME I: Text

by

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ABSTRACT

This thesis examines Byzantine Glazed White Ware pottery which was manufactured in Constantinople or its hinterlands from the late seventh to the late thirteenth centuries. The term “white” refers to the colour of the fabric which shows varieties in tones, such as pink, grey and beige. On top, there is a glaze which can either be functional, when used plainly, or decorative which allows various intriguing designs and styles across a broad colour scale from monochrome to polychrome. With rising scholarly attention beginning in the early twentieth century on the Byzantine Ceramics, Constantinopolitan Glazed White Ware pottery (CGWW) was classified as one of the two main ceramic groups: **A. White Ware** and **B. Earthenware**. Later, treatments on White Ware pottery focused either on the decoration or on the fabric of the vessels by taking the so-called art historical and archaeological approaches, respectively. Each of these approaches resulted in various classifications adding more groups and subgroups to White Wares until the development of the most conventional and well-known archaeological classification, GWW I-V and Polychrome Ware.

This thesis argues the insufficiency of the above-mentioned approaches when they are used individually on the CGWW pottery. To illustrate the problems of the earlier assessments, this thesis provides a broad review of the literature which is centred on CGWW beginning with the first systematic excavation through the present day. It is organised according to a geographic order prioritising the production centre, Constantinople, to examine the aforementioned classifications in their own context, and then the distributed sites in Europe, Anatolia and Russia and the Crimea to see how successful these classifications are.

For a wider view, this thesis evaluates the Constantinopolitan Glazed White Ware pottery with an interdisciplinary approach by combining the archaeological and art historical

methodologies. Therefore, an “integrated approach” combines some analytical methods (XRF, XRD, SEM-EDS and TG/DCS) and implements them to analyse the archaeological samples, **PAR** batch, and two powdered kaolinitic clay samples of Istanbul, Şile and Ömerli. The analyses demonstrate that the samples are made of the same clay of the previously analysed examples which were assigned to be of Constantinopolitan origin. Furthermore, the raw clay samples are in agreement showing that the raw clays of the Asian side of Istanbul correspond to the archaeological samples. The glaze type is usually lead and high lead; however, some unusual compositions, such as tin-opacified and sulphur and arsenic sulphide, are detected in some samples. These elements are usually assigned to the Islamic Ceramics; therefore, PAR batch may possibly represent the first direct evidence of this technological influence in Byzantine Ceramics. The stonepaste bodies of these samples further support the evidence of the influence of Islamic Ceramics in manufacturing and probably imitation of Lustre Ware.

In this work, the art historical approach has contributed to the establishment of a new decorative classification of White Wares with a new methodology which separates the decorative painting and the decorative techniques. It also concentrates on the decorative components including the designs, styles and motifs to reveal the themes and the meanings behind them. Next, in order to relate the history of production and also the decoration of this pottery group, the archaeological data which come from the historical sequences of the primary excavations are used. Consequently, CGWW pottery is evaluated in three basic chronological stages: early-Glazed White Ware Decoration (7^{th}-9^{th} c.), middle- Glazed White Ware Decoration (9^{th}-11^{th} c.) and late-Glazed White Ware Decoration (11^{th}-13^{th} c.).

For Kibar and Mustafa Yeşiltaş

(for Mahina)

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Fig.9. Büyüme, U., 2018. White Clay Ceramics of Parion Theater Dating From Byzantine Period, in: Başaran, C., Ergürer, E. (Eds.), Roman Theater of Parion, Excavations, Architecture and Finds from 2006-2015 Campaigns. İÇDAŞ A.Ş. Publications, Fig.3.31.

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Fig.11. Ibid, Fig. 5.

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Fig.1. Frantz, M.A., 1938. Middle Byzantine Pottery in Athens. Hesperia 7, 459, Fig.22.

Fig.2. Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938. Oxford University Press, Pl.15.39.

Fig3. Ibid, Pl.15.40.

Fig.4. Ibid, Pl.15.45.

Fig.5. Ibid, Pl.21.8.

Fig.6. Hayes, J., 1992. Excavations at Saraçhane in Istanbul II. The Pottery. Princeton University Press, Princeton, 38-Fig.61.4.

Fig.7. Ibid, 38-Fig.61.5.

Fig.8. Peschlow, U., 1977. Byzantinische Keramik aus Istanbul: ein Fundkomplex bei der Irenenkirche. Istanbuler Mitteilungen 27/28, 402, Abb.12. 90.

Fig.9. Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938. Oxford University Press, Pl.21.19.

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Fig.2. Ibid, Fig.5.4.

Fig.3. Ibid, Fig.5.2.

Fig.4. Ibid, Fig.5.1.

Fig.5. Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938. Oxford University Press, Pl.21.4.

Fig.6. Ibid, Pl.21.14.

Fig.7. Ibid, Pl.21.18.

Fig.8. Hayes, J., 1992. Excavations at Saraçhane in Istanbul II. The Pottery. Princeton University Press, Princeton, Fig.5.5.

Fig.9. Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on

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Fig.1. Talbot-Rice, Byzantine Glazed Pottery, Oxford at the Clarendon Press (1930), pl.II.2.

Fig.2. Ibid, pl.II.3.

Fig.3. Dark, K., 2001. Byzantine pottery. Tempus, Section 3, Fig.22.

Fig.4. Morgan, C.H., 1942. The Byzantine Pottery. American School of Classical Studies at Athens, Pl. IXb.

Fig.5 Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938. Oxford University Press, Pl.22. 11.

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Fig.3. Ibid, Pl.22. 12.

Fig.4. Ibid, Pl.22. 15.

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Fig.1. Zalesskaya, V.N., 2011. Masterpieces of Byzantine Applied Art. Byzantine Ceramics of the 9th – 15th Centuries, Catalogue of the Collection. The State Hermitage Museum Publisher, St. Petersburg, cat&pic.no. 260.

Fig.2. Corinth Excavations C 1937 1657a (Courtesy of the American School of Classical Studies at Athens, Corinth Excavations).

Fig.3. Böhlendorf-Arslan, B., 2010. Die Mittelbyzantinische Keramik aus Amorium. Byzanz–das Römerreich im Mittelalter, Teil 2, 24, Abb.18.10.

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Fig.5. Morgan, C.H., 1942. The Byzantine Pottery. American School of Classical Studies at Athens, Pl. IVb.

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46, Res.1.

Fig.2. Morgan, C.H., 1942. The Byzantine Pottery. American School of Classical Studies at Athens, Pl. XVIb.

Fig.3. Hayes, J., 1992. Excavations at Saraçhane in Istanbul II. The Pottery. Princeton University Press, Princeton, Pl.8g.

Fig.4. Ibid, Pl.4a.

Fig.5. Stevenson, R.B.K., 1947. Chapter II, The Pottery 1936-37, in: The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938. Oxford University Press, Pl.22.17.

Fig.6. Ibid, Pl.22.18.

Fig.7. Yashaeva, T., Denisova, E., Ginkut, N., Zalesskaya, V.N., 2012. The Legacy of Byzantine Cherson: 185 Years of Excavation at Tauric Chersonesos. Institute of Classical Archaeology, 626, No. 416.

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For Crete: Poulou, N., 2011. Τεκμήρια υλικού πολιτισμού στη βυζαντινή Κρήτη: από τον 7ο έως το τέλος του 12ου αιώνα in Πεπραγμένα Ι’ Διεθνούς Κρητολογικού Συνεδρίου Eds. E. Καψωμένος, Μ. Ανδρεαδάκη-Βλαζάκη, Μ. Ανδριανάκης, Φιλολογικός Σύλλογος 'Ο Χρυσόστομος' (Χανιά 2011), 417, Fig. 38).

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Symposium of Byzantine Studies (Oxford 1993), eds. Cyril Mango and Gilbert Dagron, Routledge, 329, Table 1.

[2] Megaw, A.H.S., Jones, R.E., 1983. *Byzantine and Allied Pottery: A Contribution by Chemical Analysis to Problems of Origin and Distribution*, The Annual of the British School at Athens, Vol. 78, 242-43, 247, Table 2-3.

[3] Armstrong, P., Hatcher, H., Tite, M., 1997. Changes in Byzantine glazing technology from the ninth to thirteenth centuries. La Céramique Médiévale en Méditerranée, Actes du 6e Congrès de l'AICEM2. Aix-en-Provence, 228, Table 2.

[4] White, H., 2009. An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the eleventh to thirteenth centuries (PhD diss.). University of Sheffield. Vol. 1, 94-98, 140-144; Vol. 2 Fig. 8.2.1-4, Tables 3.2.1, 8.3.5, 8.4.1.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Constantinopolitan Glazed White Ware pottery, CGWW, (7^{th} – 13^{th} century) was a highly distributed early medieval ceramic group in Europe, Anatolia, Russia and the Crimea. With a broad scale of motifs and elaborately executed ornamentations on tableware, this pottery group seems to be the main exported ceramic good of the capital of Byzantium during the Middle Byzantine Period. The first appearance of the CGWW coincides with the end of the Red-slip Ware of Late Antiquity.[1] The change from the imported red ware to the local white clay, perhaps, resulted from the diminution in trade which is related to the decline in the economy in the seventh century.[2] However, this new production of the capital was not widely distributed immediately after its emergence and in the following century, though it would become the only widespread fine-ware from the ninth century onwards.[3] The omnipresence of this pottery group (Map 1-2), especially the Glazed White Ware (GWW) II and IV, is associated with the betterment in the Byzantine economy after the Iconoclasm, 843 CE.[4] Until the 10th century, the manufacture seems to be centralised and its distribution was limited to

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[1] Joanita Vroom, *Byzantine to Modern Pottery in the Aegean: 7th to 20th Century: An Introduction and Field Guide* (The Netherlands: Parnassus Press, 2005), 62–63; Mark Whittow, 'Chapter 12- The Middle Byzantine Economy (600–1204)', in *The Cambridge History of the Byzantine Empire c. 500-1492*, ed. J. Shepard, (Cambridge: Cambridge University Press, 2009), 471-484.
[2] E Gülsüm Turnator, 'Turning the Economic Tables in the Medieval Mediterranean: The Latin Crusader Empire and the Transformation of the Byzantine Economy, ca. 1100–1400' (PhD diss., Harvard University, 2013), 170.
[3] Ken Dark, *Byzantine Pottery* (Tempus, 2001), 58; Joanita Vroom, 'Ceramics', in *The Archaeology of Byzantine Anatolia: From the End of Late Antiquity Until the Coming of the Turks*, ed. P. N. Niewohner, Published to Oxford Scholarship Online (Oxford University Press, 2017). 10.1093/acprof:oso/9780190610463.003.0014.
[4] Vroom, 'Ceramics'.

large urban settlements such as Athens, Corinth, Nessebar, Cherson and Otranto.[5] Excluding the exceptional cities located in the Taman peninsula and Sigtuna in Sweden, its diffusion is generally limited to the cities of the imperial territory (Map 1-2).[6] Though the quantity seems to be low, CGWW had dominated the market till an increase in manufacturing centres and the vast diversity in production occurred with the emergence of redware in the eleventh century.[7]

Several sites[8] in Greece, the Balkans, the Crimea, Italy, Albania and Sweden, west and south-west coasts Anatolia and Cyprus may suggest not only multiple maritime trade routes which could be direct from the capital,[9] but it can also frame the demand zone where the buyers were located. Despite the considerably wide diffusion, the small quantity in findings of the earliest GWW seemed to "signify no more than casual trading contacts" to Hayes.[10] Though CGWW was circulated in few overseas places till the late thirteenth century,[11] a decline in

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[5] Véronique François, 'La vaisselle de table à Byzance: un artisanat et un marché peu perméables aux influences extérieures', in *Byzance et le monde extérieur: Contacts, relations, échanges*, ed. M. Balard et al., Byzantina Sorbonensia (Paris: Éditions de la Sorbonne, 2016), 211–23, http://books.openedition.org/psorbonne/1868.
[6] Véronique François, 'Représenter Le Commerce de La Poterie à Byzance', in *Les Échanges En Méditerranée Médiévale*, ed. É. Malamut and M. Ouerfelli, (Aix-en-Provence, 2012), 33–55, https://books.openedition.org/pup/13812; 'A Distribution Atlas of Byzantine Ceramics: A New Approach to the Pottery Trade in Byzantium', in *Trade in Byzantium*, ed. P. Magdalino and N. Necipoğlu, Papers from the Third International Sevgi Gönül Byzantine Studies Symposium, Istanbul 24-27 June 2013, (ANAMED, 2016), 4, https://halshs.archives-ouvertes.fr/halshs-01342002.
[7] François, 'La vaisselle de table à Byzance'.
[8] e.g., Pamela Armstrong, 'From Constantinople to Lakedaimon: Impressed White Wares', in *Mosaic: Festschrift for A.H.S. Megaw*, *British School at Athens Studies* 8, 2001, 57–68; Beate Böhlendorf-Arslan, 'Glasierte Byzantinische Keramik Aus Der Türkei' 3 Vols (Istanbul: Ege Yayınları, 2004), 99–103. For Black Sea see, Joachim Henning, 'The Metropolis of Pliska or, How Large Does an Early Medieval Settlement Have to Be in Order to Be Called a City?', in *Post-Roman Towns, Trade and Settlement in Europe and Byzantium, Vol. 2 Byzantium, Pliska and the Balkans*, ed. J. Henning (Walter de Gruyter, 2007): 216–18; A. L. Yakabson, 'Srednevekovaja Polivnaja Keramika Kak Istoriceskoe Javlenie', *Vizantiskij Vremennik* 39 (1978): 148–59. For Italy see, Erica D'Amico, 'Byzantine Finewares in Italy (10th to 14th Centuries AD): Social and Economic Contexts in the Mediterranean World.' (PhD diss., Durham University, 2011), 93–100; 'Glazed White Ware in the Italian Peninsula: Proposals for a Study', in *Çanak. Late Antique and Medieval Pottery and Tiles in Mediterranean Archaeological Contexts*, Byzas 7, ed. B. Böhlendorf-Arslan, H.W. Orr, and A.O. Uysal (Istanbul: Ege Yayınları, 2007), 215–38.
[9] Dark, *Byzantine Pottery*, 63.
[10] John Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.' (Princeton: Princeton University Press, 1992), 18.
[11] The Green and Brown Painted White Ware of Novy Svet shipwreck is dated to the mid-twelfth to the late thirteenth centuries. see *in SOMA 2010 Proceedings of 14th Symposium on Mediterranean Archaeology Taras Shevchenko National University of Kiev, Ukraine, 23-25 April 2010*, ed. Y. Morozova and H. Oniz, BAR International Series 2555 (Oxford: Archaeopress, 2013), 127–28.

consumption at some major sites, such as Corinth in the eleventh century, and later on, may be related to the imitation of White Ware decoration in the locally produced whiteware and earthenware.[12] Though it is not definite, a few locations in Anatolia, such as Nicaea and Nicomedia can be included in the category of the local (white ware) production, which is directly in relation with the CGWW, between the late ninth and thirteenth centuries.[13] Nevertheless, as J. Hayes underlines, GWW is the mainstay of the Byzantine pottery chronology until the emergence of the Sgraffito and other associated groups at the capital and elsewhere in the twelfth century.[14] After having been produced for about six hundred years, CGWW pottery left its place to the red-bodied Elaborate Incised Ware[15] and went out of existence around the late 1200 CE.[16] Though yet to be proved by ongoing excavation in Istanbul, this date may even be extended to the early 1300s based on the presence of GWW II and Polychrome Ware which were unearthed in the late 13th and 14th-century context at the Corinth Excavations.[17]

GWW pottery is a heavily explored class of Byzantine ceramics. Though it has been more than a century since the publishing of the first study of Byzantine pottery, including White Wares, we still lack a comprehensive work which specifically focuses on the topic. Likewise,

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[12] Guy D R Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125' (Ph.D. diss., The University of Birmingham, 1995), 244–46; Dark, *Byzantine Pottery*, 63.

[13] Véronique François, 'Les Ateliers de Céramique Byzantine de Nicée/Iznik et Leur Production (Xe-Début XIVe Siècle)', *Bulletin de Correspondance Hellénique* 121, no. 1 (1997): 424; R.B Mason and M. Mundell Mango, 'Glazed "Tiles of Nicomedia", in Bythinia, Constantinople and Elsewhere' in *Constantinople and Its Hinterland*, 1993, ed. C. Mango, 321–23; Véronique François and Jean-Michel Spieser, 'Pottery and Glass in Byzantium', in *The Economic History of Byzantium: From the Seventh through the Fifteenth Century*, ed. A. E. Laiou (Washington D.C.: Dumbarton Oaks Research Library and Collection, 2002), 601.

[14] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 12.

[15] Turnator, 'Turning the Economic Tables in the Medieval Mediterranean: The Latin Crusader Empire and the Transformation of the Byzantine Economy, ca. 1100–1400', 166.

[16] See footnote 8.

[17] Florence Liard, Guy Sanders and Ayed Ben Amara, "Byzantine Glazed Wares in White Fabrics ('Glazed White Wares') Discovered in the Frankish Area at Corinth: Chronology, Provenance and Technology" (poster communication presented at European Meeting on Ancient Ceramics (EMAC), Barcelona, 16-18 September 2019) http://www.ub.edu/emac2019/wp-content/uploads/2019/10/EMAC2019-programme-and-book-of-abstracts.pdf, 112.

a coherent methodology has yet to be used for revealing the unknown features of this pottery group. As such, there is still room for a more comprehensive treatment of the material and the ornamentation for which there are still debates over the provenance of the manufacturing and the source of the decoration.

The shift from the typo-chronological archaeological approach to archaeometric analysis which focuses on the chemical and physical characterisations of both the fabric and the glaze made considerable progress on the former issue. The latter, sadly, has always kept its sketchy form which barely exposes the true characteristics of the decoration of White Wares. This is, perhaps, due to the unilateral approaches of the previous studies which reveal only one characteristic leaving the others shrouded in mystery.

Considering CGWW, there are various categorisations which are based on either the surface treatments or the fabric, the so-called art historical and archaeological approaches, respectively. Following the introduction, **1.1.1 the primary classifications of Constantinopolitan Glazed White Ware** briefly introduces the principal approaches in categorising GWW pottery. It illustrates how researchers used the above-mentioned approaches individually, from the art historical to the archaeological and demonstrates the weakness of using these two approaches separately. As stressed in **1.2 Conclusion**, "the White Ware classifications, so far, are likely individual works which focus on a limited finding of a single site; therefore, a more convenient categorisation of Byzantine White Ware pottery has yet to be made." Following this, **1.3 Methodology** discusses the problem of the material specification and the limited definition of the decorative features in previous works. Further, it explains the principles of the combined methodology, which comprises the archaeological and the art historical approaches, to build a more comprehensive categorisation of CGWW pottery.

Next, Chapter two is a bibliographic review which includes two parts. Part I focuses on the excavations, covering 1927 onwards, which took place at the capital, Constantinople, to evaluate the pottery in its own production centre. Considering the previous classifications, Part I also expands the brief bibliography in the previous chapter. Part two, **the critique of John Hayes's White Ware classification**, is devoted to criticism of the well-known categorisation, GWW I-V and Polychrome Ware, which is the most commonly used classification.[18] Unlike its conventional appearance, Hayes's typo-chronology is based on the fabric and bears several mistakes; therefore, it is broadly discussed in this section.

As stated in the Methodology (Chapter one, 1.3), both approaches were used incompetently. Beginning with the archaeological approach, a fabric-based categorisation was usually manipulated to either support the typology of the forms or the classifications. For instance, the basic criterion of the traditional fabric-based approach is to divide the sherds according to inclusion, texture and colour; hence, it commonly produced four classes. On the other hand, the laboratory-based approach has revealed three petrofabric/fabric and two chemical classes, so far. The latter approach is in its infancy; however, it concludes the ultimate definitions of the inclusions are monocrystalline quartz, fine sand-sized dark red to black iron-oxide concentrations and rare silt-sized red and white mica. Since CGWW pottery is made of kaolinitic clay, it should be considered that its nature is open to several changes depending on the firing, such as oxidisation or reduction in atmosphere of the kilns. Also, the chemical effect of the glaze on the fabric is a significant parameter in its transformation. Though the

[18] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 12–37.

inclusions remain stable since White Ware is a low-fired pottery (860-870°C suggested in this thesis), the colour and the texture are more prone to alteration.

The most challenging part of the fabric definition of White Ware pottery is that the above-mentioned changes are not always recognisable to the eye: rather, they must often be defined by microscopic inspection. For this reason, analysis of every piece of a bulk of ceramics is not always possible because the costly measuring instruments are not readily available. This challenge manifested itself as well in the presented study in Chapter three; however, it contributed to raising the following research question: Which of the characteristics of the fabric is more countable for building a fabric-based White Ware classification? Considering the effect of alteration of the colour of the raw clay (see in Methodology, Appendix 3), I suggest to use "the inclusion" as the basic criterion of White Ware fabric classification. Regarding the size, shape and especially the frequency of inclusions, White Ware fabric can be divided into three: A (fine), B (medium) and C (coarse) until a complete version of an archaeometric classification is built.

Considering the limitation of the previous archaeological approach, further material characterisation of Byzantine White Ware pottery can only be uncovered by an archaeometric analysis. Chapter three presents an experimental work to develop the right methods of archaeometry by designating the need of the studied material and to shed light on undiscovered features. Therefore, the archaeometric analysis in this study comprises an 'integrated approach' which combines some principal methods: X-ray fluorescence (XRF), X-ray diffraction (XRD), scanning electron microscopy (SEM) coupled with energy dispersive spectroscopy (EDS) and differential scanning calorimetry (DSC). This integrated approach is initially applied to answer the following inquiry: What could the physical, chemical and thermal analyses reveal about the production technology? Considering the components of the fabric, these methods serve to illuminate two chief points. The first one is to determine the elemental bulk concentrations and mineralogical features which are related to the provenance determination. The second one is to understand the thermal behaviour of the archaeological samples (**PAR** batch), which were taken from Parion Excavations, and to propose a firing degree to compare with the previous suggestions.

The archaeometric analyses in Chapter three seek further information about technological aspects of White Wares by including an analysis of two different kaolinitic clay samples from the Asian side of Istanbul, Şile and Ömerli. The raw clays of these two sources were examined by the above-mentioned methods by focusing on the following question: What more can clay samples disclose about the raw material of White Ware pottery? The comparison between the results of the clays and of the archaeological samples showed that these two clay beds are likely to be raw clay sources of CGWW. Following the Bosporus clay study, published by Megaw and Jones in 1983,[19] the analysis of these two sources contributes to the debate over the raw material of CGWW. It provides valuable data to compare the results with the previous analysis and to discuss the potential of the clay sources in Istanbul for provenance of White Wares. Though discovery of the workshop at Sirkeci has revealed proof of the Late Byzantine Period pottery production at the capital, [20] there has yet to be found physical evidence for a kiln or workshop for White Ware production in

[19] Arthur H. S. Megaw and R. E. Jones, ‘Byzantine and Allied Pottery: A Contribution by Chemical Analysis to Problems of Origin and Distribution’, *The Annual of the British School at Athens* 78 (1983): 256–58, Table 4.
[20] S. Yona Waksman, ‘The First Workshop of Byzantine Ceramics Discovered in Constantinople/Istanbul: Chemical Characterization and Preliminary Typological Study’, in *Atti del IX Congresso Internationale sulla Ceramica Medievale nel Mediterraneo, Venezia, 23–27 novembre 2009*, ed. Sauro Gelichi, (Firenze, 2012), 147; S. Yona Waksman and Çiğdem Girgin, ‘Les Vestiges de Production de Céramiques Des Fouilles de Sirkeci (Istanbul). Premiers Éléments de Caractérisation’, *Anatolia Antiqua. Eski Anadolu* 16, no. 1 (2008): 443–69.

Constantinople/Istanbul. However, the latest evidence from Vezneciler,[21] where a structure was discovered with kiln bars which are chemically associated with GWW, illustrates that the clay is potentially the key for further studies. Therefore, the raw clay analysis of Istanbul is not only important to understand the raw material of the CGWW pottery, but it also associates this pottery group with the white-bodied pottery production at the capital.

The archaeometric analysis in Chapter three is not limited by the fabric or the raw clay analysis. The chemical microanalysis of the glaze, which was conducted by scanning electron microscope coupled with energy-dispersive X-ray spectroscopy (SEM-EDS), seeks to define further the characteristic features of the glaze of White Ware pottery by focusing on the following questions: What are the glaze composition and the colouring agents of the **PAR** batch and what kind of glaze is applied on the samples? In general, the form of the glaze, colourants and the detected lead-alkali and high lead glazes are compatible with the previous analyses. However, an exclusive outcome of this analysis is the revelation of chalcophile elements,[22] tin (Sn), sulphur (S) and arsenic (As), which are likely to be opacifying agents. Excluding a glaze sample (GWW I) which includes small crystals of tin oxide,[23] these elements have never been noted in the previous works on GWW. The idea that "tin-opacified glazes were not used in Byzantine ceramics,"[24] perhaps rested on the fact that such elements have never been previously discovered. Though samples are too few to be certain, the

[21] S. Yona Waksman, 'The First Workshop of Byzantine Ceramics Discovered in Constantinople/Istanbul: Chemical Characterization and Preliminary Typological Study', 2012, 66.
[22] The Chalcophile (copper loving in Greek), was first classified by Goldschmidt in 1923, includes transition elements, heavy metals and metalloids. See Francis Albarede, 'Chalcophile Elements', in *Encyclopedia of Astrobiology*, ed. Muriel Gargaud et al. (Berlin: Heidelberg, Springer, 2011), 283, https://doi.org/10.1007/978-3-642-11274-4_261.
[23] S. Yona Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', in *Archaeometric and Archaeological Approaches to Ceramics, Papers presented at EMAC'05, 8th European Meeting on Ancient Ceramics, Lyon 2005,* ed. S. Y. Waksman, BAR International Series 1691, (Oxford: Archaeopress, 2007), 132.
[24] Pamela Armstrong, 'The Earliest Glazed Ceramics in Constantinople: A Regional or International Phenomenon?', *Journal of Archaeological Science: Reports* 29 (1 February 2020): 1, https://doi.org/10.1016/j.jasrep.2019.102078.

existence of the above three unusual elements in the glaze may suggest that Byzantine potters were trying different glaze recipes of the Islamic lands, or more broadly of the East. Sadly, the result that I discussed in Chapter three is limited; however, this anomaly poses a specific question that future studies will hopefully further clarify: had Byzantine artisans been equally inspired by the glaze technology of Islamic Ceramics as they were by the decorative features, such as motifs, designs and styles?

The above question points to the potential of the material analysis which can disclose the link between the glaze technology and the style of glaze painting in Byzantium and the East. For instance, PAR 20 (see Table 1) which bears a trichromatic painting (green, blue and dark brown) is one of the samples in which tin (Sn) was revealed. Noteworthy is the resemblance in the use of the glaze painting with some contemporaneous wares in the East, such as polychrome Splash Ware. Besides the stylistic commonality in the decoration, the more intriguing detail about these eastern provenanced wares is that their glazes also contain usually the same elements. Furthermore, the use of sulphur or arsenic to obtain a shiny gold colour in Lustre Ware[25] corresponds to the shiny-orange or slightly darker brown glazed samples (PAR 17-18, 26) of GWW III which contain sulphur and arsenic sulphide do not seem coincidental. More sampling is necessary; however, it can be said that these samples are first direct evidence for the influence of Islamic glaze technology in Byzantine Ceramics. Therefore, **PAR** batch is of high importance since it increases the number of “atypical features” in the glaze of Byzantine White Ware by including examples which contain arsenic, sulphur and tin. Starting here, the discussion of this anomaly will help to enlighten if tin-opacified lead glaze and/or sulphur and arsenic sulphide were used in the CGWW pottery.

[25] Trinitat Pradell et al., ‘Composition of the Lustre Pigment Used in the Production of 13th Century AD Raqqa Lustreware from Syria’, *Archaeometry* 58, no. 6 (2016): 983–85, https://doi.org/10.1111/arcm.12211.

Secondly, the specimen can be used in the further investigations of the eastern influence on both material and decorative similarities.

On the Art Historians' side, a direct influence of the Islamic Ceramics is still disputed. Considering Polychrome Ware, A. Grabar attributes the motifs to a Sasanian origin which was contemporaneous of the Iranian repertoire and was transferred to Byzantine Ceramics through textiles, notably luxury silks, in the tenth and eleventh centuries.[26] V. François agrees with Grabar and states that the adoption of Sasanian prototype in Macedonian art in the Middle Byzantine Period can be seen as a revival of the Constantinopolitan ornamental repertoire from the sixth century. Therefore, François adds, the iconography of Polychrome Painted Decoration refers to an ancient Byzantine version of the Sassanid prototype rather than Iranian adaptation.[27] However, the new art historical approach that I used in Chapter four revealed that there still are clues in the designs, styles and also themes of Polychrome Painted Decoration which may be considered as Iranian adaptations (see Discussion).

The parallels in the decoration between Byzantine and Islamic ceramics are more well-defined for redware, namely Sgraffito with its classes and Green and Brown Painted, by Talbot-Rice and C. Morgan.[28] These scholars were the precursors of the later scholars using the art historical approach in Byzantine ceramics. Regarding CGWW pottery, it seems that the Polychrome Decoration attracted their attention the most by far. Perhaps this is because this decorative class includes a "deluxe decorated pottery," as it is called by Sanders.[29] Nevertheless, the provided information about the decorative components of the pottery and its

[26] André Grabar, 'Recherches Sur Les Influences Orientales Dans l'art Balkanique', *Société d'édition: Les Belles lettres*, Paris, 1928, 10–50.
[27] François, 'La vaisselle de table à Byzance'.
[28] David Talbot-Rice, *Byzantine Glazed Pottery* (Oxford: Clarendon Press, 1930), 60–73; Charles Hill Morgan, *The Byzantine Pottery*, vol. 11 (The American School of Classical Studies at Athens, 1942), 168–71.
[29] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 308.

interactive elements in Byzantine and the eastern ceramics, which are initially defined by Talbot-Rice and approved by Morgan, is not satisfyingly established.

Talbot-Rice states that, in relation to polychrome tiles, the designs of the vessels are of the Hellenistic origin, but, in an eastern character which is particular to Persian and Mesopotamian art.[30] For the motifs, human figures follow the rule of Byzantine iconography; the animals are Oriental type; the geometric forms are Hellenistic;[31] Kufic-scripts are Islamic.[32] According to Talbot-Rice, the polychrome class was the only group worth exploring. For the rest, he said, "other types are usually either so simple that it is useless to attempt to trace their origins or they are of a nature that serves to distinguish a group, but which has no more than a purely colouristic or decorative appeal and which is based on no actual scheme of design."[33] Beyond question, Talbot-Rice's mindset caused a misinterpretation of the decoration in other classes by underestimating their potential to make a valuable contribution to the narration of the CGWW pottery. Thanks to the new findings from excavations and especially the repaired vessels at museums, it is demonstrable that other classes of this pottery group are noteworthy, as opposed to Talbot-Rice's idea. The more the complete vessels, the better we can observe the variations in motifs, designs and styles which are the main components of the decoration. To redress this misunderstanding, a re-evaluation of the CGWW decoration that I did in Chapter four was inevitable.

The result may confound some scholars who are inclined to think as Talbot-Rice did. Nevertheless, with the new perspective brought to the ornamentation, it is demonstrated that this pottery group means more than what has previously been interpreted. Therefore, by

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[30] Talbot-Rice, *Byzantine Glazed Pottery*, 60.
[31] David Talbot-Rice, *Byzantine Art* (UK: Penguin Books Ltd, 1968), 508.
[32] Talbot-Rice, *Byzantine Glazed Pottery*, 61, 73.
[33] Ibid., 60.

focusing on three focal points, ornamental classification, the theme of the decorative repertoire and the history of decoration, a more versatile art historical approach is applied in chapter four to reveal the artistic repertoire of Byzantine White Wares as a whole. But the most important discovery is that CGWW decoration is not only an achievement in the craftsmanship in the Byzantine Ceramic Art, but it also is a visual transmitter of the sociocultural panorama of the Middle Byzantine Period. To enlighten this point further, the art historical approach in Chapter four evaluates CGWW pottery in three main classes: Decorative, Thematic and Historical. Each of these classes centres on the specific question below, respectively.

- Is it achievable to build a more comprehensible decorative classification of Constantinopolitan Glazed White Ware pottery?
- What themes do the motifs, styles and designs create and what is the origin of those components?
- What are the changes in the artistic scale of the decoration over six-hundred years from the late seventh to the late thirteenth century?

By re-organising the earlier decorative classes in chapter four (part one), a wider and more comprehensible categorisation of the CGWW is achieved. To minimise the overlapping in the classes and to disclose more about the ornamental features, this chapter evaluates the decorative painting and decorative technique, separately. For the former, this approach enables arrangement of the ornamental classes according to the number of colours which are applied to the surfaces, such as monochrome, bichrome and trichrome (together) and polychrome. For the latter, it facilitates thorough definition of the tool-made decoration by allowing the tracking of variation in the historical periods. One of the major contributions of this approach is to separate some examples which were once mistakenly grouped, and to re-evaluate them in a newly established class: Splash Decoration. The reason for this approach is the discovery of a different style of painting which relates to the aforementioned technological relevance in the glaze referring to the eastern influence. As a result, the art historical approach used in chapter four produced a neater decorative classification which allows one to easily follow the colour schemes from monochrome to polychrome, and styles and motifs which were expressed with an orderly pattern chosen by the potters.

The above methodology reduces the effect of the confounding variables, such as fabrics, forms and chronology by excluding them in building the ornamental classification. However, it allows only the making of a plain catalogue of CGWW pottery. This pottery group needs to be explored further in its historical context to be able to re-write the history of the decoration. To follow the change and evolution in the decorative designs from the seventh to the thirteenth centuries, the above defined “confounding variables” should also be considered to fully understand if there is a simultaneous correspondence between the material and the ornamentation. Therefore, chapter four (part three) uses the archaeological material and the well-established historical sequences of the primary excavations, such as the Great Palace and Saraçhane. To assess the CGWW pottery historically, the applied chronological order divides the pottery into three groups: Early-Glazed White Ware Decoration (7^{th}-9^{th} c.), Middle-Glazed White Ware Decoration (9^{th}-11^{th} c.) and Late-Glazed White Ware Decoration ($11^{th-}13^{th}$ c.). The main principal in the division of these sequential steps is several changes which occur materially (fabric and glaze) and ornamentally (design and style). These criteria grant a clear observation of the pottery in order to achieve a broader interpretation of the history of CGWW decoration.

Chapter five presents the discussion of the results of the material analysis and revaluation of the decoration with the applied interdisciplinary approach which is outlined above. This chapter compares the achieved results with the previous studies. Chapter six concludes the re-evaluation of Byzantine White Ware pottery and supplies considerations for future works. Equal focus on both the material and the ornamentation provided new discoveries that allow deeper understanding of CGWW pottery. By establishing a more comprehensive classification of White Wares, a template is created for use in future research which hopefully will reveal more about the ornamentation by adding further information this template lacks.

Following the substantive chapters, Volume II comprises the related tables, figures and a catalogue of published and unpublished examples of the CGWW pottery (in **Plates)**. The appendices are designed to add visuals of what Volume I addressed; therefore, it supplies more media of both the pottery and other pieces of material culture. Last but not least, a database has been designed around the information extracted particularly from Corinth and Kalenderhane to produce a catalogue in furtherance of the future analytical works about CGWW. Vessels from these two sites are stratigraphically well-defined and include all groups which supply more than enough samples to examine. The database (Appendix 7) involves a tabulation which contains 16 values, including provincial and bibliographic identity, to identify ceramics and to use for benchmarking them. The database allows design five main criteria: quantity, typology, fabric groups, ornamentation, and date, and archaeological context. While the **Number** and **Sherd** estimate the quantity of excavation finds, **Rim/Base Diameters**, **Type** and **Form** define the similarly accessible matrices in typological features**.** **Fabric** and **Inclusions** are combined with the definitions of the former works to organise the previous fabric groups. **Slip**, **Decoration**, **Design**, **Glaze Interior/Exterior** are means of ornamental attributions that exhibit differentiations or similarities in surface treatments aiming and shed light on the stylistic matter of the trends of over the centuries. **Date** and **Archaeological Context** indicate secure dates, which are coin-associated shreds of evidence relating to where ceramics were found in order to stratigraphically compare them with a related sequence of the White Wares of Constantinople.

1.1.1 The primary classifications of Constantinopolitan Glazed White Ware

White Ware studies have advanced parallel with the rising interest resulting in scholarly works in Byzantine Glazed Pottery which go back earlier than the systematic excavations launched in Istanbul. However, these works are regarded as insufficient since they comprise the decontextualised ceramics which were abundant and easy to access at that time. As mentioned by Böhlendorf -Arslan, Byzantine Archaeology was a neglected branch of Classical Archaeology in the 18th and 19th century and, therefore, the finds dating after the Late Antiquity were usually counted as modern.[34] This approach resulted in losing stratigraphical evidence in the context of the related period. As a consequence, the efforts to define the pottery were made according to the so-called *Art Historical* approach, which focused on the interpretation of the material culture by classifying findings according to their surface treatments. For instance, the very first art historical assessment of the Byzantine Glazed Pottery, including White Wares, was made by Wladimir De Bock on the ceramic finds of Crimea which were kept at the Hermitage Museum in 1895.[35] With the instability created by World War I, the first two decades of the 20th century saw the same approach to the pottery

[34] Böhlendorf-Arslan, *Glasierte Byzantinische Keramik Aus Der Türkei*, 315.
[35] Wladimir De Bock, 'Poteries Vernissées Du Caucase et de La Crimée', in *Bulletin et Mémories de La Société Nationale Des Antiquaires de France*, *Sixiéme Série*, *Tome Sixiéme, Mémories 1895* (Paris: Soc. Nat. des antiq. de France, 1897), 193–254.

in Constantinople as well. Henry Wallis,[36] Jean Ebersolt[37] and Oskar Wulff[38] evaluated the ceramic finds of the capital which were found and kept at places, such as Botanical Garden, Haydarpaşa, Sirkeci Post Office, the Imperial Ottoman Museum and the Kaiser Friedrich Museum. Though these scholars' works may seem insubstantial, they are the first documentation of these ceramics to formalise the initial categorisation of the Byzantine Glazed Pottery.

1.1.1.1 Hippodrome, David Talbot-Rice

The Art Historical approach to Byzantine ceramics continued to influence scholars at the beginning of the systematic excavations in Istanbul. In 1927-28 excavation campaigns were undertaken at Hippodrome on behalf of the British Academy with which a more systematic manner of art historical approach was initiated. The preliminary and secondary reports published in 1928 and 1929 created a pattern for the later works, which not only reflects upon layers but also on the finds. The recovered pottery in the first report was divided into three groups: (I.) Red Wares, (II. A-D) White Wares and (III. A) Painted Wares.[39] Later, this established classification was extended with sub-divisions focusing on the decoration by David Talbot-Rice in the second report.[40] This categorisation that Talbot-Rice built at

[36] Henry Wallis, *Byzantine Ceramic Art: Notes on Examples of Byzantine Pottery Recently Found at Constantinople with Illustrations* (London: B. Quaritch, 1907).
[37] Jean Ebersolt, *Catalogue Des Poteries Byzantines et Anatoliennes Du Musée de Constantinople* (Typo-lithographie A. Ihaan, 1910).
[38] Oskar K. Wulff and Wolfgang F. Volbach, 'Byzantinische Keramik. Glasierte Gefäßscherben mit Reliefverzierung', in *Die Altchristlichen Und Mittelalterlichen Byzantinischen Und Italienischen Bildwerke* (Berlin and Leipzig: Walter de Gruyter, 1923).
[39] Stanley Casson et al., 'Preliminary Report upon the Excavations Carried out in the Hippodrome of Constantinople in 1927' (British Academy, 1928), 30–39.
[40] David Talbot-Rice et al., 'Second Report Upon the Excavations Carried Out in and Near the Hippodrome of Constantinople in 1928: On Behalf of the British Academy' (British Academy, 1929), 110–13.

Hippodrome is the basis of his well-known Byzantine Pottery classification which takes its final form later in *Byzantine Glazed Pottery*, published in 1930.[41]

Class A: Faience	Class B: Earthenware
A1. Polychrome Ware	B4. White Painted Ware
A2. Petal Ware	
A3. Plain Glazed Ware	
A4. White Inscribed Ware	
A5. White Ware, Impressed Design	
A6. Models	
A7. Pottery Icons	

Table I. White Ware classification by D. Talbot-Rice, Byzantine Glazed Pottery, 1930.

1.1.1.2 Corinth, Charles H. Morgan

More than a decade after Talbot-Rice's work, in 1942, Charles H. Morgan appeared to favour implementing the art historical methodology with the Byzantine pottery finds unearthed at Corinth excavations, initiated by American School of Classical Studies at Athens starting in 1896. In the book, *The Byzantine Pottery,* he prioritised the ornamentation describing the decorative features first, then the fabric and the typology of the form and lastly the

[41] Talbot-Rice, *Byzantine Glazed Pottery*, 9–31.

chronology.[42] Morgan did not make use of Talbot-Rice's classification at the Hippodrome to categorise Byzantine pottery at Corinth. Instead, he adapted a more convenient categorisation to include the regional wares as well and combined the system developed by Dawkins and Droop at Sparta and by Frantz at Athenian Agora.[43] Although his work still has value considering the approach to follow the tradition between Medieval pottery and modern ceramic production in Greece, the chronology and the typology that he built are not applicable today. While Morgan's mistaken chronology was revised by Guy Sanders after fifty years, the typology of forms did not circulate for long. Five years later, a work with a new approach would eliminate Morgan's classification and take all attention to the ceramic finds of the imperial Byzantine palace.

Plain	Painted	Sgraffito
Impressed	Polychrome I-IV	Inscribed
Petal	Green and Brown	
Undecorated I-II	Spatter Painted	
	Red Painted	
	Blue Painted	

Table II. White Ware classification at Corinth by C. Morgan, 1942.

1.1.1.3 the Great Palace, Robert B. K. Stevenson

In 1947, the first archaeological approach on White Ware pottery was introduced by Robert B. K. Stevenson. The first volume of a published book, *The Great Palace of the Byzantine*

[42] Morgan, *The Byzantine Pottery*, 26–35.
[43] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 17–18.

Emperors, covered the results of 1936-37 excavations at the Great Palace in Istanbul, carried out on behalf of the Walter Trust, the University of St. Andrews. In Chapter II, *The Pottery*,[44] Stevenson implemented an analytical method in the categorisation with a purely archaeological perspective that is opposed to the Art Historians. As Stevenson states he aimed to make a basis for a closer chronological division of 7,000 ceramic sherds of the glazed pottery of the 1936-7 excavation seasons. Stevenson's work on several deposits of the Great Palace combines Talbot-Rice's alphanumeric categorisation with Stevenson's own numerical system to either distinguish the fabric or the decoration of White Wares. Stevenson evaluates these pottery assemblages which are correlated to six "stages" dating from the Late Roman period through the 13th century. By the help of coin-associated evidence, Stevenson dates White Wares to either the early or the late period of a dynastical time span. It begins with early Isaurian and late Isaurian; early and late Macedonian; and early and late Comnene. Stevenson placed attention more on the fabric in order to differentiate it in Stages, and this became the focus of the archaeological approach which would frame the later works in White Ware studies.

A Series	B Series (white bodied B Series)
Stage I and II	**Stage Va**
A 0/2 Petal Ware	B 4a White Painted Ware
A 0/4 Incised Decoration	B 4b
A 0/5 Impressed Design	B 4c

[44] Robert B. K. Stevenson, 'Chapter II, The Pottery 1936-37', in *The Great Palace of the Byzantine Emperors: Being a First Report on the Excavations Carried out in Istanbul on Behalf of the Walker Trust (the University of St. Andrews) 1935-1938* (Oxford University Press, 1947).

Stage III	**Stage Vb**
A 2 Petal Ware	B 4a White Painted Ware
A 3 Simple Glazed Ware	
A 3/5 Impressed Design	
Stage IV	
A 1 Polychrome Ware	
A 2b Red-Brown Painted Ware	
A 3/4 Incised Ware	
A 3/5 Impressed Design	
Stage Va	
A 1 Polychrome Ware	
A 3b Simple Ware	

Table III. White Ware classification at the Great Palace by R. Stevenson, 1947.

1.1.1.4 St. Irene, Urs Peschlow

Byzantinische Keramik aus Istanbul. Ein Fundkomplex bei der Irenenkirche, by U. Peschlow, is the published work of the church of St. Irene excavations which yielded a considerable number of White Wares in a deposit which is dated to the ninth and the tenth centuries.[45] Peschlow does not initially use Stevenson's classification; instead, he combines the

[45] Urs Peschlow, 'Byzantinische Keramik Aus Istanbul: Ein Fundkomplex Bei Der Irenenkirche', *Istanbuler Mitteilungen* 27/28 (1977/78): 375–77.

categorisation systems of Talbot-Rice's at the Hippodrome, Stevenson's at the Great Palace and Frantz's at the Athenian Agora. As the dating deposit included intrusive pottery, Hayes neither used the Glazed White Ware pottery of St. Irene as the primary dating evidence nor classification of Peschlow. Instead, he built a purely archaeological classification which was based on the fabric specifications of Glazed White Wares, GWW I-V, at the St. Polyeuktos Church excavations at Saraçhane.

Plain Glazed Ware
Impressed and Unimpressed Glazed Ware
Incised Ware
Petal Ware
Plastic Ware
Turquoise Glazed Ware

Table IV. White Ware classification at St. Irene by U. Peschlow, 1977/78.

1.1.1.5 Saraçhane, John Hayes

This new classification based on the fabric and its relationship with the stratigraphy would be implemented in another excavation taking place between 1965 and 1969 at Saraçhane, Istanbul. The results of the Saraçhane Camii excavations under the direction of Dumbarton Oaks were published in two volumes. The second volume, *Pottery*, written by John Hayes and published in 1992,[46] covers ceramics and also glasses dating from Late Roman to Ottoman

[46] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.'

Period. Hayes evaluates almost one hundred layers and catalogues the dumped fill deposits in 62 groups dating before and after the construction of Hagios Polyeuktos built by Anicia Juliana between 524 and 527 CE. The number of White Ware unearthed at Saraçhane is immense, about 20,000 sherds.[47] Hayes categorises the Glazed White Wares into five classes, GWW I-V, and he separates Polychrome Wares (see more in the critique of John Hayes White Ware classification).[48] His categorisation of White Wares is based on fabrics, and unlike the previous scholars Hayes does not pay attention to the decoration. However, he divides Polychrome pottery into three classes according to their decorative attributions. Hayes's conventional White Ware classification began influencing other works right after it was built, and it is still in use.

Glazed White Wares	Polychrome Ware
Glazed White Ware I	Class 1
Glazed White Ware II	Class 2
Glazed White Ware III	Class 3
Glazed White Ware IV	
Glazed White Ware V	

Table V. White Ware classification at Saraçhane by J. Hayes, 1992.

[47] Ibid., 12.
[48] Ibid., 12–37.

1.1.1.6 Corinth, Guy D. R. Sanders

Guy Sanders is another scholar who employs a fabric-based categorisation to White Wares and, yet Sanders's Ph.D. thesis[49] includes more stylistic and chronological data on the pottery sherds which were revealed at the Corinth excavations. His work includes reassessment of the glazed pottery which was once evaluated by Morgan and also subsequent Byzantine pottery assemblages which are dated up to c. 1125 CE. Sanders defines four fabric groups of White Wares, based on the difference in colour, texture, inclusion and voids. He also categorises the surface treatment of these wares, and the decoration is mainly divided into four which also have sub-divisions.[50] Sanders's evaluation of the Polychrome Pottery is a comprehensive work with a logical chronological order and a proper classification based on an art historical approach.

White Wares	
Fabric	Decoration
Fabric 1	D. Glazed Decoration
Fabric 2	D1. Plain glazed
Fabric 3	D2. Polychrome Glazed (Group 1-4)
Fabric 4	E. Plastic Decoration
	E1. Petal Ware
	E2. Slip Painted
	E3. Slipped

[49] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125'.
[50] Ibid., 58–59 and 70-77.

	E4. Appliqué
	E5. Figural Relief
	F. Incised Decoration
	F1. Cut
	F2. Incised
	G. Relief Decoration

Table VI. White Ware classification at Corinth by G. Sanders, 1995.

1.1.1.7 Kalenderhane, Herrin and Ayyüz S. Toydemir

In 2007, another categorisation of White Wares was made for the pottery assemblages of Kalenderhane Camii, Istanbul. The Pottery in Volume 2,[51] written by J. Herrin and A. S. Toydemir initially divides Byzantine pottery into two groups: White Wares and Red Wares. Regarding the fabric and the glaze application, White Wares are also divided into three groups: Glazed White Wares I-IV, Unglazed White Wares I-IV and Coarse/Gritty White Wares. Further categorisation of White Wares is made based on the decoration. What makes the Kalenderhane findings important is the inclusion of the classes called Glazed White Ware of Latin Date. This group allows us to follow the examples of White Wares circulating during the Fourth Crusade (1202-1204) in Constantinople, which is scarcely represented in Saraçhane.

[51] Judith Herrin and Ayyüz Sabuncu, '2. Byzantine Pottery', in *Kalenderhane in Istanbul: Final Reports on the Archaeological Exploration and Restoration at Kalenderhane Camii 1966–1978, Vol. 2 The Excavations,* ed. Cecil L. Striker and Y. D. Kuban (Mainz: P. von Zabern, 2007).

White Wares
Glazed White Wares I-IV
Impressed White Ware
Speckle-Glazed White Ware
Red-Brown Painted White Ware
Incised Red-Brown Painted White Ware
Incised with Green Glaze
Polychrome White Ware
Glazed White Ware of Latin Date
Purple and Green Painted White Ware
Unglazed White I-IV
Coarse/Gritty White Ware

Table VII. White Ware classification at Kalenderhane Camii, by J. Herrin and A.S. Toydemir, 2007.

1.1.1.8 Küçükyalı, Elif Demirtiken

Current excavations in Istanbul have not only been yielding more White Ware findings, but they also give rise to more categorisations. For instance, Küçükyalı, which is located on the Asian bank of Istanbul, has produced two Master’s Theses which have suggested two different categorisations of White Wares. The first classification, by Demirtiken,[52] focuses on Byzantine glazed pottery which was found at a single findspot, so-called small/sealed chamber. Demirtiken divides White Ware pottery focusing on the surface treatments of the sherds.

White Wares
Plain Glazed White Ware
Multi-color White Ware
Slip Painted White Ware
Green Glazed White Ware

Table VIII. White Ware classification at the Küçükyalı, by E. Demirtiken, 2012.

1.1.1.9 Küçükyalı, Rick Wohmann

The second classification at Küçükyalı, by Wohmann, comprises the whole site's tableware and amphorae.[53] Wohmann's White Ware classification resembles the typo-chronology which was used by Hayes and Sanders. He groups the glazed examples, Glazed White Ware I-V, and separates Polychrome Ware and also includes Unglazed White Ware. Unlike Hayes, Wohmann subordinates Glazed White Ware I and Early Plain Glazed Red Ware (Hayes's Coarse Glazed Ware) by pointing out the difficulty of distinguishing the fabrics of these two types. Wohmann's assessment derives from the result of the revision of the Saraçhane finds

[52] Elif Demirtiken, 'Interpreting a Small Chamber Context from Byzantine Küçükyalı, Its Chronology and Function through Its Glazed Ceramic Assemblage', MRes diss., (Istanbul, Koç University, 2012).
[53] Rick Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul), A Ceramic Assemblage from the Asian Hinterland of Constantinople (4th-14th Centuries CE)', MRes diss., (Istanbul, Koç University, 2015).

by Böhlendorf-Arslan. Wohmann's approach to Hayes's GWW I points to one of the issues that are addressed in this thesis (see the critique of John Hayes's White Ware classification), to highlight the fact that Hayes's classification is not always clear-cut.

200 Lead-Glazed Earthenware	
(220) Glazed ware in a white or pink fabric	(310) Unglazed White Ware
(221) Plain Glazed White Ware	(311) Unglazed White Ware I
(221.1) Glazed White Ware I / (231.1) Early Plain Glazed Red Ware	(312) Unglazed White Ware II
(221.2) Glazed White Ware II	(313) Unglazed White Ware III
(221.3) Glazed White Ware III	(314) Unglazed White Ware IV
(221.4) Glazed White Ware IV	(315) Unglazed White Ware V
(221.5) Glazed White Ware V	
(222) Polychrome Glazed White Ware	

Table IX. White Ware classification at the Küçükyalı, by R. Wohmann, 2015.

1.2 Conclusion

The basis of art historical classification was built in the early twentieth century, and more classes of this pottery group began to be revealed with the first systematic excavation at Hippodrome in Istanbul, in 1927. Until 1947 when R. Stevenson built the first archaeological categorisation, difference in ornamentation was the determiner of the different classes of CGWW pottery and was used by D. Talbot-Rice at Hippodrome and C. Morgan at Corinth excavations. By Stevenson's methodological shift from art historical to archaeological at the Great Palace excavations, the chronology of this pottery group was re-defined by a stratigraphically established classification. However, Stevenson made the same mistake that Talbot-Rice did by including some groups of White Ware in the earthenware category. Later, John Hayes corrected this by gathering all decorative classes of White Ware under the Glazed White Ware I-V and Polychrome Ware.

The Byzantine White Ware categorisations at the Küçükyalı are important to illustrate how researchers still choose different paths even when working on the same material at the same site. This is, perhaps, related to the quantity and the variety of finds which allow researchers to make either a narrow or a broad categorisation. But beyond the chosen methodology of Demirtiken and Wohmann's White Ware categorisations (art historical and archaeological, respectively), this also points to a lack of a complete categorisation which can be used as a template for all finds. The White Ware classifications, so far, are likely individual works which focus on a limited finding of a single site. As a result, a substantial, and also a more convenient categorisation of White Ware pottery, has yet to be made. Nevertheless, this thesis builds a new suggested categorisation for CGWW which is the outcome of combined art historical and archaeological approaches and which can be easily used at any site.

1.3 Methodology

1.3.1 The Scope, Research Problem and Objectives

This study focuses only on the tableware of Byzantine Glazed White Wares. The polychrome revetment tiles and icons which were manufactured in Constantinople and Bulgaria (Patlenia and Preslav) are excluded to avoid repetition. To explore more about the white-clayed tiles and icons of Constantinople, the author recommends a beautifully written book edited by Sharon Gerstel and Julie Lauffenburger: *A Lost Art Rediscovered, The Architectural Ceramics of Byzantium*. The book includes a catalogue comprising almost every piece of tile which was unearthed at Constantinople and which today is kept in the Istanbul Archaeological Museums and many other overseas Museums and private collections. This work also includes several articles devoted to the technical features of the material and also the decorative attributions of the tiles and icons. For Bulgarian counterparts, the book titled *The Ceramic Icon in Medieval Bulgaria*, by Totyu Totev, covers a fine catalogue of the icons and the valuable information about the monastery complex where the icons were revealed intact.

The re-examination of the CGWW reveals valuable insight into the pottery production and consumption of the Middle Byzantine Period. The aforementioned extensive trade link between the capital and the other sites in Europe, Thrace and the Crimea not only maintains the incontestable fact in the distribution of tableware but also allows evaluation of the characteristic features of CGWW from outside of the capital. The objective of re-analysing studied examples is to create a comprehensive treatment to get a better understanding the pottery technology and also the tradition in decorative treatments of the capital’s workshops for about six-hundred years. Hence, an interdisciplinary approach combining two disciplines, archaeology and art history, shall enlighten all features of CGWW pottery.

One of the problems which this thesis addresses is the earlier fabric classifications. The fabric classification is a very first step when a ceramicist builds a category up to identify the colour of the fabric/biscuit either by eye or more securely by using soil colour charts. A categorisation based on either method is indeed more useful if the sherds show a diverse colour scale; however, to rely on these methods in the case of Byzantine White Wares to create fabric groups seems questionable since the raw material is kaolinitic clay.

Clay is a primary raw material for pottery production, and it can be in various colours which are defined by non-clay components of clays. For instance, kaolinitic clay is white because of a lack of organic materials and iron, while other clays seem grey, green or even black due to the presence of rich organic matter.[54] The initial colour of the raw clay is first determiner of the final colour of the fabric and then the firing. An experiment, which was done by myself, on two possible clay sources of White Wares demonstrates the effect of the initial colour and the firing on the fabric (see Appendix 3). The firing experiment includes two samples of two powdered clays (Şile and Ömerli) which were also examined chemically and mineralogically by XRF and XRD (see below). The both samples were fired together under the same firing condition, neutral atmosphere, up to 900°C to observe the change in the colour. The result shows that the colour of the raw material affects the final colour as much as the firing degree.

The colour change in fabrics not only depends on the colour of the raw material and the firing degree, but also oxidisation and reduction in the atmosphere affect the colour of the final product. The resulting character of the fabric is determined by the mineral impurity content of the white clay as well as the various colours and the difference in textures together with nonhomogeneous particles. Therefore, it makes it difficult to build a reliable fabric categorisation by an eye inspection of the archaeological samples. In addition, there are instances that show the kaolinitic clay bears difficulties in classifying the fabric colours with the help of soil colour charts, such as Munsell Soil Color Chart.

[54] Evangelia Kiriatzi and Ruth Siddall, 'An Introduction to Ceramic Petrology, Notes and Bibliography to Support a Course Taught at the British School at Athens, Part 2: Petrology Applications to Ceramic Studies' (Athens, 2019), 6.

Although Hayes does not use the Munsell Soil Color Chart, a good example from Corinth excavations illustrates the bias of researchers even when using the same colour catalogue. Sanders, for some fabric groups of White Ware, consults the chart twice to show the colour differences in core and mantle of sherds. Either he may not have been satisfied by Hayes's "plain" fabric colour and particle descriptions, or else Sanders intended to provide more detail for his research. Not surprisingly, the way Sanders describes the fabrics is richer than Hayes and, likewise, Sanders is accurate if his definitions are compared with the petrofabric groups of H. White. His soil colour references from Munsell are sorted by white, pinkish-white, pink and pale brown, 5 YR, 7.5 YR, 10 YR.

On the other hand, H. White's use of the Munsell Soil Color Chart in her archaeological sample catalogue is wider than Sanders and ranges from 2.5 Y&YR, 5 Y&YR, 7.5 YR, and 10 YR.[55] My argument in this comparison is that a classification which is based on the colour difference of the fabric (of the same source of clay) is misleading and is not always a dependable norm in White Ware studies. Perhaps, the firing experiment which is mentioned above supports my argument by demonstrating it visually. Nevertheless, if it is a must, the fabric categorisation of White Ware must be done by a more objective way.

For instance, archaeoceramology comprises analytical studies, such as chemical, mineralogical and petrographic compositions of ceramics, besides the technological and functional analyses of them.[56] To specify the structural and the chemical compositions of ancient ceramics by microanalysis has great importance, from dating and identifying the

[55] Harriet White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries' PhD diss. (University of Sheffield, 2009), Vol. 2, 284–85.
[56] Małgorzata Daszkiewicz, 'Ancient Pottery in the Laboratory: Principles of Archaeoceramological Investigations of Provenance and Technology', *Novensia* 25 (2014): 177.

authentication of the objects to determining the measures of conservation and preservation.[57] Attention is given to the mineralogical, chemical and structural features of the material not only casts light on the provenance of the raw material of ceramics, but also reveals the technological process in regards to production of pottery.[58]

Regarding the previous laboratory studies on White Wares, allocated information of the chemical and physical properties helps to differentiate the provenance of the sherds. For instance, in 1957, Etienne Coche de la Ferté studied two polychrome tile fragments in the collection at the Louvre Museum. She concluded that pottery sherds were chemically alike and could have come from the same production centre, based on the common inclusions (quartz and iron oxide) apparent in those two sherds. Later in 1965, D. Talbot-Rice published the results of X-ray fluorescence analysis on two polychrome white ware vessels which were attributed to different workshops based on the textural differences in the fabrics. Later, in 1983, the provenance studies of White Ware were taken a step further by A. H. S. Megaw and R. E. Jones who studied Byzantine and allied pottery production and distribution.

The work showed that the high Aluminium Oxide (Al_2O_3) low Iron Oxide (Fe_2O_3) and Calcium Oxide (CaO) are common chemical compounds of CGWW. Relatedly, the research of the chemical analysis of the white clay from Arnavutköy on the Bosphorus undertaken by Megaw and Jones shows consistency with the chemical composition of White Ware samples unearthed both at Constantinople and Corinth excavations. So far, this is the only reference that has been made for the raw clay of Byzantine White Ware pottery.

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[57] Andrei V Oancea et al., 'Multi-Analytical Characterization of Cucuteni Pottery', *Journal of the European Ceramic Society* 37, no. 15 (2017): 5079.
[58] A Iordanidis, J Garcia-Guinea, and G Karamitrou-Mentessidi, 'Analytical Study of Ancient Pottery from the Archaeological Site of Aiani, Northern Greece', *Materials Characterization* 60, no. 4 (2009): 292.

		Al_2O_3	CaO	MgO	Fe_2O_3	TiO_2	Na_2O	MnO	CrO	NiO
Corinth	χ	>25	<1.0	0.6	3.5	1.08	0.24	0.047	0.014	0.005
	s.d	—	—	0.2	0.8	0.12	0.11	0.031	0.004	0.00
Istanbul 1		24.6	2.6	0.5	4.1	1.09	0.19	0.034	0.018	0.002
Istanbul 2		30	1.1	0.7	4.8	1.26	0.21	0.032	0.016	0.002
Istanbul 3		30	1.1	0.8	2.9	0.77	0.60	0.020	0.024	0.009
Bosphorus white clay		23.7	<0.5	0.5	5.5	0.9	<0.2	0.041	0.010	<0.001

(H. White, Vol. II, Table 3.2.1, 245)

However, based on the chemically different fabrics, later analyses on White Ware and Tiles suggested a variety of different sources. For instance, R. B. Mason and M. Mango suggest two different clay sources based on the analysis which revealed a chemical difference with a high concentration of calcium in a tile sample from the Constantine Lips and a low concentration of iron in a pottery sherd from the Ashmolean Museum.[59] Later, another archaeometric work by Lauffenburger et al., suggested two other possible sources besides Arnavutköy clay.[60] Also, they add that an analysed kaolinitic clay from Ömerli Köy (Bithynia) was eliminated from being a possible source of Polychrome Tiles because of its limestone nature.[61] Hence, Iznik is not a manufacturing centre for Glazed White Ware as François argued.[62] On the other hand, Sanders points to Beykoz and Aşağı Dudullu in Istanbul and the south shores of the Dardanelles for kaolinitic clay sources. He also relates other sources in a wider region considering manganese, lead and copper which are suggested to be

[59] Mason and Mundell, 'Glazed "Tiles of Nicomedia", in Bythinia, Constantinople and Elsewhere', 324, 328-31.
[60] Julie A Lauffenburger, Christine Vogt, and A Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', *A Lost Art Rediscovered. The Architectural Ceramics of Byzantium, Pennsylvania State University Press, Baltimore*, 2001, 82.
[61] Ibid., 81.
[62] François, 'Les Ateliers de Céramique Byzantine de Nicée/Iznik et Leur Production (Xe-Début XIVe Siècle)', 1997, 417.

used as colourants and fluxes in the glaze.[63] Apart from that, Hayes also mentions a local source based on the alikeness of the fabrics of the UGWW V and Turkish Ware X (unglazed sandy-white, mid/late 17th-19th century)[64] which may be the one at Çömlekçi Bayırı in Eyüp and which seems to be related to the Tekfur Palace, and also, secondarily, the kiln with bars found at Vezneciler (see Discussion). The other potential clay beds may have been discarded by researchers considering the cost arising from the great distance between the raw material and the workshops in the Middle Byzantine Constantinople (personal communication with Guy D.R. Sanders, Corinth, March 2019). Nonetheless, unless an analysis proves otherwise, the other clay beds remain as the other possible sources. A precise answer for the material provenance can only be revealed after analysing the raw samples taken from all the kaolinitic clay deposits of Istanbul.

It should be remembered that majority of the clay sources in Istanbul are not in use today and it is almost impossible to locate the inland clay beds. The main problem about this is to track the locations of clay beds in modern Istanbul because of the anomalous urbanisation which limits any industries linked to the clay to survive. Considering the other white-clayed pottery production centres, Iznik and Kütahya, of the late Ottoman Period, it can be assumed that the kaolinitic clay sources of the modern Istanbul[65] might have lost their importance in producing tableware and also the tiles. Nevertheless, two of these sources, Şile and Ömerli, in Asian side of Istanbul have been analysed by myself to contribute the debate of provenance of the clay of White Ware pottery. The result of the analytical work on the raw clays shows consistency

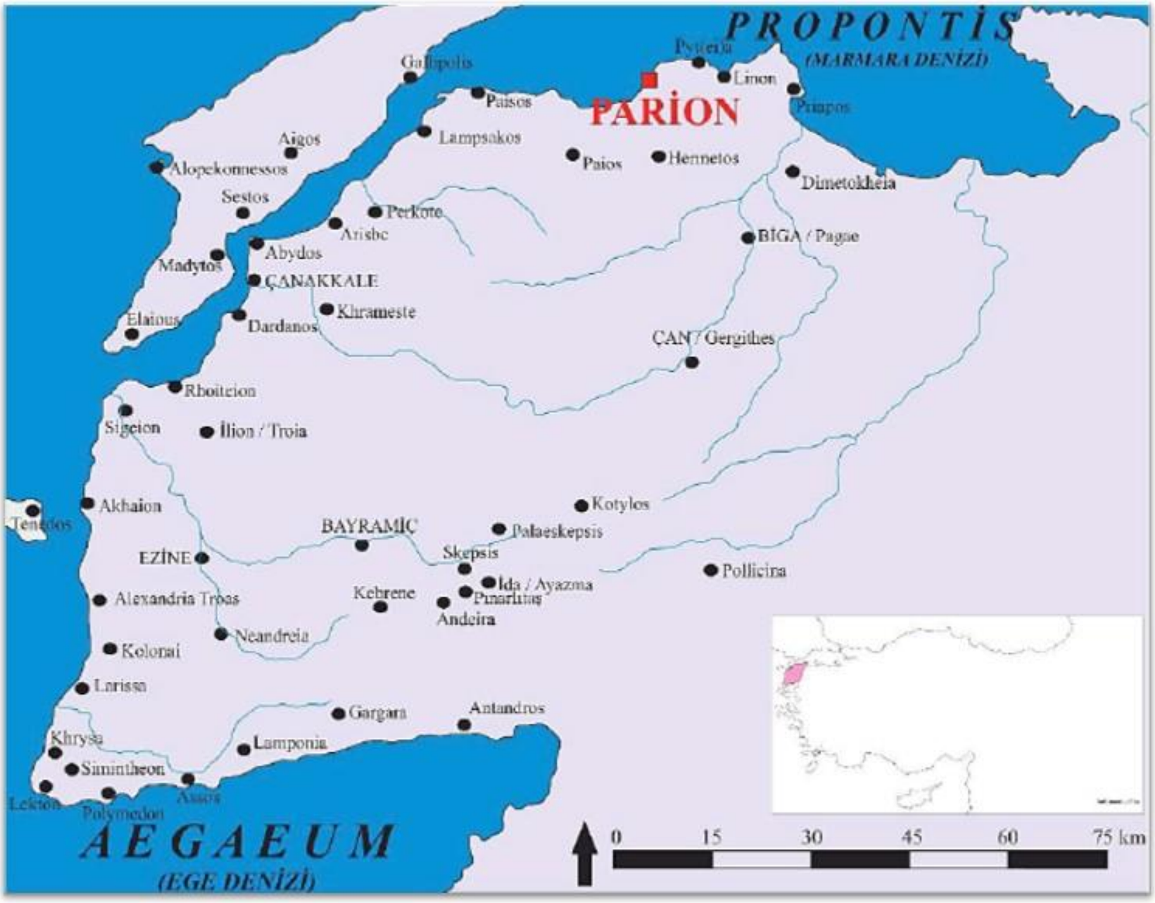
[63] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 233.
[64] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 277.
[65] Two important records of a dispute between individuals registered in the Ottoman Archives, specifically dated to 17 March 1912 and 20 November 1913, prove that the clay source at Aktopraklı, Arnavutköy district was in use under foreign entrepreneurs during this time. See Appendix 4.

with my own archaeological samples (**PAR** batch) and also similar examples mentioned in the previous scholarly works, (see Discussion).

1.3.2 The Archaeological Approach

The archaeological approach that I implemented in Chapter three uses archaeometric methods. The chapter comprises the material analysis of both the archaeological and the raw material samples. An "integrated approach" is used to determine production techniques and to provenance the raw material by focusing on the chemical composition and mineralogical properties and the structure of the ceramic body and the raw clay. It also considers the chemical composition of the glaze and the use of the colourants. To analyse the archaeological material, twenty-six pottery sherds were selected among the ceramic finds of Parion excavations conducted in the ancient site which is located in Kemer village of Biga town in Çanakkale province, Turkey. The studied samples were selected among the pottery which is kept in storages of Parion excavations and procured with the courtesy of the excavator, Prof. Vedat Keleş, and Museum of Troy. These specific ceramics of Parion are a selection of White Wares which were imported from Constantinople sometime between ninth and eleventh centuries,[66] proving the trade link, probably by sea, other than the overseas sites of the Empire. Judging by the quantity and variety in groups, Parion excavations seem to have the widest collection so far unearthed in any sites in Anatolia.

[66] Some of these examples were studied together with other Byzantine glazed ceramics unearthed at Parion. See Umut Büyüme, 'White Clay Ceramics of Parion Theater Dating From Byzantine Period', in *Roman Theater of Parion, Excavations, Architecture and Finds from 2006-2015 Campaigns*, ed. Cevat Başaran and Ertuğ Ergürer (İÇDAŞ A.Ş. Publications, 2018), 153–63; Umut Büyüme, 'Parion'un Bizans Dönemi Sırlı Seramikleri' MRes diss. (Izmir, Dokuz Eylül Üniversitesi, 2018).



(U. Büyüme, 2018. Map 1, 118)

The all-laboratory analysis was done at the ILTAM, İleri Teknoloji Uygulama ve Araştırma Merkezi (Advanced Technologies Application and Research Centre), and Pamukkale Üniversitesi Teknoloji Fakültesi Laboratuvarı (the Research Laboratory of the Faculty of Technology) Denizli, Turkey. While the laboratory analyses were done by Dr Ahmet Erdem (TG/DSC), Dr Duygu Takanoğlu Bulut (XRF and XRD) and Nilüfer Aydınlık (SEM), the interpretation of the results was made by the author.

Before exposing the archaeological specimens to the methods of the laboratory analysis, an archaeological catalogue was formed. Regardless of the decoration, the pottery sherds are divided into separate fabric groups that are based on what is visible to the naked eye in freshly chipped pieces. Later, the cross-section of the sherds was made even by a diamond saw to be able to examine the fabrics under the optical microscopy. The pictures of the cross-sections were taken by the attached Nikon ECLIPSE LV 150 NL with 50x magnification (Table 1).

After, twenty-one samples out of twenty-six were subjected in a series of analysis: SEM (EDS), XRF, XRD and TG/DSC. The majority of the samples (PAR 2-7, 11-12, 15, 17-19, 20, 22, 25-26) was analysed by scanning electron microscope (SEM). First, the samples were coated in Au-Pd by Quorum Q150R ES, to obtain images of the characteristic morphologies of the ceramic body by SEM, ZEISS-SUPRA 40VP. The elemental composition both the fabric and the glaze determined by the equipped energy dispersive X-ray spectrometry (EDS), Bruker Quantax 200.

To support and to compare the elemental compositions that we acquired by SEM, five samples (PAR 1, 8, 16, 21, 24) were also inspected by a quantitative method, energy dispersive X-ray fluorescence (ED-XRF), SPECTRO XEPOS. The mineralogical properties of the samples were determined by X-ray diffraction (XRD), GNR APD 2000 PRO, by exposing five samples (PAR 1, 8, 16, 21, 24) to the method. Lastly, five samples (PAR 4, 11, 17, 20, 25) were examined by thermal analysis techniques, such as thermogravimetry and differential scanning calorimetry (TG/DSC), NETZSCH STA 449 F5 Jupiter, to illustrate their thermal behaviour and to estimate a firing degree of the pottery.

For the provenance analysis, two different kaolinitic clays were used as reference samples, which were obtained from the stockpiles of the Hitit Seramik factory in Uşak, Turkey. The clay samples are known to be taken from the two different sources in the Asian side of Istanbul, Şile and Ömerli. Similarly, the elemental compositions of two sources were determined by XRF and, the thermal behaviour of Şile clay was ascertained by TG/DSC to compare the results with those of the archaeological samples. Hence, the integrated-approach provides more information about the production of the material and helps re-define White Ware pottery, archaeologically.

1.3.3 The Art Historical Approach

No doubt, the earlier archaeological approach guaranteed the place of Byzantine White Wares in a stratigraphically established context. However, the focus which was only given to form and fabric is far from enlightening the change of ornamental attributions in historical sequences. A mundane description of the motifs, techniques and glaze applications in combined with an analogy of typology of the form seem to be the frame of this approach. Perhaps, scholars who favoured the archaeological approach may not have left the comfort zone of this methodology believing that all other decorative features of White Wares have already been covered by those scholars who implemented so-called art historical approach. This approach goes back to the earliest classifications of Byzantine ceramics and it has been a much-debated issue. Beyond the traces of bias in dating of sherds in both Talbot-Rice's[67]and Morgan's[68]evaluations, their approaches stress that more focus be given to the decorative aspects and less attention to the fabrics and forms. The weakness of this approach has been emphasised by Stevenson, Hayes and Sanders. Therefore, the methodology has been shifted from the "art historical" to the "archaeological" by these scholars in both Istanbul and Corinth.

[67] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 12.
[68] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 18.

The terminology of Byzantine ceramics which is based on the decorative attributions was first established by David Talbot-Rice in his published work in 1930. Class A with all its subdivisions and the white-bodied Class B, specifically B 4, comprise all White Wares which were categorised by him, art historically.[69] As a whole, the attention given to the decoration of Byzantine ceramics by Talbot-Rice is praiseworthy, although the work includes errors, especially in the classification of White Wares. Briefly, these errors can be outlined by his misinterpretation of some groups. Talbot-Rice, first of all, places the Painted White Wares (II.E in 1930's classification) in Class B, the Earthenware. Although Talbot-Rice admits that the fabric colour is lighter than red, he believes that this group is different than the others in Class A because of the applied technique and the decoration. He justifies his statement indicating that the applied slip is an inherence of Class B rather than A.[70] Even though these ceramics are called 'white-bodied', the same error in misplacing White Ware in Class B was repeated by Stevenson as well.[71] Later, this was corrected in Hayes's conventional classification at Saraçhane by including them in the Glazed White Ware I-V, GWW I-V. Besides this materially mistaken group, Talbot-Rice treats the Polychrome Wares as the first group, A 1, believing that they are the finest and also the earliest group of Byzantine Ceramics.[72] Talbot-Rice was surely mistaken on the latter as in his proposition to date certain groups, such as A4 Inscribed Ware which is believed to be erroneous since "it rested on insufficient archaeological evidence."[73]

Another problem of the earliest assessments of White Wares is the restricted information resulting from a brief overview of the data of decoration. It should be borne in mind that in all

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[69] Talbot-Rice, *Byzantine Glazed Pottery*, 9–31, 45–48.
[70] Ibid., 6, 9.
[71] Stevenson, 'Chapter II, The Pottery 1936-37', 47.
[72] Talbot-Rice, *Byzantine Glazed Pottery*, 6.
[73] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 12.

published works, except the primary ones, such as Saraçhane, the Great Palace and Corinth, White Wares represent a small portion of finds revealed by excavations. However, there is not always a direct correlation between quantity and the ornamental representation, meaning that more sherds do not necessarily expand the decorative scale. For instance, though the estimated number of the pottery sherds is about 20.000 at Saraçhane,[74] the decorative repertoire represents not the whole but some earlier and later examples. The examples of Green and Purple Painted Ware that have been unearthed in Kalenderhane well exemplify this instance since Saraçhane has none. A conclusion of this nonspecific distribution is that we still do not know a single site that includes all examples of White Wares, nor likewise do we have a publication that broadly mentions them all. Hence, a revision of the information of both old and "contemporary" publications and a re-evaluation of the finds with an art historical approach are necessary to piece together the ornamentation of White Wares, and, also our fragmentary knowledge about them.

Regarding ornamental features of White Ware pottery, all assessments which have been done, so far, either superficially mention it, as in Hayes's work, or evaluated it separately as in Talbot-Rice's book by seeing each of the classes as an independent entity. These ineffective approaches produced a vicious circle which is either shaped by grouping the decoration within the fabric-centric frames or giving only mundane descriptions of the decorative elements over the sherds. In this thesis, the aforesaid problem and the limitation of the previous assessments are solved by taking a more effective art historical approach. Considering the weakness of the earlier art historical approaches, the primary focus of the art historical approach in Chapter four is to establish a new classification which is plainer, more vibrant and inclusive than the

[74] Ibid.

previous ones. The Art Historical Approach uses a chromatic class system, analogy in decorative components and stratigraphical evidence to do the following:

- to offer a new decorative classification of Constantinopolitan Glazed White Ware pottery
- to determine the source of decorative attributions and themes
- to establish the decorative history of White Wares

Accordingly, the decoration of CGWW is re-categorised under two decorative criteria: decorative painting and decorative technique. The Decorative Painting is divided into three groups according to the number of the colours: monochrome, bichrome and trichrome (together) and polychrome. On the other hand, the complementary techniques, such as carving, impressing and sculpting in the ornamentation are defined in the Decorative Technique. Therefore, the components of the decoration, such as motifs and figures are conveyed with a thoroughly new perspective which pays more attention to interpretation the designs and styles.

The art historical approach also focuses on revealing the history of decoration of White Ware pottery with its unique features. It is a comparative analysis of the whole scale of the surface treatments to understand changes and the evolution of the decorative techniques, styles and motifs in historical sequences. Therefore, it is inevitable to use the archaeological data of principal excavations, such as the Great Palace, Saraçhane and Corinth. Hence, a new method is applied to build an ornamental chronology to illuminate both the differences amongst the periods and the decorative groups. To get a better understanding, the CGWW is divided periodically into three groups: Early-Glazed White Wares (7^{th}-9^{th} CE), Middle-Glazed White Wares (9^{th}-11^{th} CE) and the Late-Glazed White Wares (11^{th}-13^{th} CE). This approach not only helps to follow the change of the typology of forms, but it also reveals all surface treatments of the Glazed White Wares in the historical sequences, simultaneously.

1.3.4 Limitations

This thesis provides a new way to look at the Glazed White Ware pottery of Constantinople, by focusing on material specification as it relates to the source of the clay, but also decoration and the history of decoration. However, the work that I have completed has limits since the study involves many challenges. First and foremost is to access the archaeological material. For instance, the priority of this thesis was initially to re-evaluate White Ware examples unearthed in Istanbul which are kept in the Istanbul Archaeological Museums. But the museum has been undergoing restoration for over ten years, and pottery sherds are not accessible. I, therefore, had to identify another site where White Ware pottery shows variety both in classes and numbers. Corinth Archaeological Museum was surely the best place since the excavations have revealed the second largest collection. But, Covid-19 outbreak prevented me from conducting the second phase of my research there in 2020. The travel restrictions and unforeseen circumstances compelled me to find another site in Anatolia and, thus, work on a relatively small selection of White Wares. Although the Parion excavation does have a good collection of White Ware pottery, still, some of the decorative groups are not present there. Consequently, I have analysed a limited selection of samples which surprisingly revealed new discoveries, but they are hardly enough to generalise the results that I achieved. Hence, the archaeometric research in this thesis submits a case study.

Relatedly, another challenge about the archaeological material is to acquire access to enough samples to analyse in the laboratory. Since the laboratory methods seem destructive, either no samples are allowed or they are restricted in number by the regulations of the Ministry of

Culture and Tourism, Turkey. Therefore, I collected and analysed a limited number of samples, which naturally limits the number of methods. For example, if the number of samples were high, the other available methods could have been used for new experiments to support the data. This links to the problem of choosing the right method to implement in the laboratory. For example, the energy dispersive spectroscopy (EDS) did not reveal all of the chemical compositions under 1.00 weight percentage in the samples of the PAR batch. Perhaps, a wavelength dispersive spectroscopy (WDS) would suit better since it is a more sensitive tool than the former. Besides that, the thermogravimetric analysis, TG/DSC, that I used to propose a firing degree of the pottery may have been replaced by Fourier-transform infrared spectroscopy, FT-IR, to be certain.

Being unable to access the material is not the only limit which precludes the implemented archaeological approach to reach a more generalised result. This is the case with a template that I designed to convert the old classification into a new one by focusing on the fabric classes. To do that, it was necessary to use the descriptions of the fabrics in published works. A conflict derived from an unsettled terminology which also limits utilisation of the database of the other excavations. Perhaps, the repeated old term “pepper and salt” to define the fabric inclusions of White Wares at Kalenderhane may exemplify how difficult it can be to convert such a term into usable data.

Another problem concerning the terminology is the formulaic terms which prevent any necessary alteration or even suggestion. Perhaps, polychrome, as a term, exemplifies the problem nicely. In White Ware studies, this term is strictly used to define a specific group, Polychrome Ware. However, it technically refers to many colours, more than three and usually up to five, which are used together in the decoration of a vessel. However, two specific groups inside the Polychrome Wares (Class I and Class IV in **Polychrome Decoration**) bear usually two and rarely three colours. The logic of the categorisation that I built in Chapter three is based on the number of the colour, therefore, the aforementioned group should be included in **Bichrome and Trichrome Decoration**. However, to prevent any confusion which may occur, I had to include this group in the Polychrome Decoration.

A similar problem occurs in the assigned names to the forms. For instance, “fruit stand” is used to define a dish with a tall stem which is quite responsive to the form. But, in some occasions, this name does not describe to the content of the image on the vessels. It hardly makes sense to define a dish which bears a religious image and, perhaps, was used in a commemorative rite, with a name whose connotation is just utilitarian. To prevent any possible conflict between the given name and the content of the vessel, “pedestal dish” could be a suggestion for this type. However, I have to use the term “fruit stand” for defining the form to conform with previous studies. But I occasionally used the term “pedestal dish” when I was in need, for example in the case of Three Holies depiction on the pedestal dish (pl.33.7).

Relatedly, there are instances that terms are subjectively used either to define the colour or the technique of the decoration. A particular dish from Corinth excavations is defined as “green and brown” and “marbled” in two different works. However, in my opinion, both terms do not quite respond to the specific technique which is used in the glaze, therefore, I instead used the term “splash” for the decorative feature on the same vessel. This small detail may seem harmless at first; however, it causes the misinterpretation of the ornamentation and it also prevents identifying the source of the decorative technique.

Consequently, both a revision in the decorative classes of White Wares and also the slight changes in the terminology that I made were inevitable. The interdisciplinary approach that I implemented in this study is better suited to fully explore the material and design of this Early Medieval pottery group. This thesis is a restorative work of the CGWW that pieces together both the pottery sherds and, especially, our fragmented knowledge.

CHAPTER TWO: CONSTANTINOPOLITAN GLAZED WHITE WARES

This chapter presents a methodological and also historical survey of CGWW studies. It includes two parts. Part I comprises a bibliographic review of the studied Glazed White Wares at Istanbul excavations covering 1927 onwards. This particular date refers to the Hippodrome excavation when for first time the Byzantine Ceramics was the main focus of an excavation in Istanbul. Therefore, it was not only important for contextualising Byzantine Ceramics, but also for adapting a comprehensive method to evaluate them. As a result, Talbot-Rice's approach on ceramics extended the first approach, i.e., the art historical approach, which is based on the surface treatments of CGWW pottery.

Part I arranges publications in chronological order for Constantinople/Istanbul to reveal the further categorisations of Glazed White Wares at the capital. It allows the reader to follow researchers' individual methodologies which were applied on the pottery and the shift in the approach from art historical to archaeological, or vice versa, up to date. For other findspots, such as in Europe, the Balkans, Russia and the Crimea and Anatolia, this chapter seeks to identify the pottery groups which were diffused by the main routes. It also observes how other scholars use the primary classifications which were built for the excavations that took place in Istanbul. Following, Part II covers the critique of John Hayes's White Ware classification at St. Polyeuktos, Saraçhane.

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2.1 PART one: BIBLIOGRAPHY OF WHITE WARES

This part investigates Glazed White Ware pottery by focusing mainly on the classifications of the potsherds which were unearthed in Istanbul. It also seeks to extend the bibliography outside of the capital's borders where this pottery group is distributed. However, it begins with introducing the pioneering works of two scholars, Joanita Vroom and Beate Böhlendorf-Arslan, who made great contributions to revise our state of knowledge on Byzantine Ceramics and to rightly assess them in a wider context. Both scholars made particular revisions to the earliest examples of Glazed White Ware (GWW I) which address one of the problems of J. Hayes's White Ware classification discussed in Part two.

J. Vroom's Ph.D. thesis, which is later published in 2003 is titled *After Antiquity: Ceramics and Society in the Aegean from the 7th to the 20th century A.C. A Case Study from Boeotia, Central Greece*. This work focuses on survey finds of the Boeotia in Central Greece. Beginning with a review of the previous studies, Vroom puts the survey finds of Boeotia in context of thirty survey sites with post-Roman pottery presenting diagnostic pieces. Vroom builds a typo-chronological classification which identifies forty-eight ware types, including White Ware, and discusses the change in vessel shapes from the seventh to the twentieth century. Besides this significant contribution to the study of post-Roman ceramics in the Aegean, Vroom's work contextualises Boeotia ceramics with socio-economic and cultural perspectives by supporting evidence in production, distribution and also consumption of the pottery.

Vroom's endeavour in framing the change in size of the vessels brought a bright conclusion relating to a change in eating habits.[75] For example, the forms are mainly open shapes, such as large dishes in the Middle Byzantine Period (ca. 10th-12th CE), whereas they are smaller bowls and closed shaped forms, such as jugs in the Late Byzantine or Frankish Period (ca. 13th-15th CE) indicating a shift in eating habits from the communal to the individual.[76] Vroom extends her research by focusing on the Last Supper scene depicted in fresco and mosaics, from the fifth to fifteenth century, to find further clues in the alteration of eating habits. Vroom observes that the alteration occurs in the thirteenth century from the communal to small group eating which means two or three men at the table share one bowl. Also, the variety and the quantity in the jugs, cups and cutlers increased significantly on the Last Supper scene from the thirteenth century onwards.[77]

Lastly, Vroom published a handy field guide in 2005, *Byzantine to Modern Pottery in the Aegean: An Introduction and Field Guide*. The guide aims to help archaeologists and art historians during preliminary use on site. It includes several groups which are materially, decoratively and also chronologically divided, as the title suggests. Vroom's categorisation is based on the fabric colour. Regarding Glazed White Ware pottery, two main classes are B-1: Plain Lead Glaze (Plain lead glaze, white ware) and B-2: Lead Glaze with Decoration (Lead glazed, whiteware with polychrome painted decoration). Vroom divides White Wares chronologically into two: Early Plain Glazed Ware in a White Fabric (GWW I) in Early

[75] Joanita Vroom, *After Antiquity: Ceramics and Society in the Aegean from the 7th to the 20th Century AC; Case Study from Boeotia, Central Greece* (Faculty of Archaeology, Leiden University, 2003), 335–56.
[76] Joanita Vroom, 'Byzantine Garlic and Turkish Delight: Dining Habits and Cultural Change in Central Greece from Byzantine to Ottoman Times', *Archaeological Dialogues* 7, no. 2 (2000): 200, 203–4.
[77] Joanita Vroom, in *The Changing Dining Habits at Christ's Table*, ed. Kallirroe Linardou and Leslie Brubaker, Eat, Drink, and Be Merry (Luke 12: 19)–Food and Wine in Byzantium: Papers of the 37th Annual Spring Symposium of Byzantine Studies, In Honour of Professor AAM Bryer (Routledge, 2016), 199–200.

Byzantine Ceramics (EBYZ 17), Plain Glazed Ware in a White Fabric (GWW II-IV) and Polychrome Ware in Middle Byzantine Ceramics (MBYZ 4-5).[78]

B. Böhlendorf-Arslan published her Ph.D. thesis as a three-volume monograph, *Glasierte Byzantinische Keramik aus der Türkei* in 2004. It is the first comprehensive study of Byzantine glazed wares in Turkey which comprises unpublished and published material which was manufactured and distributed in Thrace and Asia Minor. Böhlendorf-Arslan's work first materially divides glazed wares into two: Ceramics with white fabric and Ceramics with red fabric, then divides them according to surface treatments. The latter group, Red Ware, represents a wider variety of groups and a wider geographical distribution with a longer time span. On the other hand, White Ware is divided into two: Glazed White Wares (GwW I-IV) and Polychrome White Ware (PwW). Both groups mostly comprise the examples from Constantinople, dated from the eight to the thirteenth century, but her study also adds new spots, such as Troas, Miletus, Magnesia on the Meander and Amorium where Glazed White Ware is unearthed. Böhlendorf-Arslan's ground-breaking work also locates new centres for red ware production in Metropolis, Magnesia, Ephesus and Miletus in the western Anatolia.[79] Also her extensive surveys revealed imitations of Glazed White Ware I in red ware which were uncovered in Güllüce, Akçin Kayalar and Gülpınar,[80] but some certainly were manufactured in Amorium.[81]

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[78] Joanita Vroom, *Byzantine to Modern Pottery in the Aegean: 7th to 20th Century: An Introduction and Field Guide* (Parnassus Press, 2005), 63–65, 75–79.
[79] Böhlendorf-Arslan, *Glasierte Byzantinische Keramik Aus Der Türkei, 3 Vols*, 222–24, 250, 316–20, 324.
[80] Beate Böhlendorf-Arslan, 'Surviving the Troad: Byzantine Sites and Their Pottery in Medieval and Post-Medieval Ceramics', ed. Joanita Vroom, The Eastern Mediterranean-Fact and Fiction: Proceedings of the First International Conference on Byzantine and Ottoman Archaeology, Amsterdam, 21-23 October 2011 (Belgium, 2015), 59.
[81] Böhlendorf-Arslan, *Glasierte Byzantinische Keramik Aus Der Türkei, 3 Vols*, 98; Beate Böhlendorf-Arslan, 'Stratified Byzantine Pottery from the City Wall in the Southwestern Sector of Amorium', in *Çanak. Late Antique and Medieval Pottery and Tiles in Mediterranean Archaeological Contexts*, vol. 7, 2007, 287–88.

2.1.1 Constantinople/Istanbul

Beginning with a relatively recent archaeological campaign, the Marmaray-Metro Salvage Excavations is one of the works which yielded a considerable number of Byzantine ceramics taken place at Yenikapı, Sirkeci, Üsküdar and Sultanahmet, Istanbul. The project was initiated by the directors of the Istanbul Archaeological Museums in 2004 and lasted almost a decade. Among these sites, Yenikapı has been a high priority since thirty-seven shipwrecks (5th-11th-century) were uncovered there which makes Yenikapı the largest medieval wreck context discovered at a single site.[82]

Though several publications have been dedicated to the site and its *in situ* findings, an immense amount of pottery has yet to be published. Regarding White Ware, only a Master's Thesis, *Yenikapı Kazı Buluntusu Sırlı Seramiklerinin Değerlendirilmesi*,[83] mentions a few examples found at Marmaray-Yenikapı excavations. Akpınar's work includes a discussion of the petrology of the material and reason for the deterioration in the pottery covering the period between the ninth and nineteenth centuries. Akpınar's thesis supplies only a brief assessment of Glazed White Ware sherds (MRY'06 1-11), including thin/cross-section pictures of the fabric.

A similar but highly advanced approach was used by S. Y. Waksman and her associates on the Byzantine ceramics unearthed at pottery workshops at Sirkeci and Vezneciler. Several articles[84] have revised our current knowledge of the chemical characterisation of the fabric

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[82] Ufuk Kocabaş, 'The Yenikapı Byzantine-Era Shipwrecks, Istanbul, Turkey: A Preliminary Report and Inventory of the 27 Wrecks Studied by Istanbul University', *International Journal of Nautical Archaeology* 44, no. 1 (2015): 31; Ufuk Kocabaş, 'Yenikapı Shipwreck Excavation and Studies', *TINA Maritime Archaeology Periodical* 1 (2014): 30.

[83] Yurdanur Akpınar, 'Yenikapı Kazı Buluntusu Sırlı Seramiklerinin Değerlendirilmesi' MRes diss., (Istanbul, Mimar Sinan Güzel Sanatlar Üniversitesi, 2006), 53–64.

[84] S Yona Waksman, 'Byzantine Pottery Production in Constantinople/Istanbul: Recent Excavations and New Issues Regarding the Diffusion of Models and Techniques', 65-81; S Yona Waksman, 'Defining the Main" Middle Byzantine Production"(MBP): Changing Perspectives in Byzantine Pottery Studies', vol. 1, No. 42 (XIth

and the glaze of Byzantine ceramics, including White Ware, produced at the capital or its hinterland. The recent discoveries at Sirkeci train station excavations revealed several workshop related findings such as tripod stilts, wasters, and perhaps a workshop from the Late Byzantine Period. Among the unearthed ceramics of the Palaiologan Period, Sgraffito Ware with a bird depiction which was previously associated with Thessaloniki has revised our knowledge that the capital was also manufacturing this type.[85]

The result of a chemical analysis on Glazed White Ware I from Saraçhane[86] is one of several invaluable contributions to Glazed White Ware studies by Waksman. The data shows the earliest Byzantine White Ware (GWW I) is associated with the Late Roman ceramics from Garičin Grad, the Balkans, and also Northern Italy. Also, the comparison between Glazed White Ware I and a group of "vetrina pesante" illustrates a "very good correspondence." Waksman highlights the fact that both results need to be supported by further samplings; however, the similarity in the glaze composition and also the application may suggest that the

Congress AIECM3 on Medieval and Modern Period Mediterranean Ceramics Proceedings (Antalya), Ankara: VEKAM, 2018), 397–408; S Yona Waksman, 'The First Workshop of Byzantine Ceramics Discovered in Constantinople/Istanbul: Chemical Characterization and Preliminary Typological Study', 2012, 147–51; S Yona Waksman, Nihal Erhan, and Süleyman Eskalen, 'Caractérisation Des Céramiques Produites Dans Les Ateliers de Sirkeci (Istanbul). Résultats de La Campagne 2009', *Anatolia Antiqua* 18, no. 1 (2010): 329–37; S Yona Waksman, Nihal Erhan, and Süleyman Eskalen, 'Les Ateliers de Céramiques de Sirkeci (Istanbul). Résultats de La Campagne 2008', *Anatolia Antiqua* 17, no. 1 (2009): 457–67; S Yona Waksman, I Teslenko, and S Zelenko, 'Glazed Wares as Main Cargoes and Personal Belongings in the Novy Swet Shipwreck (13th c. AD, Crimea): A Diversity of Origins Investigated by Chemical Analysis', vol. 27, 2009, 851–56; S Yona Waksman and Çiğdem Girgin, 'Les Vestiges de Production de Céramiques Des Fouilles de Sirkeci (Istanbul). Premiers Éléments de Caractérisation', *Anatolia Antiqua. Eski Anadolu* 16, no. 1 (2008): 443–69; S Yona Waksman et al., 'Approche Archéométrique Des Premières "Byzantine Glazed White Ware" et de Productions Glaçurées Romaines et Romaines Tardives', *Rei Cretariae Romanae Acta* 40 (2008): 531–36; Waksman et al., 'The First Byzantine" Glazed White Wares" in the Early Medieval Technological Context', 129-135.

85 Waksman, 'The First Workshop of Byzantine Ceramics Discovered in Constantinople/Istanbul: Chemical Characterization and Preliminary Typological Study', 2012, 147, 151; Waksman, 'Byzantine Pottery Production in Constantinople/Istanbul: Recent Excavations and New Issues Regarding the Diffusion of Models and Techniques', 66–70.

86 Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', 130–34.

reintroduction of the glaze technique in the Empire's capital in the late seventh century may have reached from the Roman provinces, rather than Middle East.[87]

Waksman's latest publication,[88] on the other hand, shares an intriguing hypothesis on an Eastern influence in manufacturing process with the discovery of a kiln with bars at Vezneciler. The analysis relates Glazed White Ware to the kiln bars unearthed in this pottery workshop which is dated to the eleventh and the twelfth centuries. Although White Wares have yet to be found there, the chemical reference of the kiln bars corresponds to Glazed White II and also Polychrome Ware pointing to the same kaolinitic clay in Istanbul.[89] Waksman discusses that both the associated kaolinitic clay and the discovered kiln could be the key for establishing the Eastern influence in Polychrome Ware since this type of structure was formerly believed to be an Islamic model. However, this idea has begun to change by the help of various kilns with bars revealed in Byzantine contexts.[90]

Returning to the earliest works, the beginning of the 20th century saw the very first evaluations of decontextualised Byzantine glazed ceramics in Constantinople. A construction work placed at the new Post Office at Sirkeci quarter yielded the material studied by Henry Wallis. His book, *Byzantine Ceramic Art: Notes on Examples of Byzantine Pottery Recently Found at Constantinople with Illustrations*, published in 1907,[91] includes a catalogue. It not only covers Byzantine pottery found at Constantinople, but also later ceramics kept in museums in Europe, such as the Bode Museum (Kaiser Friedrich Museum), the British Museum, the Victoria and Albert Museum (South Kensington Museum), Musée du Louvre,

87 Ibid., 134.
88 Waksman, 'Byzantine Pottery Production in Constantinople/Istanbul: Recent Excavations and New Issues Regarding the Diffusion of Models and Techniques'.
89 Ibid., 70.
90 Ibid., 72.
91 Wallis, *Byzantine Ceramic Art: Notes on Examples of Byzantine Pottery Recently Found at Constantinople with Illustrations*.

the Ravenna National Museum, the Vatican Museum and the Archaeological Museum at Grottaferrata, Italy. Wallis's approach is art historical and examines the origin of the decorative repertoire, interaction and exchange in motifs between Byzantine and alliance pottery. The catalogue of the book comprises the definition of twelve White Ware pottery types, including commonly impressed designed examples with their illustrations.[92] Later in 1910, a published book called *Catalogue des Poteries Byzantines et Anatoliennes du Musée de Constantinople,* written by Jean Ebersolt. The book includes a catalogue of Byzantine pottery uncovered from many sites in Constantinople, such as the Botanical Garden, Ahırkapı, the construction area of the new museum, Haydarpaşa and also Smyrna, Troy and Edirne. Ebersolt's approach is art historical; therefore, she builds up a categorisation focusing on the decoration. The pottery is divided into two groups: Series A (glazed) and Series B (unglazed) combining white and earthenware. Each group includes four subgroups: Variant A a., A b., A c, A d. and Variant B a., B b., B c., B d. Series A includes incised, impressed, green and brown painted, polychrome and mottled green glazed White Ware pottery; Series B covers a single polychrome tile sherd.[93] Considering White Wares, Ebersolt's initial categorisation into Series A and B is technically wrong since each group is represented by glazed examples. Nevertheless, this alphabetic classification would be used by other researchers in later works for other purposes, such as differentiating the colour of the fabric: A: white ware, B: earthenware, as in Talbot-Rice's. Though the systematic excavations increased in Constantinople/Istanbul especially after World War II, between the two wars, especially from 1921 to 1937, some researchers from the French and British institutions conducted extensive excavations at the Mangana area (in the eastern part of the Topkapı Palace), the Hippodrome and also the Great Palace.

[92] Ibid., fig. Pl. I fig.1-2, Pl. III fig. 4-5, Pl. IV fig. 6-7, Pl. V fig. 8-10, Pl. XIV fig. 36-38.
[93] Ebersolt, *Catalogue Des Poteries Byzantines et Anatoliennes Du Musée de Constantinople*. p.28 no. 92, 94-95; p.30-31 no. 99 and 109; p.32 no. 112; p.33-34 no. 118-122; p.36 no. 139; p.39 no. 151-2.

Hippodrome

The preliminary report upon the excavations carried out in the Hippodrome of Constantinople in 1927 on behalf of the British Academy would cover a substantial number of White Wares. In the report, Talbot-Rice divides the uncovered pottery into two: I. Red Wares and II. White Wares. The both wares have classes and also sub-classes and the class of White Wares is grouped as II. A-D and III. A. The former group comprises vessels of some of the decorative groups, such as of Plain Glazed Ware, Stamped Wares, White Inscribed Ware and Petal Ware. The latter, on the other hand, is represented by only Polychrome Ware (III. A Coloured Glazed Wares. White Ware. in Talbot-Rice).[94] This work does not include any suggested date, except the assumption of Talbot-Rice that the Impressed Wares (II.B Stamp Ware) might have been produced "throughout the ages of Byzantine history."[95] The Hippodrome could have been the first excavation whose stratigraphical evidence could be used to rightly date the vessels and to help in generating as well as a well-established Byzantine pottery classification. However, Talbot-Rice's evaluation of the pottery emphasises a pure art historical approach reflecting his classification which is based on the decorative treatments.[96] Later, in 1947, "a much more refined chronological division of Byzantine pottery," as J. Vroom indicates,[97] was made by R. Stevenson at the Great Palace.

The Great Palace

In 1947, the first volume of a published book, *The Great Palace of the Byzantine Emperors*, covered the excavation results carried out on behalf of the Walter Trust, the University of St.

[94] Casson et al., 'Preliminary Report upon the Excavations Carried out in the Hippodrome of Constantinople in 1927', 30–39.
[95] Ibid., 40.
[96] Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul)', 17–18.
[97] Vroom, *After Antiquity: Ceramics and Society in the Aegean from the 7th to the 20th Century AC; Case Study from Boeotia, Central Greece*, 40.

Andrews, at the Great Palace. The chapter II, The Pottery, written by Robert B. K. Stevenson implements an analytical method of categorization with a purely archaeological perspective opposing to the Art Historians', as he states that he aimed to make a basis a closer chronological division. Totally, 7.000 ceramic sherds of the glazed pottery of the 1936 – 7 excavation seasons, Stevenson's work on deposits of the Great Palace has overtones from Talbot-Rice's categorization with his numbering system but also Stevenson characterises six groups, "stages" as he named, dating from the Late Roman period through to the 13th century by using the dynastical time span and dating them either early or the late period of it, begins with early Isaurian and late Isaurian; early and late Macedonian and early and late Comnene. All the pottery from Stage III and IV came from the Pier 2 – 3, below and under the layer at -3.50 and -4.00 respectively, dated early Macedonian dynasty (867 – 1056) based on 12 coins evidence in the deposits, and the Pier 7 on four fills between the level of -2.15 and -4.00 dated to the latter of the Macedonian dynasty (867 – 1056) which based upon late 11th and middle 12th century coins find in the North-West Building.

St. Irene

Byzantinische Keramik aus Istanbul. Ein Fundkomplex bei der Irenenkirche, by U. Peschlow, is the published work of the church of St. Irene excavations which yielded a considerable number of White Wares in a deposit which is dated to the ninth and the tenth centuries.[98] Peschlow's catalogue (see Table IV) includes plates, bowls, cups, jugs, fruit stands, chafing dishes (especially the polychrome one)[99] and goblets in five ware types, namely Impressed

[98] Peschlow, 'Byzantinische Keramik Aus Istanbul: Ein Fundkomplex Bei Der Irenenkirche', 375–77.
[99] Ibid., no.104, fig. 16, pl. 141, 3–4.

and Unimpressed Glazed Ware (no 1-88), Incised Ware (88-90), Petal Ware (91), Plastic Ware (93-95) and Turquoise Ware (92).[100]

This deposit was thought to be homogeneous and its discovery could produce evidence to fix the dates at the Great Palace. However, the homogeneity of the deposit was questioned since similar White Ware vessels (Hayes's GWW II and Polychrome Class I) were uncovered at Saraçhane where they are dated to the late tenth to early twelfth centuries by Hayes.[101] Peschlow combines the categorisation systems of Talbot-Rice's at the Hippodrome, Stevenson's at the Great Palace and Frantz's at the Athenian Agora. As stressed earlier, the dating deposit included intrusive pottery. Therefore, Hayes neither used the Glazed White Ware pottery of St. Irene as the primary dating evidence nor classification of Peschlow. Instead, he built another classification which was based on the fabric specifications of Glazed White Wares, GWW I-V, at the St. Polyeuktos Church excavations at Saraçhane.

[100] Ibid., 380–403.
[101] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 3, 13; This date is also suggested later by Sanders and Vroom, see: Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 25; Vroom, *After Antiquity: Ceramics and Society in the Aegean from the 7th to the 20th Century AC; Case Study from Boeotia, Central Greece*, 59.

Saraçhane Camii[1]

The article, *Excavation at Saraçhane in Istanbul: Fifth Preliminary Report, R. Martin Harrison and Nezih Fıratlı with a contribution on a seventh-*century Pottery Group by John *Hayes*, covers the results of the excavation carried out in St. Polyeuktos in which the north aisle, the narthex and the atrium were the main focus in the 1968 campaign.

The pottery from the excavation seasons 1967 and 1968 comprises the seventh century deposit. In 1968, two deposits were found in the narthex and in the atrium pavement area. These two fills include a large body of white wares similar to the Great Palace Stage IV with some polychrome fragments and B4a wares. Overall, the white wares include some well-preserved impressed and brown painted decorations on large dishes and bowls. An impressed winged lion which covers the whole body seems to be a unique example (Fig. B and 15). Also, the polychrome ceramic fragments are divided into three groups by the authors. The first class is determined as the most common: green and yellow painted decoration with black outlines. The second class consists of a red dotted background and varied decoration on the surface. Finally, the third class, which is rare, shows the interlocking pattern of black and white in colours that, possibly, could be dated to the late tenth or early eleventh century. Furthermore, an impressed ware which was found in the vault under the central staircase and has a classicized fishing scene that was identified by the authors as a "particularly fine example". The second group of ceramics come from the domestic dump debris area in the late cistern (the area X/13) with the fine Sgraffito Ware from twelfth century and some Persian import wares which are classified as "lakabi" and noted as "the first of its kind" in Istanbul. Lastly, a white ware jug which is covered by a red slip was found in the side niches of the

[1] This section covers only the Fifth preliminary report at Saraçhane. For more see in **the critique of John Hayes's White Ware classification**.

narthex on the seventh-century undisturbed level. Among the seventh century pottery groups, the Glazed Ware, the Coarse Glazed Ware, the African Red Slip Ware, the Late Roman C Ware, the Cypriot Red Slip Ware, the Light-coloured Late Roman Ware, Import Late Roman Ware, Local Red Slip Ware, Mica-dusted Ware, Unguentaria, Cooking Pots, Plain Coarse Ware and Amphoras, White Wares are represented by 1000 (+) fragments of Unglazed White Ware I, Unglazed White Ware II and Colour-coated White Ware.

The Unglazed White Ware I is an off-white clay, pale brown and rarely reddish and grey on the exterior in which the clay has some quartz but no mica. The light orange or brown thin slip covers the body, this is similar to the standard glazed ware, and few glaze spots can be detected on the slip of the generally spouted jugs and lids. This group of jugs fragments is recorded as 88 handles, 72 spouts, 200 loose rims and circa 600 body fragments. Considering nearly complete vessels, by taking into account their missing parts, (Fig. D, 26, 27 – 29) a globular body with hardly ridged and curved hollow base which buttoned at the centre and a short spout and flattened handle that raises over the shoulder with another one on the top of the lid outlining the shape. The lids of this group can be divided into three and they were most probably used in both glazed and unglazed examples. The first group consists of small convex lids with horizontal loop-handle lids. Forty lids and forty-five loop-handles are found in similar configurations. The second group is the concave saucer-shaped lids. A knob at the centre of the lid and slight stripe marks can be seen on the rim. One hundred and forty sherds are found associated with this group, and some glaze spots on an example may show that this group of lids could have been used on the glazed bodied of jars. The third group of the lids has a shallow conical shape with a central knob and a horizontal loop handle. Only one example is found to be similar among the sherds.

The Unglazed White Ware II has a white or pink clay with quartz and red inclusions but no mica. A large vessel is the characteristic shape of this group and no glaze is detected on the surface. Among the fragments, a rounded rim with a ribbon handle below is found similar to twenty sherds (Fig. D, 33). Another fragment of a vessel which has a vertical rim with a double profile on the exterior and a horizontal handle which is pressed at the centre as if it has loops. It does not match with any other sherds (Fig. D, 34). Two shallow conical large lids with a knob are found associated with other seven examples of Unglazed White Ware II.

The last group of the white-bodied pottery is the Colour-coated White Ware with nine hundred and twenty – four fragments which include 145 (+) handles, 115 (+) rims, 145 (+) bases and more than 500 body sherds. This group has white or pinkish clay with some inclusions that the finer body of the clay makes it softer than the previous groups. The jug formed vessels seem to have a red, orange-brown coat (Fig. E, 37 – 39).

Kalenderhane

The Kalenderhane Archaeological Project was launched under the co-sponsorship of Dumbarton Oaks and Istanbul Technical University in 1966. The results were shared by reports and finally two volumes in 1997 and in 2007, by the directors Cecil Striker and Doğan Kuban. The first evaluation of Byzantine ceramics at Kalenderhane Camii was introduced by the Fifth Preliminary Report comprising the excavation seasons between 1970 and 1974.[2] Ayyüz Sabuncu submits a brief assessment of pottery assemblages dated from the mid-sixth to the sixteenth centuries, including Late Roman, Early Byzantine, Middle Byzantine and Latin Period, Late Byzantine and Ottoman ceramics. White Wares include the earliest examples which were revealed at the Early Byzantine Basilica and pre-Iconoclastic church

[2] Cecil L Striker and Y Doğan Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', *Dumbarton Oaks Papers* 29 (1975): 306–18.

context, together with Late Roman pottery, from the seventh century. Polychrome Wares, an eleventh century chafing dish and twelfth century slip-painted jug (fig.16.1-2) were yielded at the pre-Iconoclastic and Main Church phases, dated circa the late seventh to the late twelfth centuries. The latest phase of the White Wares at Kalenderhane is associated with the period covering Latin Crusaders' occupation in the church. A green glazed jug and a goblet, a dish and a censer in Green and Brown Painted style (fig.17.1-4) are dated to the late twelfth and early thirteenth centuries. Only six samples are illustrated in the article.

In Volume 2, *Kalenderhane in Istanbul: final reports on the archaeological exploration and restoration at Kalenderhane Camii 1966 – 1978*, pottery is divided periodically into three: Roman, Byzantine and Ottoman by Judith Herrin and Ayyüz Sabuncu Toydemir. The Byzantine Pottery includes into three categories, such as White Wares, Red Wares and Cooking Pots. Among them, White Wares are represented by 177 sherds having subdivisions which are based on their surface treatments (see Table VI). The book does not have any photographs but drawings of all of the sherds.

In the Glazed group, GWW, the statistical analysis shows that White Ware II and III have the lowest amount as they are represented by one each, however, White Ware I and IV have the highest quantity are constituted 17 fragments which includes plates, bowls, dishes, Jugs and basin and 39 examples of plates, dishes, bowls, goblet, vase, lamp, candlestick etc., respectively. In the unglazed group, UGWW I-IV, the number seemed lower than glazed ones. Among them, the highest amount belongs to the group UGWW II with 13 sherds which consist of bowls, basin, jug, small amphora, jar and lid. Others are represented by a small quantity such as 3 each UGWW I and UGWW IV, and 1 for UGWW III with the jug, bowl, jar, lamp and cooking pot.

Among the other White Wares, Polychrome White Wares show a particular variety since 12 sherds out of 24 are called revetment tiles, and other examples are utilitarian, such as bowls, plates and cups. The rest of the catalogue which the surface treatments have the main role for the classification is apportioned 21 for Purple and Green Painted White Ware (bowl, plate, goblet, high footed bowl, censer, dish), 15 for Impressed White Ware (chafing dish, plates and vessels), Red-Brown Painted White Ware (bowls, plate, fruit stand , jug and vessel), 7 for Speckle-Glazed White Ware (plate, chafing dish, vessel, goblet, handled bowl and bowl), 3 Incised Red-Brown Painted Ware (cup, vessel and lid), 3 for Incised with Green Glaze White Ware (plate, goblet and lid), 1 for Coarse/Gritty White Ware (bowl/basin) with 14 Glazed White Ware of Latin Date (bowl, plate, goblet, Jug/jar, pitcher and handle).

Küçükyalı

Küçükyalı is one of the sites in Istanbul where the excavations have revealed a considerable number of Byzantine ceramics. The site is located on the Asian shore of the Bosporus where the initial surveys were taken by Alessandra Ricci, between 2001 and 2004 and the results were shared in Ricci's Ph.D. Thesis. Further investigations adjoined a project called the Küçükyalı ArkeoPark Project (KAP) by Ricci with the collaboration of the Istanbul Archaeological Museums between 2008-2010.[3] Ricci's long-term efforts for the site resulted in identifying the remains belonging to a Middle Byzantine monastery which was built by patriarch Ignatios, the son of emperor Michael I Rangabes (811-813CE), in the second half of the ninth century.[4] As mentioned in the Introduction, White Wares together with the other middle and late Byzantine ceramics uncovered at the site have become the topic of two

[3] Demirtiken, 'Interpreting a Small Chamber Context from Byzantine Küçükyalı, Its Chronology and Function through Its Glazed Ceramic Assemblage', 35–40.
[4] Alessandra Ricci and Barış Altan, 'Sustainable Cultural Routes in Istanbul: The Küçükyalı Arkeopark and Its Vicinities', in *Proceedings of the Symposium on City Ports from the Aegean to the Black Sea, Medieval-Modern Networks 22nd-29th August 2015*, ed. Flora Karagianni and Ufuk Kocabaş (Istanbul: Ege Yayınları, 2016), 216.

Master's Theses.[5] Also, two articles,[6] comprise some of White Ware pottery which have been evaluated in Wohmann's Master's Thesis.

The first study, by Demirtiken, covers pottery finds of 2009-2010 campaigns at the so-called small chamber which is located in the west of the tower. Demirtiken categorises White Ware pottery according to the surface treatments (Introduction, Table VIII), i.e., Plain Glazed White Ware, Multi-colour White Ware, Slip Painted White Ware and Green Glazed White Ware. The pottery sherds were unearthed at the contexts called US1001, US1002, US1026 and US1073. 50 sherds are defined as open shaped (bowls and plates), 11 are closed shaped (pitchers and pots) and 4 are intermediate shaped (cups). The first layer, US1001, of the chamber contains 10 White Ware sherds in total. The finds of US1002, which is right below US1001, are 34 in number. US1026, below US1002, yielded 18 pieces of White Wares. The White Ware sherds from US1073 are represented by 3 sherds.[7]

The Plain Glazed White Ware is the most abundant type, which is 31 in number, among the White Wares at the Küçükyalı. The fabric of this group is very fine or fine, hard or soft and medium-fired or well-fired. The colour of the fabric is generally pink and the body is covered by a transparent glaze which is either pale yellow or yellow. This group is dated between the eighth and the twelfth centuries.[8]

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[5] Demirtiken, 'Interpreting a Small Chamber Context from Byzantine Küçükyalı, Its Chronology and Function through Its Glazed Ceramic Assemblage'; Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul), A Ceramic Assemblage from the Asian Hinterland of Constantinople (4th-14th Centuries CE)'.

[6] Alessandra Ricci and Rick Wohmann, 'Byzantine Contexts from the Asian Suburbs of Constantinople: Preliminary Remarks on the Ceramics and Archaeology at the Küçükyalı Arkeopark (Istanbul)', vol. 1, No. 42 (XIth Congress AIECM3 on Medieval and Modern Period Mediterranean Ceramics Proceedings (Antalya), Ankara: VEKAM, 2018), 453–58; Rick Wohmann, 'The Ceramics Found at Küçükyalı: Preliminary Considerations, *Bizantinistica: Rivista Di Studi Di Bizantini e Slavi* Vol. 19 (2018): 391–402.

[7] Demirtiken, 'Interpreting a Small Chamber Context from Byzantine Küçükyalı, Its Chronology and Function through Its Glazed Ceramic Assemblage', 97–164.

[8] Ibid., 182.

The second most abundant class is multi-colour Glazed White Ware, 20 sherds in total. What Demirtiken calls multi-colour is green or yellow glaze which have dark brown or black tinges. The fabric of this class is very fine or fine, hard or soft and well-fired or medium-fired. The colour of the fabric is usually pink and pinkish-white. Few sherds bear slip beneath the glaze, but mostly glaze is directly applied on the surface. The glaze application in open forms is varied. Green or yellow glaze with dark colour tinges on the interior and plain green or yellow glaze on the exterior, or vice versa. This group is dated to the tenth to early twelfth century.[9]

Another pottery class at the small chamber is Slip Painted White Ware. Only two sherds are defined by an open form vessel and a fruit plate. The fabric is reddish-yellow and soft and is not well-fired. Demirtiken only uses L. Doğer's suggestion to date the fruit plate which is between the seventh to the eleventh centuries.[10]

The last group is Green Glazed White Ware. 16 pottery sherds are identified in this group. The fabric is soft and medium-fired and its colour is white and pale pink. Though some sherds have uneven surfaces, slip is not necessarily used in this class. A thick green glaze is directly applied on the surface. Forms are generally closed shaped, but open forms are also existing. Due to the lack of published material, this group could not be compared, however, Demirtiken suggests that this group should be in circulation until the early twelfth century.[11]

The second study, by Wohmann, comprises tableware and cargo amphorae at the Küçükyalı covering the period from the Late Antiquity to Late Byzantine (4th -14th CE). Wohmann's approach to White Ware pottery is an archaeological one. He uses the numeric categorisation of White Wares, designed by Hayes, but he also adds a multi-digit code to separate the classes

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[9] Ibid., 183–84.
[10] Ibid., 184.
[11] Ibid., 184–85.

of White Wares. According to this classification, the main group, Glazed White Ware, is 220 and the sub-groups of this class are 220.1-220.5 which correspond to Glazed White Ware I-V. To differentiate the fabric colours, 221.2 (GWW II) are also divided into two (221.2.1 and 221.2.2). Lastly, Polychrome Glazed White Ware is represented by the digit code 222. He also uses multi-digit code in grouping the unglazed counterparts, Unglazed White Wares 310-315 (UGWW I-V), (see Introduction, Table IX).

As mentioned in the Introduction, Hayes's GWW I is found problematic by Wohmann and, therefore, he subordinates Glazed White Ware I (221.1) with Early Plain Red Ware (231.1). The amount of this class at the Küçükyalı is low, 5.95%, however, the existence of the material is important to support the chronology of the site. The colour of the fabric is varied: dark pink, light yellow, dull or pale orange and light-brown or orange brown. The fabric is medium-hard to hard. It contains quartz, mica, some reddish-brown inclusions and lime particles. A slip which is darker than the fabric is present beneath the glaze. The glaze is applied only on the interior and it also covers the rim. The colour of the glaze varies, yellow-orange, yellowish-brown, light to orange-brown and also dark brown. Though most of the vessels are open forms, such as dishes and bowls, few jugs and a chafing dish are included in this class.[12]

The second class, Glazed White Ware II (221.2), represents 16.7% of Byzantine Pottery at the Küçükyalı. Wohmann separates this group into two subgroups, 221.2.1 and 221.2.2, based on the fabric colour to differentiate the earlier and the later examples.[13] The colour of the fabric of the first subgroup is white, greyish-white or light grey. It is hard, bearing few inclusions:

[12] Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul), A Ceramic Assemblage from the Asian Hinterland of Constantinople (4th-14th Centuries CE)', 38–41.
[13] Ibid., 43.

reddish-brown/greyish-brown/dark grey. The glaze is usually applied on the interior, but it can rarely be detected on the exterior of the vessels. The colours of the glaze are light or pale yellow, greenish-yellow and olive green. This group is dated from eight or nineth to the eleventh centuries.[14]

The fabric of the second subgroup is dark pink and pale orange. Some examples have white/light grey in the core and yellow or dark pink in the mantle. It is medium-hard to hard fired. It contains inclusions, such as limestone, mica and reddish-brown or grey particles. Wohmann asserts that the fabric is similar to GWW IV with its “flaky texture”. The glaze colours are plain yellow orange, light to yellowish-brown or mottled olive and dark olive green. This subgroup is dated from the eleventh to the twelfth centuries. Wohmann thinks that a further division upon the decoration is not logical for this class since some decorative classes, such as Impressed White Ware and Red-Brown Painted White Ware do not exist in the Küçükyalı. He also does not separate other decorative means, such as incision and other type of glaze decoration, believing that they are the different decorative patterns of the same pottery class.[15]

The third class is Glazed White Ware III (221.3). The quantity of this class at the Küçükyalı is low, 6.85%, as it is at Saraçhane. The fabric of this class is light grey which contains grey, small reddish-brown and orange-red inclusions. The glaze tends to decay which is pale or dark bluish-green, dark olive-grey or greyish-yellow in colour. Forms are commonly dishes, bowls and occasionally cups. A dish has a notched rim which inclines to the later group’s dish

[14] Ibid.
[15] Ibid., 41–44.

forms, GWW IV. This group is dated to the second half of the eleventh to early twelfth centuries.[16]

The fourth class is Glazed White Ware IV (221.4). The amount of this pottery type at the Küçükyalı is 66% which is the commonest group. The fabric of this class has a gritty and sandy texture with some visible lime and small to medium sized mica, reddish-brown and grey inclusions. The colour of the fabric is white, white grey, pink, pale or yellowish-orange, greyish-yellow and grey. Also, a pink core and grey mantle is common in this group. A light grey, pale brown or pinkish-brown slip lies under the glaze. The colour of the glaze varies, light grey, light yellow, light orange, yellowish-brown, greenish-yellow, olive green, greyish-green, bluish grey or brownish-black. The common vessel forms are dishes and small bowls. Cups, chafing dishes and pitchers are the other forms in this class. This group is dated to the late eleventh/twelfth to the late thirteenth centuries.[17]

The fifth class of White Ware pottery at the Küçükyalı is Glazed White Ware V (221.5). This group is the second smallest group which is represented by 3.57% of total sherds. The fabric is sandy and gritty and the colour is generally light grey, but a sherd has a dull orange colour. A light greyish-brown or orange brown slip is observed both on the interior and the exterior. The glaze is pale yellow, light olive green and an example has a dark yellow glaze with mottled reddish-brown. This class is dated to the late eleventh/twelfth century.[18]

Wohmann's work includes a few examples of Polychrome White Ware. Three fragments of this class were unearthed at the Küçükyalı which represents only 0.89% among the White Ware pottery at the site. The fabric of this class is light grey which has dark grey inclusions.

[16] Ibid., 44–45.
[17] Ibid., 45–48.
[18] Ibid., 48–49.

A light grey glaze is detected on the interior of a vessel. The fragments bear black and white decoration which are dated to the late eleventh or early twelfth century.[19]

The other small group of White Ware class is Unglazed White Ware. Although Wohmann makes a broad categorisation for the unglazed counterparts, Unglazed White Ware (310) 310.1- 310.5, (see Introduction, Table 8), Küçükyalı revealed only two classes, UWW III and V. While the former is represented by two fragments, the latter seems relatively more common with 29 pottery sherds.[20]

[19] Ibid., 49.
[20] Ibid., 50–51.

2.1.2 DISTRIBUTION OF GLAZED WHITE WARE POTTERY: A BIBLIOGRAPHIC OVERVIEW

As stressed in the Introduction, CGWW pottery is a thinly but highly distributed Early Medieval Ceramic group. However, the diffusion of all of the groups is generally limited to the same economic and political boundaries, excluding Taman peninsula and Sigtuna in Sweden.Glazed White Ware I seems to be diffused over a fairly large geographical area (Map 2), yet, makes up the smallest quantity.[21] Glazed White Ware II and Polychrome Ware, on the other hand, are more widespread classes of Glazed White Ware Pottery both in the number of vessels and in the geographic locations.[22] The classes with the least number of vessels which are represented in the distribution are Glazed White Ware III and V. On the other hand, Glazed White Ware IV looks to be scarcely distributed in the West, but mostly to the Black Sea and Anatolia. The outlying position of the spotted consumption sites creates a distribution pattern suggesting maritime, riverine and also inland routes. The maritime trade identifies three main routes from the main port(s) of Constantinople where Glazed White Ware pottery was being exported to the outlands from the late seventh to the late thirteenth centuries.[23]

2.1.2.1 The Balkans and the Black Sea

[21] Véronique François, 'Représenter Le Commerce de La Poterie à Byzance', in *Les Échanges En Méditerranée Médiévale*, ed. Élisabeth Malamut and Mohamed Ouerfelli, 2012, 33–55, https://books.openedition.org/pup/13812; Joanita Vroom, 'Ceramics', in *The Archaeology of Byzantine Anatolia: From the End of Late Antiquity Until the Coming of the Turks* (Oxford University Press, 2017), 10.1093/acprof:oso/9780190610463.003.0014.

[22] François, 'Représenter Le Commerce de La Poterie à Byzance', Map 7.

[23] The following routes are suggested according to the findspots in the Map 1 and 2, which belong to Vroom and François, and also other findspots where Glazed White Ware pottery was unearthed.

The diffused sites of Glazed White Ware on Map 1 and 2 point to three main maritime routes, and the distribution of Glazed White Ware I (GWW I) suggests these routes had already been in use in the late seventh and the eight centuries. This ware group seems to be rarely diffused to ports and cities in the coast on the Black Sea, Aegean Sea and Mediterranean Sea which may have reached directly from the capital. The first route is north to the coastal cities of Bulgaria, Romania and Ukraine in the western Black Sea (Map 1) and also the Crimea (Map 2). The distributed sites of CGWW in the northern maritime route show a clearer picture of later groups, Glazed White Ware II-IV and Polychrome Ware, after the tenth century.

The first diffused area in the northern route includes the cities in the western Black Sea region. Manalova-Voyokova builds a catalogue for the later groups, Glazed White Ware II-V and Polychrome Ware, comprising mainly museum collections of coastal cities, such as Agathopol, Urdoviza, Sozopol, Anchialos, Messembria, Varna and Balchik and also inland cities as Develt and Therma.[24] The author uses Hayes's classification and also its dating for the finds of Glazed White Ware II-V and also Stevenson's stage Va. Nevertheless, she benefits from Sanders's categorisation for Polychrome Ware.[25] Chronologically, there seems to be a continuation from the tenth to the thirteenth century which is represented by imported vessels of Glazed White Ware II-V. Among the finds of Glazed White Ware II, dishes are commonly Impressed Ware which is decorated with vegetative motifs, animal and human figures.[26] Only a blue-green glazed sherd from Varna is classified as Glazed White Ware III.[27]

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[24] Mariya Manolova-Voykova, 'Import of Middle Byzantine Glazed Pottery to the Western Black Sea Coast: The Case of Two Cities – Varna and Anchialos', in *Medieval Ports in North Aegean and the Black Sea, Links to the Maritime Routes of the East*, ed. Flora Karagianni (Thessaloniki, 2013), 353–67; 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview', in *XIth Congress AIECM3 on Medieval and Modern Period Mediterranean Ceramics Proceedings*, vol. 2 (Antalya, 2015), 103–17.
[25] Manolova-Voykova, 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview', 104–7.
[26] Manolova-Voykova, 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview' pls. 1:1-3, 2:1, 3:1-2, 4:1, 5:1, 6:1, 7:1-5; 'Import of Middle Byzantine Glazed Pottery to the Western Black Sea Coast: The Case of Two Cities – Varna and Anchialos', fig. 1.1-2.

A few examples of Polychrome Ware types are mostly two-handled cup and bowl sherds and more rarely dishes painted in yellow, green, black and blue which correspond to Sanders's subgroups 2a, 2c and 3a which are dated to the middle eleventh to the beginning of the twelfth century.[28] From this date, it seems that the rarest group is represented by a few sherds belonging to Glazed White Ware V.[29]

On the other hand, the most diffused class of Glazed White Ware pottery in the western Black Sea is the group called Glazed White Ware IV. The majority of the finds consists of dishes, bowls and cups decorated with plain glaze speckled in green and brown colour, and blurred painted with green, blue and brown. The blue painted examples are high in number and they are commonly dated to the twelfth and the beginning of the thirteenth century. [30] Manolova adds some examples of a decorative subtype painted with green and red which is also noted in the northern Black Sea[31] and Danube delta[32] where it is usually dated to the eleventh and the twelfth century. However, the author relies on Stevenson's suggestion for dating, of Stage V which is the end of the twelfth and beginning of the thirteenth century, since it is based on stratigraphical evidence.

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[27] Manolova-Voykova, 'Import of Middle Byzantine Glazed Pottery to the Western Black Sea Coast: The Case of Two Cities – Varna and Anchialos', fig. 1.3.

[28] Manolova-Voykova, 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview', pls. 1:8, 4:7, 5:4, 7:8, 8:5-6; 'Import of Middle Byzantine Glazed Pottery to the Western Black Sea Coast: The Case of Two Cities – Varna and Anchialos' fig. 2.24-29.

[29] Manolova-Voykova, 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview' pls. 7:7, 8:4, 9:3; 'Import of Middle Byzantine Glazed Pottery to the Western Black Sea Coast: The Case of Two Cities – Varna and Anchialos' fig. 2. 22-23.

[30] Manolova-Voykova, 'Import of Middle Byzantine Pottery to the Western Black Sea Coast: An Overview', 105.

[31] Tatyana I. Makarova, 'Polivnaia Posuda. Iz Istorii Keramicheskogo Importa i Proizvodstva Drevnei Rusi', svod arkheologicheskikh istochnikov, 1967, 21–22.

[32] Ion Barnea, 'Ceramica de Import', in *Dinogetia: Aşezarea Feudală Timpurie de La Bisericuţa-Garvăn,* ed. Gheorghe Ştefan et al. (Editura Academiei Republicii Socialiste România, 1964), 241.

Nufăru, Romania, is another site which is located in the upper direction of the north route in the western Black Sea. Baraschi and Damian[33] divide Glazed White Ware sherds of Proslavita-Nufăru stylistically into two: A. monochrome and B. polychrome. The sub-groups which are included in A. Plain Glazed White Ware (A. a. La céramique émaillée monochrome simple) are decorated with a relief design and incised design, namely Impressed an Incised Ware, covered by green and yellow to brown glaze. Potsherds are dated to the tenth and the eleventh century and they also appear sporadically in the twelfth century level of the excavation.[34] On the other hand, B. polychrome (B. La céramique émaillée polychrome) includes Slip-brown Painted Ware, Spatter Painted Ware, Polychrome Ware and Green and Brown Painted Ware as sub-groups of polychrome decoration which are dated to the eleventh and the twelfth century by an analogue.[35] Based on the authors' account, Capidava, Cernavoda, Dinogetia, Păcuiul lui Soare, Tulcea, Troesmis, Isaccea, Murfatlar, Măcin, Camena, Mangalia, Hârşova, Hinog, Igliţa, Dervent, Piatra Frecăţei, Silistra and Djadovo are the other sites in Romania where White Ware are noted.

Similar examples are diffused to the cities of modern Ukraine, Russia and the Crimea. Kiev, Vyshhorod, Gnezdova, Shestovitsa, Avtunychi and Liskovoe in the Chernihiv and Cherson in Ukraine[36] Among these cities, Gnezdova represents a particularly interesting contextual case since Glazed White Ware was unearthed in a burial mound. The site is located on the banks of the river Dnieper covering more than four-thousand barrow mounds, spread over thirty hectares, which are dated between the late ninth and the eleventh century.[37] Eniosava and

[33] Silvia Baraschi, 'Considérations Sur La Céramique Émaillée de Nufăru', *Dacia* 37 (1993): 237–77.
[34] Ibid., 238-242: Fig. 14.
[35] Ibid., 242-43: 15-17, 20–21.
[36] Natalia V Eniosova and TA Pushkina, 'Finds of Byzantine Origin from the Early Urban Centre Gnézdovo in the Light of the Contacts between Rus' and Constantinople (10th-Early 11th Centuries AD)', in *From Goths to Varangians-Communication and Cultural Exchange between the Baltic and the Black Sea*, ed. Line Bjerg, John H. Lind, and Søren M. Sindbæk (Denmark: Aarhus University Press, 2013), 226.
[37] Ibid., 214.

Pushkina state that Byzantine objects in general may have been acquired by several contacts, such as trade, gift exchange or tribute and brought to Bulgaria or the Crimea by nobles, merchants and soldiers who were then buried in the Gnezdova necropolis. The article includes only Polychrome Ware which are dated in mid-tenth and in the second quarter of the mid-tenth century.[38] Examples are a dish which bears a depiction of a griffin (Fig.5.1) from mound 20, a nearly complete polychrome cup with handles from an unidentified grave (Fig.5.3) and also some cup sherds (Fig. 5.4) from the rich chamber-grave Ol-30. Also, the catalogue includes another plate (Fig.5.2) from grave 18 on which the surface treatment is unrecognisable. Among these Polychrome Painted White Ware, the plate with a griffin and the polychrome cup sherds were unearthed in the biggest and richest mounds among those excavated in the central group of the necropolis.[39] Therefore, the context indicates that Polychrome Painted White Ware was also used as a burial object signifying the nobility of the wealthy dead (see Chapter four, Part two).

Another city where Glazed White Ware is diffused in the north route after the tenth century is Cherson. Yakobson's article[40] examines some import middle and the late Byzantine ceramics at Cherson including White Ware, Zeuxippus Ware and Champlevé Ware, spanning from the tenth to the fourteen centuries. Two almost complete vessels depict a human figure on the back of a winged horse, probably St. George or Theodore, fighting with a snake and also depicted in between a fantastic beast and a snake. The central medallions which are formed by champlevé are the other decorative motifs on these pottery fragments. Glazed White Ware pottery which is dated to the tenth century includes Impressed Ware on which bear depiction of facing animals, a hunting scene depicting a griffin and a human figure.

[38] Ibid., 226.
[39] Ibid., 227–29.
[40] Yakabson, 'Srednevekovaja Polivnaja Keramika Kak Istoriceskoe Javlenie'.

Zalesskaya's article[41] comprises thirty sherds belonging to Polychrome pottery which were recovered at Cherson in between 1976 and 1980. The decoration of the pottery assemblages is mainly vegetative, Greek inscription and pseudo-kufic characters. Also, a dish bears a unique motif depicting two human figures under a tree. These sherds are dated to the tenth century based on the coin evidence.

Recently published examples of Glazed White Ware found in Cherson come from a well-defined archaeological context. The book written by Yashaeva et al.,[42] comprises 18 pieces of White Wares including the following: dishes, bowls, cups, mugs, icon fragments and tiles, vases, chafing dishes, lids and jugs. Two restored dishes (fig. 410 – 411) from the same layer, Northern area, block XXVIII, cistern JI, have a similar ornamental pattern.

The dishes have ring feet and outward rims. The vegetal depiction on the dishes is applied under the transparent glaze. Four opposing medallions on the fig. 410 (D: 29cm; H: 6.5cm; the tenth century) have two stylized trees and two split-palmette motifs with curved branches. On the upper side of the exterior of these medallions, there are four leaves. In the centre a four-pointed leaf surrounds a cross in a diamond shape. Other than this composition, the background depicted with red dots and the rim is ornamented as a bordure with half circles. The centre of the dish, Fig. 411 (D: 30; H: 6cm; the tenth and eleventh centuries), has wine scrolls into a form of a quatrefoil which ends with three pointed palmettes. Around this central medallion radially circulated half-palmettes are arranged with pseudo-Kufic decoration. Like the previous example, the background is similarly decorated with red dots and the rim has half circle ornamentation. Although it is not indicated, the dishes in figures

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[41] Vera N Zalesskaya, 'Nouvelles Découvertes de Céramique Peinte Byzantine Du Xe Siècle', *Cahiers Archéologiques* 32 (1984): 49–62.
[42]Tatyana Yashaeva, Elena Denisova, and Natalia Ginkut, *The Legacy of Byzantine Cherson* (United States: The University of Texas at Austin, Institute of Classical Archaeology, 2012).

416 and 419 are impressed wares and the missing bottom part of the Fig. 416 (D: 25.3cm; H: 7.5cm; the tenth and eleventh centuries), which was found in the North-eastern area, block XCVI, could have been an indication for a fruit stand rather than a dish. On the centre of the dish, three male figures are encircled with a tondo which has an interlaced border around. The description of these males in the book is that three saints with their short tunics and halos around their heads hold close books in their hands. On the surface of the impressed design, the yellow, green and brown glaze are used, and also yellow glaze can be seen on the exterior. The other impressed ware (Fig. 419, D: 18.2cm; H: 5.5cm; second half of the tenth and mid-eleventh centuries), was unearthed in North-eastern area, block I, square in front of the Eastern Basilica, ornamented with a bird facing to left side in a tondo and the inner surface is covered by a green glaze. The other two dishes are Green and Brown Painted Wares with ring feet and outward rims. The Fig. 426 (D: 34cm; H: 8.9cm; mid-twelfth and thirteenth centuries) is decorated with a dog image whose face and body are depicted from the right. The surrounding leaves can be seen above, below and in front of the figure, and the rim has diagonal strokes all over. In Fig. 427 (D: 34cm; H: 8cm; the thirteenth century destruction layer) a lion figure whose body is depicted in profile and face in frontal rests on the whole surface and painted brown and blue in colour. The rim has a wavy line moulding. The glaze is transparent on the inner surface and green in the exterior. A cross is depicted on the outside of the bottom, and it is indicated that there are traces of ancient repairing.

Sedikova's article[43] focuses on a selection of ceramics from what is called the destruction layer in Cherson which is dated to the mid-thirteenth century. Among the pottery groups, the Zeuxippus Ware is counted as the most representative one. White Ware IV, Aegean or Incised

[43] Larissa Sedikova, 'Glazed Ware from the Mid Thirteenth-Century Destruction Layer of Chersonesos', in *Medieval and Post Medieval Ceramics in the Eastern Mediterranean: Fact and Fiction*, ed. Joanita Vroom, Proceedings of the First International Conference on Byzantine and Ottoman Archaeology, Amsterdam, 21-23 October 2011 (Belgium: Brepols, 2015), 173–286.

Sgraffito Ware, Slip Painted Ware and Islamic Ware are the other detected pottery groups in this layer. The author gives seven well preserved examples of Glazed White Ware IV which is divided into two categories. The first group is Green and Brown Painted Decoration which are applied on plates, jugs, vases and cups. The decoration comprises figural depictions, such as birds and other animals (Fig. 2, 1-5). The second group consists of jugs which are decorated with green glaze on the exterior (Fig. 2, 6-7).

The pottery discussed in the article by Morozova et al.,[44] is a selection of ceramics from a shipwreck which was discovered off the southern coast of the Crimea by KNU's (Taras Shevchenko National University of Kiev) archaeologists. This cargo ship is thought to have been purchased in the Constantinopolitan market which had specific and rare goods, such as White Wares with polychrome paintings. With the help of archaeological evidence and narrative sources, the Novy Svet shipwreck is dated at the end of the thirteenth century.

In general, ceramics found in the Novy Svet are divided into 3 groups: Monochrome, Polychrome and Unglazed Pottery. The article focuses on the glazed pottery which is typologically divided into seven: plates, bowls, cups without handles on a high base, bowls so-called fruit stand, bowls with a rounded wide body, mugs and cups without handles on a low base. The surface treatment is varied and depends on the group, for example, vessels are painted on the interior while the exterior is plain. The glazes also show a variety of yellow, light or dark green and brown. Among the shipwreck finds, the Green and Brown Painted type has its variants such as Brown Painted and Blue Painted which all have the same surface treatment technique and style: a broad blurred contour is outlined with brown paint. The

[44] Morozova, Zelenko, and Timoshenko, 'Green and Brown White Wares from the Collection of the Archaeological Museum, National University of Kiev (Ukraine)'.

Glazed White Ware IV presents mainly three ornamental categories: floral and vegetal, abstract and geometrical, animals and birds. In the article, the examples are shown in fifteen figures which include drawings and photos.

The Balatlar Church complex is located in Ada district of Sinop, Turkey. İnanan[45] informs us that many of the ceramic sherds were unrevealed in the excavation season in 2012. The Byzantine pottery finds are classified as Glazed White Wares, Aegean Wares, Slip Painted Wares, Fine Sgraffito, Champléve Wares and Zeuxippus Family Wares. Glazed White Wares are represented by only a few fragments which are classified as Green and Brown Painted White Ware, GWW IV. Though Glazed White Ware IV is few in number, Red Ware ceramics at Balatlar seem alike to those were found with the Novy Svet's shipwreck. Sinop port may not be considered a loading port, but certainly a similar cargo ship might have reached to that trade point attesting by both White Ware and Red Ware in the thirteenth century.

2.1.2.2 The Aegean Sea and the Western Mediterranean

The second route goes to cities in the west of the Aegean Sea, via the Bosporus, the Sea of Marmara and the Dardanelles, respectively. The findspots suggest that this route goes to cities in northern Greece, probably first stopping at Sestos where Glazed White Ware I was recently discovered by an archaeological survey.[46] It rotates down to some big cities in the south, such

[45] Filiz İnanan, 'Sinop Balatlar Kilisesi Kazısı Sırlı Bizans Seramik Buluntularının Ön Değerlendirmesi', *TÜBA-AR Türkiye Bilimler Akademisi Arkeoloji Dergisi*, no. 15 (2012): 147–60.
[46] Ayşe Çaylak Türker, 'Byzantine Glazed Ware from Sestos-Akbaş in the Thracian Chersonesos', *Sinop Üniversitesi Sosyal Blimler Dergisi* 5, no. 2 (2021): 365–82.

as Corinth and also the islands as Aegina and Crete.[47] The farthest sites in the west where GWW I was revealed are Butrint in Albania.[48]

An increase seems to have happened in the number of distributed sites by revealing Glazed White Ware II-IV and Polychrome Ware in the Aegean Sea and the Western Mediterranean beginning in the mid-tenth century. The cities which were diffused by the west route are as follows: Ganos and Perinthos in Thrace; Maroneia, Synaxe, Thessaloniki, Vrya, Anargiri, Doliana, Halkidiki, Chalcis, Thebes, Thespies, Lefokastro, Athens, Aegina (Kolona), Corinth, Sikyona, Sparta, Kastania, Nichoria, Messinia, Rhodes, Crete in Macedonia and Greece; Otranto, Quattro Macine, Venice, Vaccarizza, Sicily, Capaccio, Vecchia, Velia in Italy and Butrint in Albania.[49]

A group of pottery sherds was discovered during a rescue excavation in a private house at Agape Street of Thessaloniki. Kanonidis[50] states that finds of White Ware pottery appear to be rare for the city among the recorded archaeological researches until 1999. In the landfill of the house, a number of coins and a considerable amount of Middle Byzantine Glazed White Ware and Red Ware were revealed. Among them, White Ware sherds were unearthed in the courtyard which were dated to the last decade of 11th century based on the coin finds from the same layer of this landfill. The forms of the vessels are deep and shallow, small and large plates, small bowls, one and two handled cups, saucers, goblets, and lamps. The decoration

[47] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18; Vroom, 'Ceramics'.
[48] Joanita Vroom, 'Dishing Up History: Early Medievale Ceramic Finds from the Triconch Palace in Butrint', *Dishing Up History*, 2008, 293.
[49] For further information see Anastasia Vassiliou, *Βυζαντινή Εφυαλωμένη Κεραμική Από Το Άργος, (10ος-α' Μισό 13ου Αι.), (Byzantine Glazed Ceramics from Argos (10th-First Half of the 13th Century)*, Σειρά Μονογραφιών AURA 5 (Athens, 2020), 47–71.
[50] Ioannis Kanonidis, 'Μεσοβυζαντινή Εφυαλωμένη Κεραμική Με Λευκό Πηλό Από Ανασκαφές Οικοπέδων Στη Θεσσαλονίκη', ed. Charalambos Bakirtzis, VIIe Congrès International Sur La Céramique Médiévale En Méditerranée Tessaloniki, 11-16 Octobre 1999 (Athènes, 2003), 71–76.

includes Polychrome, Plain Glazed and Brown-slip Painted Wares consisting of incised and impressed geometric and vegetal designs which are similar to John Hayes's White Ware II.

On the other hand, Tsanana argues that Polychrome Painted White Ware at Vrya, Halkidiki[51] is problematic since no further digging has been done for the earlier strata than the twelfth century. Nevertheless, a few sherds which belong to Hayes's Polychrome Ware Class 2 were found with an anonymous folles (Class A2), and, also some sherds of class 3 with some coins of Alexios I (1057-1118). The author also briefly mentions other Glazed White Wares which are similar to Hayes's GWW II; however, the article does not include any illustration or photos of the aforementioned sherds. However, some cities in the southwest coast, such as Chalcis, Euboea, where Plain-glazed and Polychrome Painted Wares unearthed, may suggest a date beginning from the ninth to the eleventh century.[52]

In the west, Thebes excavations uncovered a considerable amount of GWW sherds which were unearthed in a house in vicinity of the church of St. Gregory of the Theologian. Koilákou[53] builds a catalogue which comprises six examples from Thebes. Three of them are fruit stands with impressed design which are dated to the tenth century (Fig. 1-3). A chafing dish, (fig. 4) a lid and another fruit stand are also other examples which are also dated to the tenth century. Lastly, a polychrome cup, which falls into Sanders's Type 2, is dated to the eleventh century. Also, Nichoria[54] is another site which is located in southwest Greece where

[51] Aikaterini Tsanana, 'The Glazed Pottery of Byzantine Vrya (Vrea)', *VIIe Congrès International Sur La Céramique Médiévale En Méditerrannée, Thessaloniki. Atina*, 2003, 245–50.
[52] Nikos D. Kontogiannis and Stefania S. Skartsis, 'Ceramic Vessels and Food Consumption: Chalcis as a Major Production and Distribution Center in the Byzantine and Frankish Periods', in *Multidisciplinary Approaches to Food and Foodways in the Medieval Eastern Mediterranean*, ed. Sylvie Yona Waksman, Archéologie(s) (Lyon: MOM Éditions, 2021), 239–54, http://books.openedition.org/momeditions/10199.
[53] Charíkleia Koilákou, 'Κεραμική Με Λευκό Πηλό Από Ανασκαφές Στη Θήβα', *Δελτίον Της Χριστιανικής Αρχαιολογικής Εταιρείας* 33 (2012): 305–12.
[54] John Rosser, 'The Pottery', in *Excavations at Nichoria in Southwest Greece: The Dark Age and Byzantine Occupation*, ed. William A McDonald, William DE Coulson, and John Rosser (University of Minnesota Press, 1983), 378–97.

excavations in Area II revealed a Polychrome cup (Fig. 10-1, Pl.10-1) dated to the tenth and eleventh centuries, a Green Glazed Ware (Fig. 10-2, Pl.10-2), and a Green and Brown Painted Ware (Fig.10-3, Pl.10-3), which are dated to the late eleventh and early twelfth centuries.

The chronology and the diffused groups of Glazed White Wares are made more comprehensible by the excavation results of two big cities in Greece: Athens and Corinth. The earliest publication mentioning the presence of Glazed White Ware in Athens is written by Frederick O. Waagé.[55] The article covers local and imported wares, spanning chronologically from the Hellenistic to the Turkish Period, which were unearthed in the first year of the excavations in the Athenian Agora. In the catalogue of Late Roman pottery (A-D) and Byzantine pottery (mostly sgraffito and red-clayed green and brown), only two sherds of Impressed Ware are evaluated in the class called "1. White Stamped Ware (Talbot-Rice A5)" in Stamped Ware which is dated in the ninth to the twelfth centuries.[56]

Later, in 1938, M. Alison Frantz adds examples to the selection of the Middle Byzantine Pottery revealed in the Agora. The article includes White Ware found in a closed context, a cistern, near the Church of the Hypapanti.[57] According to Frantz's categorisation, which is adopted from Talbot-Rice, but together with associated coin evidence, the glazed White Ware is evaluated under three main classes: I. Plain-glazed Wares (a. White Ware, Talbot-Rice A3), II. Impressed Ware (Talbot-Rice A5), III. Painted Wares (a. Polychrome Ware Talbot-Rice A 1). Since White Ware findings are fragmentary, Frantz uses only a polychrome cup (Fig. 19, B 3), a blue glazed bowl/cup (Fig. 19, B 4) and a green glazed chafing dish (Fig. 22)[58] as

[55] Frederick O. Waagé, 'The Roman and Byzantine Pottery', *The American Excavations in the Athenian Agora: First Report* 2, no. 2 (1933).
[56] Ibid., 321-22, Fig. 17a, b.
[57] M. Alison Frantz, 'Middle Byzantine Pottery in Athens', *Hesperia* 7, no. 3 (1938): 433.
[58] Ibid., 434, 458-9.

representatives of this pottery group. Even though these ceramics are fragmentary, Frantz thinks that their presence in the context contributes as valuable chronological evidence.[59]

The above limited definition of the existence of Glazed White Ware in Athens is unravelled by a reference book, *Byzantine Glazed Pottery in the Benaki Museum*, written by D. Papanikola-Bakirtzi et. al., which was published in 1999.[60] The book comprises a catalogue of the fine ware at the Benaki Museum. The primary division is made upon the colour of the fabric: White (A) and Red (B) Wares, and the surface treatment is used for a further subdivision, such as A.1 Painted Wares: A.1.a Polychrome Ware and so on. The catalogue includes seventy-five sherds and one restored bowl of White Wares, of which the majority belongs to the Andronikos Kintaoglou Donation, with their black and white photographs. White Ware pottery is divided into three: A.1 Painted Wares (with its subdivisions: A.1.a. Polychrome; A.1.b. Green and brown painted; A.1.c.Brown painted; A.1.d. Blue painted), A.2. Incised Ware and A.3. Relief Ware. The chapter dedicated to the White Wares is well organised, but forms are not clearly defined because all of them are called vases. Also, the author does not use the typology of John Hayes.

In the first group, A.1. Painted Wares, the author divides Polychrome Wares (A.1.a.) into two: Tiles and Vases. In total, ten sherds of polychrome tiles including two icons (Nos 1-2), possibly one of them is Christ Pantocrator, and other eight revetment tiles (Nos 3-8 was published by Macridy, *Monastery of Lips*, 275, fig.85, inv. Nos 17495, 17496 and 17497). Although the author labels the other ten examples of Polychrome wares as vases, they are actually open and closed vessels, whose base diameters are between 5 and 10cm. The figures are usually depicted on the interior surface, except the restored example (No 11) which bears

[59] Ibid., 430.
[60] Dimitra Papanikola-Bakirtzi, Foto N. Maurikiou, and Charalambos Bakirtzis, *Byzantine Glazed Pottery at the Benaki Museum* (Benaki Museum, 1999).

a wavy band on the exterior surface, including human figures (No 15) and animals (Nos 11, 12, 13 and 14), such as birds and lions, medallions inscribed with crosses and a single example with pseudo-kufic decoration in black and white decoration. The executed colours on all revetment tiles, icons and vessels are in green, blue, white, yellow, brown with black outlines.

The group A.1.b. Green and Brown Painted Ware is represented by fourteen vessels, such as large plates, and are made of hard white fabric and painted with animals (Nos 21-24) and abstracts motifs (Nos 26-34) in green and purplish brown with blurred outlines under the pale green, bright yellow and colourless glaze. Vessels usually bear the decoration on the interior surface, but some show exceptions with their designs on the exterior (Nos 22, 29 and 33). Six examples of the class A.1.c. Brown Painted Ware are also made of hard white fabric with scroll motifs (Nos 36 and 37), star-shaped medallion (No 39) and a bird (No 40) which are executed in purplish brown under an opaque glaze. The last sub-group of A.1 Painted Ware in the Benaki Museum is A.1.d. Blue Painted Ware which is four in number. This group also has hard white fabric with dark blue painted decoration. Motifs are birds (Nos 41 and 42) and unidentified designs (Nos 43 and 44) with blurred outlines under an opaque glaze.

The second group, A.2. Incised Ware which corresponds with John Hayes GWW I from the seventh to the ninth centuries, in the Benaki Museum includes five sherds that have pinkish white or whitish fabric with pinkish white slip in inside and outside of the vessels. The incised executed motifs are wavy lines (No 48), vegetal forms (No 45), animals (Nos 46 and 47), such as birds and fish, and a unique example (No 49) with relief and painted decoration under the green, yellow and orange glaze. Among these open vessels, a chafing-dish (No 45) and a fruit stand (No 46) are especially important.

A.3. Relief Ware is represented by twenty-eight sherds which have coarse hard white fabric and sometimes pinkish and the glaze is varying from yellow, green and yellowish orange. This group also corresponds with John Hayes GWW II from 9th to 11th-century. Since the impressed decoration repertoire is broad and motifs are varying, the author categorises them in two: the first one is free standing subjects and the second one is inscribed figures in enclosed medallions, designed either single or chained.

The former director of the Corinth Excavation Guy D. R. Sanders's Ph.D. thesis, *Byzantine Glazed Pottery at Corinth to c. 1125,* comprises Byzantine glazed pottery of Corinth which unearthed the second largest Glazed White Ware collection after Istanbul. As stressed in the Introduction, his work is of high importance since it revised the previous evaluation, by Morgan, in which an issue in the chronology of Byzantine ceramics exists. This revised chronology and classes of the Byzantine and Frankish Pottery in Corinth have been discussed in several articles by the author[61] (relatedly, see Appendix 7, CGWW tabulation).

Sanders's approach to classification of Glazed White Ware is a combined treatment including both archaeological and art historical approaches (see Introduction, Table 6). Four different fabric types (Fabric 1-4), and four main decorative classes together with variety of sub-groups (Decoration D-G) and also the forms of the vessels (White Wares A-E) are organised very neatly.[62] The lack of evidence of the earliest White Ware in Corinth (only two sherds) limits Sanders's discussion of the first group (GWW I) in his thesis. However, his combined

[61] Guy D R Sanders, 'Recent Developments in the Chronology of Byzantine Corinth', *Corinth: Results of Excavations Conducted by the American School of Classical Studies at Athens*, 2003, 385–99; Guy D R Sanders, 'Byzantine Polychrome Pottery', *British School at Athens Studies, Mosaic: Festschrift for A. H. S. Megaw* 8 (2001): 89–103.
[62] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 58-59: 70-77:250-260:278-290.

methodology brings undeniably better definition of later Glazed White Wares which are dated from the mid-tenth to the first quarter of the twelfth century.[63]

One particular difference in the methodologies both Sanders and Hayes implemented is the way of treating Polychrome Ware. Hayes divides this group into three (Polychrome Ware 1-3) according to the surface treatments (see Part two in this Chapter). On the other hand, Sanders initially states, in his thesis, that Polychrome decoration can be seen in most of the fabric classes (Fabric 1-3). Therefore, he thinks that the chronological order cannot be defined by the difference in the fabric.[64] However, Sanders's article[65] divides Polychrome Ware into three types (Type 1-3) and also three fabric classes (Fabric 1-3). Regarding the association among the types and fabrics, Type 1 is made in Fabric 1-2; Type 2 includes Fabric 1-3; Type 3 is "exclusively" made in Fabric 3. All three types are dated to the eleventh and the twelfth centuries.[66]

Argos, which is located in the eastern part of the Peloponnese, is another findspot of Glazed White Ware Pottery. Vassiliou[67] divides Glazed White Ware into six groups according to the surface treatments. 1.1 Impressed White Ware, Glazed White II (Kat. no. 1-3) comprises relief decoration with geometric designs which are dated from the late tenth to the mid-eleventh century. 1.2 Plastic Ware, Plastic Decoration/Figural Relief (Kat. no. 4-7) defines a group of relief/impressed designs which are embossed, rather than impressed. They are mostly fragments, and motifs cannot clearly be defined; however, there is a body part that probably belongs to a human. Vassiliou uses Morgan's reference to date Plastic Ware to the

[63] Ibid., 307–8.
[64] Ibid., 233.
[65] Sanders, 'Byzantine Polychrome Pottery', 91–98.
[66] Ibid., 101.
[67] Vassiliou, *Βυζαντινή Εφυαλωμένη Κεραμική Από Το Άργος, (10ος-α' Μισό 13ου Αι.), (Byzantine Glazed Ceramics from Argos (10th-First Half of the 13th Century)*.

late tenth and mid-eleventh century. 1.3 Red-brown Painted White Ware, Incised Red-Brown Painted White Ware, Glazed White Ware II (Kat. No. 8-9) involves red-painted white ware examples together with a variant on which incisions are used together, and all examples are dated in the late tenth and mid-eleventh century. 1.4 Monochrome Glazed White Ware, Speckle-Glazed White Ware, Glazed White Ware II-III (Kat. No. 10-13) includes Plain-glazed or Monochrome Glazed Ware and Spatter Painted Ware and are dated to the tenth-to-eleventh (Fig. 11-12) and eleventh-to-twelfth (Fig. 13) centuries. 1.5 Polychrome Ware (Kat. No. 14) comprises a cup which falls in Morgan's first group (9^{th}-11^{th} c.) and Sanders's Type 2c (late 11^{th} c.). 1.6 Green and Brown Painted White Ware, Glazed White Ware IV (Kat. no. 15-16) includes Brown and Green Painted White Ware examples which are dated between the late eleventh and the early twelfth centuries. Since the sherds are fragmented, the author cannot describe the decoration; however, she uses Green and Brown Red Ware to construct the decorative data of the white counterparts.

On the other hand, the least diffused sites in the second route are located in the Western Mediterranean from the tenth century onwards. D'Amico can only include a few sherds of Glazed White Ware II, IV and Polychrome Ware from Capaccio Vecchia,[68] Velia,[69] Quattro Macine[70] and Vaccariza-Apulia[71] suggesting that Glazed White Ware exports to the Italian peninsula appear to continue until the twelfth to thirteenth centuries.[72] Though the context is residual, D'Amico suggests that those wares were used as symbols of power and status by the

68 Erica D'amico, 'Glazed White Ware in the Italian Peninsula: Proposals for a Study', *Çanak. Late Antique and Medieval Pottery and Tiles in Mediterranean Archaeological Contexts*, 2007, 224, Fig. 4.
69 Ibid., 226, Fig. 6.
70 Ibid., 224.
71 D'amico, 'Byzantine Finewares in Italy (10th to 14th Centuries AD): Social and Economic Contexts in the Mediterranean World.', 330–32, Figs. 5.6a, 5.7-5.7a.
72 Ibid., 94.

higher social class groups.[73] Also, Whitehouse's article[74] comprises the results of the salvage excavations at Otranto under the direction of University of Lecce and the British School at Rome, between 1977 and 1978. Though the author mentions some sherds of Polychrome pottery, there is not any pictures or drawings of these ceramics available. But some Glazed White Ware II were later studied by Whitehouse and Patterson.[75]

2.1.2.3 The Western Asia Minor and the Eastern Mediterranean

The third route leads to south, the Mediterranean Sea, passing through the same strait line, Bosporus to the Dardanelles, in the west to reach the Aegean Sea. But the route turns to the south from the Dardanelles passing through Troas and the big cities of western Asia Minor in the south, such as Ephesus and Smyrna, then goes to Lycia and Pamphylia, Cilicia[76] and Cyprus which seems to be the final destination in the Eastern Mediterranean.

Glazed White Ware I is scarcely noted both in the western Asia Minor and the Eastern Mediterranean. Güllüce, Akçin Kayalar and Gülpınar in Troas are the locations Glazed White Ware I has been found as surface material (see below).[77] Nevertheless, the earliest dated

[73] Erica D'amico, 'Byzantine Finewares in Italy (10th-14th Centuries): Social and Economic Context in the Mediterranean World', in *Atti Del IX Congresso Internazionale Sulla Ceramica Medievale Nel Mediterraneo AIECM2 (Venezia, Scuola Grande Dei Carmini Auditorium Santa Margherita 23-27 Novembre 2009)*, ed. Sauro Gelichi (Firenze, 2012), 478.
[74] David Whitehouse, 'Otranto Bizantina: Scavi Di Emergenza 1977-78', in *Magna Grecia Bizantina e Tradizione Classica, Atti Del XVII Conv. Di Storia Sulla Magna Grecia, Taranto 1977* (Naples, 1978), 537–41.
[75] Helen Patterson and David Whitehouse, 'The Medieval Domestic Pottery', *Excavations at Otranto* 2 (1992): 163–66; Helen Patterson, 'Contatti Commerciali e Culturali Ad Otranto Dal IX al XV Secolo: L'evidenza Della Ceramica', *La Ceramica Nel Mondo Bizantino Tra Xi e Xv Secolo Ei Suoi Rapporti Con l'Italia*, 1993, 104–5, Fig.2: 3-6.
[76] Three Glazed White Wares from the Yumuktepe Excavations are on display at Mersin Arkeoloji Müzesi (personal communication with Filiz Kerem, 2017)
[77] Böhlendorf-Arslan, 'Surviving the Troad: Byzantine Sites and Their Pottery in Medieval and Post-Medieval Ceramics', 52, 54, 56.

context, the late seventh or the eight centuries,[78] for Glazed White Ware I is the Yassı Ada Shipwreck,[79] which was found off the coast on this route. Ephesus,[80] and Paphos[81] in Cyprus are other sites which Glazed White Ware I were unearthed. Also, vessels found in Carthage,[82] are thought to have been reached to the city by local sailors via the north-south route which was the only notable trading link between Carthage and Constantinople in the late seventh century.[83] From the ninth century onwards, later groups, GWW II-IV and Polychrome Ware, were distributed to the cities which are Parion, Kepez, Kurşunlu, Assos, Magnesia, Beşiktepe, Anaia, Ephesus, Smryna, Milet, Myra, Balboura, Nicosia and Paphos.[84]

In the north, Parion is a seaport city which is located in the north of Troas. A group of Plain Glazed, Brown-slip Painted and Polychrome Painted White Wares were uncovered in the theatre of Parion which was studied by Büyüme in his MRes thesis,[85] later published in a monograph concerning the findings of the theatre. In the article, [86] Büyüme revises the classes, which were first divided into five according to the difference in decorative painting. In the revised version, Glazed White Wares are categorised in three groups: Unicolor, Glazed, Plain Ceramics (Fig.1; 2. 11-17); Ceramics Painted Brown (Fig. 3. 18-28) and Ceramics with

[78] Joanita Vroom, 'Byzantine Sea Trade in Ceramics: Some Case Studies in the Eastern Mediterranean (ca. Seventh–Fourteenth Centuries)', in *Trade in Byzantium: Papers from the Third International Sevgi Gönül Byzantine Studies Symposium*, 2016, 159, 169.
[79] George F Bass and Frederick H Van Doorninck, 'The Pottery', in *Yassi Ada. A Seventh-Century Byzantine Shipwreck*, vol. I (Texas A & M University Press, 1982), 317.
[80] Joanita Vroom, 'Medieval Ephesus as a Production and Consumption Centre', in *Ephesos from Late Antiquity until the Middle Ages. An Archaeological Introduction*, ed. Sabine Ladstätter and Paul Magdalino, 2019, 115, pl. 297, K 239.
[81] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18; Vroom, *Byzantine to Modern Pottery in the Aegean*, 63.
[82] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18; Vroom, *Byzantine to Modern Pottery in the Aegean*, 63.
[83] D'amico, 'Byzantine Finewares in Italy (10th to 14th Centuries AD): Social and Economic Contexts in the Mediterranean World.', 41.
[84] Vassiliou, *Βυζαντινή Εφυαλωμένη Κεραμική Από Το Άργος, (10ος-α' Μισό 13ου Αι.), (Byzantine Glazed Ceramics from Argos (10th-First Half of the 13th Century)*, 47–71.
[85] Büyüme, 'Parion'un Bizans Dönemi Sırlı Seramikleri', 21–38.
[86] Umut Büyüme, 'White Clay Ceramics of Parion Theater Dating from Byzantine Period', in *Roman Theater of Parion, Excavations, Architecture and Finds from 2006-2015 Campaigns*, ed. Cevat Başaran and Ertuğ Ergürer (İÇDAŞ A.Ş. Publications, 2018), 153–63.

Multicolour Underneath the Glaze (Fig.3. 29-32). All examples are dated in the ninth and the eleventh century. Büyüme's reference for dating comprises similar vessels which are mainly from Saraçhane, Hippodrome, Corinth Excavations.

Böhlendorf-Arslan[87] conducted surveys beginning in 2006 and resulting in six campaigns in the area covering 2832 km² in the northwest of Asia Minor where Late Antique and Byzantine sites are located in and around Troas. The ceramic finds of the sites, except Assos whose sherds were unearthed in the excavations, are surface finds and not in high quantity; however, these finds help to identify sixteen sites which were occupied in the Middle Byzantine Period. Glazed White Ware pottery seems to be used as a dating criterion for those sites.

198 find spots which were identified and documented during the six campaigns with 24 places where some materials from the Byzantine Period are used as spolia in the Ottoman cemeteries, buildings or some randomly displayed. These recorded sites comprise a Roman-Early Byzantine site with the occupation of the Scamandros Valley (Marmat/Güllüce), a settlement close to a production site in Akçin Kayalar, Kızkalesi castle, a small town Chyrse (Gülpınar) and a seat of a bishopric (Assos). Among these places, two fragments of White Ware I (Fig. 9, 2) were determined in Güllüce in the Scamandros Valley, and another two fragments of White Ware I (Fig. 12) were found in Akçin Kayalar. Despite the fact that Kızkalesi castle does not have any examples of White Wares in overall its ceramic selections, Simithne (Gülpınar) is represented by three groups which are White Ware I, II (Fig. 16, 1-2) and IV (Fig. 16, 3-4). With the evaluation of the quantity on the sites, the episcopal city of Assos seems to have it has the highest number and the most variety. A few and small fragments of White Ware II (Fig. 19, 15) with thick yellow glaze and impressed decoration

[87] Böhlendorf-Arslan, 'Surviving the Troad: Byzantine Sites and Their Pottery in Medieval and Post-Medieval Ceramics'.

and dented ornaments, a rim and a bottom of a goblet (Fig. 19, 16-17) as the characteristic of White Ware III are also in the finds. A well-preserved cup as an example of White Ware IV is covered with grey-yellow glaze inside and orange-white glaze outside. Over the glaze, the cup has green and dark brown irregular loops in shape and flow marks (Fig. 19, 18). Overall, the author's conclusion of White Wares is that they were imported into Troad from the beginning of the eighth or in the ninth centuries and their painted versions, such as White Ware IV and V, were still in use in the thirteenth century.

Doğer mentions a variety of ceramic fragments were unearthed at the excavation of Roman State Agora at Smyrna by the Izmir Archaeological Museum. Her article[88] includes the findings between 1997-1998 and 2002-2003 excavation seasons. Considering the Middle Byzantine Period, Glazed White Ware pottery from this period includes Undecorated, Impressed, and Inscribed with Spattered painted wares (Pl. X a-g). Also, a small quantity of Brown and Green Stained Wares are dated to the thirteenth and fourteenth centuries. The illustrated Glazed White Wares in the article are six pieces in total. Fabric bears black inclusions and has pinkish layers which can be observed in the core of the fragments. They usually are covered by a plain yellow or green glaze. Two Impressed Ware are decorated with griffins, birds and geometric designs and are covered by a yellow and green transparent glaze. Additionally, two Incised White Wares which are decorated with horizontal, zigzag and parallel bands are in the findings of Smyrna.

A few sherds of Glazed White Ware were unearthed in the St. Nicholas Church's excavations, between 1989 and 2009, where the episcopal palace and other annexed buildings of the church are located. Fındık divides Byzantine pottery into two groups: (A) Medieval Byzantine

[88] Lale Doğer, 'Byzantine Ceramics: Excavations at Smyrna Agora (1997-98 and 2002-03)', in *Çanak. Late Antique and Medieval Pottery and Tiles in Mediterranean Archaeological Contexts*, Byzas 7 (Istanbul, 2007), 97–122.

Glazed Wares and (B) Late Byzantine Glazed Wares. As a subdivision of the first group (A.1) Glazed White Wares are classified as Monochrome, Incised, Brown-Painted, Polychrome, Spatter and Impressed. There are only two illustrations of these examples, a chafing dish and an Impressed Ware bearing an eagle figure.[89]

2.1.2.4 Anatolia

In general, vessels are fewer and mostly fragmented, yet the diffusion of Glazed White Ware in Anatolia is sharpened by later classes Glazed White Ware, specifically II-IV. The most rarely distributed class in central Anatolia is Glazed White Ware I. Its existence in the inner cities, such as Amorium,[90] Kaman-Kalehöyük,[91] suggest that vessels were transported by a land route. Nevertheless, there are two main land routes that vessels could possibly have been transported into inner Anatolia.

The first one is the north-south route which runs between Constantinople and the Cilician Gates with two alternatives: The Northwest-Southeast Diagonal Route 1 (Pilgrim's Road) via Ancyra (Ankara) and the Northwest-Southeast Diagonal Route 2 via Dorylaion and Amorium. While the former is known to have been used in the Late Roman period, the latter gained importance in between the seventh and the ninth century, especially used for military

[89] Ebru F Fındık, 'Medieval Glazed Ceramics from Myra and New Results', in *Actas Do X Congresso Internacional A Cerâmica Medieval No Mediterrâneo, Silves, 22 a 27 Outubro 2012*, ed. Maria J Gonçalves and Susana Gomez-Martinez (Silves, 2015), 164–76.
[90] Böhlendorf-Arslan, *Glasierte Byzantinische Keramik Aus Der Türkei, 3 Vols*, 98; Böhlendorf-Arslan, 'Stratified Byzantine Pottery from the City Wall in the Southwestern Sector of Amorium', 287–88, fig. 11, cat. no. 64-66.
[91] Joanita Vroom, 'Some Byzantine Pottery Finds from Kaman-Kalehöyük: A First Observation', *Anatolian Archaeological Studies* 15 (2006): 163–69.

purposes.[92] The second route is the west-east axis which also has two arteries: West-East Route 1 and West-East Route 2. The former (W-E R 1) starts from Ephesus, passing the Anatolian Plateau through Phrygia and Galatia, and goes to the Euphrates (i.e., the Great Trade Route) which was used for local trade. The latter (W-E R 2) connects Smyrna to Ancyra which is also thought to be used for local and regional trade.[93] Though it cannot be certain which of these routes was used in transportation of Glazed White Wares, one can deduce a casual contact via the West-East Route, from Ephesus or Smyrna, for the earliest Glazed White Ware unearthed in the inner Anatolia. For the later groups, GWW II-IV and Polychrome Ware, the findspots are as follows: Iznik (Nicaea), Daskyleon, Aphrodisias, Kaman-Kalehöyük, Amorium, Çanlı Kilise and Mokissos in Cappadocia.[94]

Iznik which is located in the southern Marmara by the Ascanius Lake (Lake Iznik) is a special case for Glazed White Wares studies. François argued the possibility of workshops which may located in Nicaea for Glazed White Ware manufacturing based on the white ware wasters at the theatre.[95] However, an analysis proved otherwise that the local clay does not match with Glazed White Ware.[96] The paragraphs below comprise the published examples which are kept in the Iznik Museum and also the findings of the Roman Theatre of the city which was studied in two different publications centring on the excavation seasons of 1980-1995 and 2012-2019.

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[92] Tülin Kaya, 'Routes and Communications in Late Roman and Byzantine Anatolia (ca. 4th-9th Centuries A.D.)' (MRes diss., Middle East Technical University, 2020), 193–94, 223.
[93] Ibid., 224–25.
[94] Tolga B. Uyar, Can Erpek, and Tülay Yeşiltaş, 'Mokissos Arkeoloji Projesi: 2021 Yılı Kazı Çalışmaları', in *42. Kazı, Araştırma ve Arkeometri Sempozyumu* 23-27 Mayıs 2022 Denizli. A few Glazed White Ware potsherds were found as surface material at Çanlı Kilise and Mokkissos in 2021.
[95] Véronique François, 'Les Ateliers de Céramique Byzantine de Nicée/Iznik et Leur Production (Xe-Début XIVe Siècle)', *Bulletin de Correspondance Hellénique,* no. 121.1 (1997): 417.
[96] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 82.

François's article[97] includes a catalogue of Glazed White Ware II, IV and Polychrome Ware which are dated to the tenth and eleventh century (Fig. 1-2). Glazed White Ware II includes dishes decorated usually with vegetative motifs and animal figures in relief and covered by a plain yellow, green or rarely speckled glaze. François mentions similar examples in Saraçhane context dating in the tenth and eleventh century. A few numbers of Glazed White Ware IV (12-15) include crudely painted Green and Brown Painted White Ware which is dated to the twelfth to thirteenth century. Lastly, a Polychrome Ware depicts a horseman in a medallion (Fig. 2b) which is dated to the tenth and eleventh century as Hayes suggested.

Özkul Fındık's publication[98] represents Byzantine ceramics which were unearthed at the theatre of Iznik (Nicaea) during the excavation seasons from 1980 to 1995. Potsherds were unearthed in three specific locations in the theatre: cavea, vaulted passage and near to the three-aisled basilica. Chapter III includes the classification of the ceramic findings. Byzantine ceramics are divided into two groups: 1. White Ware and 2. Earthenware. White Ware is divided into four subgroups: Brown Painted Ceramics (1.1); Impressed Ceramics (1.2); Monochrome Undecorated Ceramics (1.3); Underglaze Polychrome Ceramics (1.4). The catalogue comprises 84 examples with their drawings and 15 pictures of White Wares (Table 1-21, Photos 1-15). The examples are similar to those in François's article. Özkul also makes use of a wide range of publications for dating. However, she suggests a date centring in the ninth to fourteenth century for Byzantine Ceramics, in general, found in the theatre.

Meriç and Ekin Meriç's article examines Byzantine Ceramics of the theatre covering 2012-2019 excavation seasons. The authors use Hayes's classification and divide the pottery into

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[97] François, 'Les Ateliers de Céramique Byzantine de Nicée/Iznik et Leur Production (Xe-Début XIVe Siècle)', 1997.

[98] Nurşen Özkul Fındık, *İznik Sırlı Seramikleri, Roma Tiyatrosu Kazısı (1980-1995)* (Ankara: Bilgin Kültür Sanat Yayınları, 2014), 39–72.

two: Glazed White Ware II and Polychrome Ware. In Glazed White Ware II, Plain glazed includes relief designs encompassing crosses, animal figures, such as birds and griffins (Fig. 2:1-6). A few sherds bear relief motifs with Brown-slip Painted design (Fig.2:7, 9-10). On the other hand, Polychrome Ware involves cups with crosses depicted on the inside floor (Fig.3:1-4). Some sherds belong to dishes on which animal figures are depicted on tondo. Vegetative motifs also adorn these dishes and rarely bowls bear geometric designs on the exterior. All motifs and figures are outlined in black and infilled in warm yellow. While Glazed White Ware II is dated to the ninth and eleventh century, Polychrome Ware is dated in mid-eleventh and twelfth century.

Doğer's article[99] involves a group of Glazed White Wares IV unearthed in the Daskyleion excavation between 1988 and 2008. The settlement lies on a hill and its surroundings in Ergili village, southeast of Kuş Gölü, 30 km southwest of Bandırma. In total, 28 pieces of green and brown glazed white wares are examined in this article regarding their fabrics, glazes, forms and decorations. Frequently, hard, medium, greyish white, cream, beige and pale pink fabric with black- brown inclusions appear together with yellow and green-yellow lead glaze where glaze can be detected. Open vessels, bowls and small bowls are the main forms with green and brown glaze painted. The brown paint is usually applied under the slip. The repertoire of Green and Brown Blurred Painted Ware is the various shapes, such as stripes and some body forms, probably belonging to animals, in Glazed White Wares IV.

[99] Lale Doğer, 'Daskyleion Kazılarından Buluntular: Beyaz Hamurlu Yeşil ve/veya Kahverengi Boyalı Bizans Seramikleri (Sırlı Beyaz Mal IV/GWW IV)', in *Bizans ve Çevre Kültürler, Prof. Dr. Yıldız Ötüken'e Armağan*, ed. Sema Doğan and Mine Kadiroğlu (Yapı Kredi Kültür Sanat Yayıncılık A.Ş., 2010), 164–76.

In relation to the previous work, Doğer's book[100] comprises Byzantine ceramics recovered from the same site, Daskyleion, by extending the numbers and classes of the vessels. In Chapter III, Byzantine ceramics are periodically divided into two groups: 1. Late Roman/Early Byzantine and 2. Middle and Late Byzantine. In 2.2 Glazed White Wares, two subgroups include the examples of (2.2.A) Green and Brown Painted Ware and (2.2.B) Monochrome Plain Ware. The features of the fabric, glaze, form and decoration are discussed in detail, and forty rim, body and base sherds are shown by drawings and pictures (Tables 53-59, Fig. 247-285).

Vroom[101] identifies a group of White Ware Ceramics, GWW I – IV, which were unearthed in the excavation of Kaman Kalehöyük, located in the east of Ankara, revealed between 1986 and 1991. The article comprises 7 examples (Fig.1-7). Three fragments similarly have soft, fine orange fabric with tiny black inclusions which belong to open vessels (Fig.1-3). They are covered by a similar lead glaze: vitreous yellow-orange to orange. All are evaluated in the same group, GWW I, and dated circa the seventh and to the late eight centuries which is supported by two coins (dated to the sixth and eighth centuries). Also, some small fragments of GWW II make an appearance among the excavation finds, and author uses one example (Fig.4): soft, medium, fine with black inclusions in white coloured fabric. A base fragment (Fig.5) is evaluated in GWWII/III. The fabric is pinkish which includes red particles and it has dark and glossy olive-green lead glaze on the outside. This example is dated to the second half of the eleventh and twelfth centuries. The last group of the White Wares recorded by the author in this article is one piece of GWW IV (Fig. 6) and a variant of Late Byzantine imitation of GWW IV (Fig. 7) which is called Brown Painted Ware.

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[100] Lale Doğer, *Daskyleion II, Hisartepe/Daskyleion Kazısı Bizans Seramikleri Prof. Tomris Bakır'a Armağan* (Ege Yayınları, 2012).
[101] Vroom, 'Some Byzantine Pottery Finds from Kaman-Kalehöyük: A First Observation'.

Öztaşkın[102] evaluates a few amounts of pottery which was revealed at Aphrodisias, from the season of 2003. Glazed White Wares are represented by only three sherds. A polychrome rim (Pl. 1.9) was found in the tenth and the eleventh century-context. It has a white-grey fabric with a sandy texture and black particles. On the interior, the black and white the design under a thick opaque glaze and the green glaze on the exterior can be seen. Öztaşkın makes an analogue between this sherd and the Corinthian Polychrome Ware III (Morgan, 1945)/Polychrome Ware 3a. Another sherd (Pl. 1.10) which was uncovered in the Hadrianic Baths is included in Hayes's Glazed White Ware II and it has small black inclusions in fabric and a shiny green glaze of the interior surface on which the rim has wavy incise decoration with brown painting. The last sherd of this group belongs to Glazed White Ware III. The fabric is micaceous, sandy and has red particles, and the surface is covered by a light green glaze.

[102] Muradiye Öztaşkın, 'Byzantine and Turkish Glazed Pottery Finds from Aphrodisias', in *Поливная Керамика Средиземноморья и Причерноморья X—XVIII Вв.* (Издательский дом Stratum, Университет «Высшая антропологическая школа», 2017), 165–88.

2.2 PART two: ST. POLYEUKTOS CHURCH AND WHITE WARE POTTERY

The accidental discovery of architectural remains belonging to the St. Polyeuktos Church, probably built by Anicia Juliana in 524-7 CE,[103] in the quarter of Saraçhane nearby Şehzade Camii in Istanbul in 1960 brought attention to the unidentified church and its finds. Numerous sherds revealed by the ongoing excavations at the site under the joint auspices of Dumbarton Oaks and the Istanbul Archaeological Museum in 1964-68, allowed Hayes to implement his new approach to the White Wares since the earlier categorisations somehow were not widely applicable.[104] This general classification that Hayes developed at St. Polyeuktos is still in use serving as the primary reference for Byzantine White Wares unearthed all around the world. Before introducing the White Ware classes of Hayes, I will first outline the Saraçhane excavations to demonstrate the context where White Wares were found and to illuminate the basis of Hayes's categorisation.

The results of the work at Saraçhane were published in Dumbarton Oaks Papers, 1965-68.[105] Although the premises of the categorisation of Hayes do not appear until the *Fifth Report*, White Wares, such as Impressed, Painted and Plain White Wares appear right from the beginning, the *First Preliminary Report (1965).*[106] Hayes states that these wares correspond to Stage IV at the Great Palace and, evidently, this helps to date them to the eleventh century.

[103] Cyril Mango et al., 'Remains of the Church of St. Polyeuktos at Constantinople"', *"Excavations at Saraçhane in Istanbul: Second and Third Preliminary Reports", Dumbarton Oaks Papers* 15 (1966): 243.
[104] In Saraçhane Book page 12, Hayes underlines the fact that the weakness of the classes of Byzantine pottery belonged to Talbot-Rice, which are based on surface treatments, lead Stevenson to build a new one considering both fabric and decoration. However, Stevenson's evaluation of the later version of White Wares (e.g., B4) in the red fabric groups caused him to break all previous fabric classification of white clay to assess all together.
[105] R Martin Harrison and Nezih Fıratlı, 'Excavations at Saraçhane in Istanbul: First Preliminary Report' (1965): 230–36; R Martin Harrison and Nezih Fıratlı, 'Excavations at Saraçhane in Istanbul', *Second and Third Preliminary Reports"* 230 (1966): 222–38; R Martin Harrison and Nezih Fıratlı, 'Excavations at Saraçhane in Istanbul: Fourth Preliminary Report' (1967): 273–78; R Martin Harrison, Nezih Fıratlı, and John Hayes, 'Excavations at Saraçhane in Istanbul: Fifth Preliminary Report, with a Contribution on A Seventh-Century Pottery Group', *Dumbarton Oaks Papers* 22 (1968): 195–216.
[106] Harrison and Fıratlı, 'Excavations at Saraçhane in Istanbul: First Preliminary Report"', 236.

Apart from the limited features of the three main classes of the pottery, which are Late Roman, Byzantine and Turkish, the report lacks any other description. On the other hand, Hayes references considerable data regarding the location of the finds. These sherds were unearthed in the west of the main site at the “explanatory trenches along the line U,” in a drain at M/9 and M/12 grid lines at the northern building, called B.[107]

In the *Second and Third Preliminary Reports (1966)*, the pottery was treated, again, by dividing it chronologically into three main categories: Roman, Byzantine and Turkish. The White Ware sherds of the 1965-66 excavations were found in the dark and the light fills in the narthex area, which corresponds to the M/14 and L/14-15 and also the western part of the main building at U/12-13 and V/12-13&15-16 grid lines of the excavation. The ‘Dark earth layer’, which refers to the lower level, contains few polychrome wares and tiles and corresponds to Stage IV together with some sherds similar to ones at Stage III at the Great Palace, which are dated to the tenth century. The “Light mortary destruction layer,” the upper level, revealed incised, impressed and brown-stained decorated wares, which corresponds to Stage Vb, the twelfth century, at the Great Palace sequences. Although the catalogue contains ten examples of the dark and two more from the light fills, a group of UWW, mostly jugs from twelfth to the thirteenth centuries, was unearthed at the west of the underpass cutting and is noted in the report.[108] Hayes also briefly mentions similar pottery found at the same spots from the 1966 excavation in the incorporated third report, the difference being the more prolific number of White Ware found in both the dark and the light layers.[109]

[107] Ibid.
[108] R Martin Harrison and Nezih Firatli, ‘Excavations at Saraçhane in Istanbul: Second and Third Preliminary Reports’, *Dumbarton Oaks Papers*, 1966, 230, 233.
[109] Ibid., 230, 237.

The work of 1967, which yielded deposits in the northern passage next to the north wall of the church, supplied a considerable sequence of the early and the middle Byzantine pottery.[110] While the glazed sherds at the uppermost level of the three periods (the seventh to the tenth centuries)[111] in the deposit have a parallel with Stages III and IV, the pottery from the middle layer, which is characterised by mostly the incised ware, corresponds to Stages I or II of the Great Palace sequence. Hayes dates the uppermost and the middle level finds to the early tenth and the eighth centuries respectively by the help of the parallels at the Great Palace and the "associated coins". Finally, the pottery from the floor level seemed to Hayes to be transitional (from Late Roman to Byzantine style), perhaps, because of the sherds are mainly late examples of *Late Roman B* and *C* wares which could be dated to the seventh century.[112]

Last but not least, the final publication, the *Fifth Report*, not only comprises the results from the closing year of the excavation in 1968 but also covers the unearthed seventh-century deposit finds of the previous year. The excavation in 1968 revealed two more deposits at which White Wares were located below the final destruction layer of the narthex and above the remaining pavement of the atrium. The glazed sherds were mainly impressed wares and brown painted White Wares together with a few polychrome ceramics, which are similar to Stage IV at the Great Palace sequence.[113] The seventh-century deposit included sherds of various classes, from unglazed to glazed, fine and coarse wares, White-Coated Wares, African Red Slip Wares, Late Roman B and C Wares and some imported wares. The Unglazed White Wares are categorised into two groups: Unglazed White Ware I and II (see below).[114]

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[110] R Martin Harrison and Nezih Firatli, 'Excavations at Sarachane in Istanbul: Fourth Preliminary Report', *Dumbarton Oaks Papers*, 1967, 274.
[111] Striker and Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', 203.
[112] Harrison and Firatli, 'Excavations at Sarachane in Istanbul: Fourth Preliminary Report', 278.
[113] Striker and Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', 201–3.
[114] Ibid., 203–16.

2.2.1 A critique of John Hayes's White Ware classification

The second volume of Saraçhane excavations was devoted to pottery and published in 1992, *'The Pottery' Excavations at Saraçhane* (hereafter the Saraçhane Book). In the book, Hayes establishes a chronology for the pottery of Late Roman, Byzantine and Turkish, which was unearthed from hundreds of layers during the excavations. The basis of our White Ware knowledge still depends on Hayes's work since it is believed that his classification flawlessly responds to every single piece of White Wares. But, in fact, his work does not focus on every piece but rather on a limited set of representative examples. Apart from the gaps in historical sequences caused by the lack of examples at Saraçhane, Hayes's categorisation appears to be a classification that is the same in substance, but more sophisticated in appearance, as Stevenson's work at the Great Palace. But Hayes's classification could take the credit since it clarified the confusion of the early classification of A and white bodied B Series pottery.

Hayes's categorisation of White Wares is based on fabric type and shape, excluding the decoration.[115] In general, White Wares are divided into two groups: Glazed and Unglazed White Wares. Hayes's observations on the glazed sherds identify four different fabric groups, Glazed White Wares I – IV **(GWW I – IV)**, and another tentative group, **GWW V**, in which the fabric and the glaze fall under two different groups of the previously mentioned ones.

The unglazed counterparts are also subdivided into five groups, Unglazed White Wares I - V **(UWW I - V)** dated between the seventh and the twelfth centuries. The first evaluation of the first and the second group (UWW I – II) published in the *Fifth Report* is later brought up together with the following groups in *Chapter Five, Unglazed White Wares* in the Saraçhane

[115] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 25.

Book. Associating the colour-coated wares as the forerunners of the unglazed groups, especially for UWW II, Hayes suggested that the unglazed wares were used as cooking vessels subsidising the glazed ones.[116] Generally, the most common type is UWW V, while the UWW II and III are rare. Forms are usually jugs in the earlier groups (I, II and III), and other shapes occur later (III, IV and V). Judging by the lime deposits on the surface of the UWW IV, the sand temper in the UWW V and fire-blackened marks on some sherds, Hayes suggested that the Unglazed White Wares are cooking vessels and added that these vessels took an auxiliary role to the glazed counterparts until the early twelfth century.[117]

On the contrary to what is expected, these two main groups do not necessarily match each other. In Hayes's tabulation, while only the UWW I and GWW I seem equal, the UWW II shows no match, and others fall under the previous groups in the glazed counterparts, such as UWW IV = GWW III. The main criterion of this unevenness is unexplained, but it may implicitly refer to more variety in fabric types in the unglazed group. Still, that logical assumption is hardly sufficient to comprehend how an unmatched group, UWW II, corresponds to other groups in the tabulation. However, it should be mentioned that the Unglazed White Wares are not necessarily the focus of this thesis, but they are being discussed here in this chapter as a primary source for a parallel analysis to frame the fabric classification and to discuss the applicability of the fabric groups which were made by Hayes.

Both main groups seem to be established by overlapping the thousands of sherds from different locations of the Saraçhane according to the alikeness in their appearances. Due to the absence of a solid proof which could be stratigraphically confirmed by a single deposit that covers all sequences, the chronological order may not be decisively correct. By no means

[116] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 12–34, 38–40.
[117] Ibid., 38.

does this an invalid approach, but it does certainly need to be supported by coin-evidence from an archaeological point of view. Hayes, of course, uses the associated coins to support his chronology for some of the classes, but, surprisingly, he ignores some others. Sanders notes that Hayes's overlooking of the coin-evidence which seems helpful to date some of the deposits epitomises the conflict which arises from exploiting the data:

"One major problem with the latter work is the relationship between Saraçhane deposit 40 and Great Palace stage IV, on the one hand, and with Saraçhane deposits 41 to 44 which contain pottery with clear analogues to Great Palace stage IV on the other. Part of this problem can be simply illustrated. Saraçhane deposit 43, for which Hayes maintained that the "associated coins (are) not helpful: early tenth and earlier, plus one of Manuel I (1143-80), presumably intrusive" actually contained a number of germane and important coins. According to the contexts published in the first volume, layer 1272 contained four coins which may be relevant to the date of deposition and of the contents. Starting with the latest, these were coins no. 847 Alexius I (1092-1118) 3rd coinage; no 838 Anonymous Class K Follis (1085-92); no. 832 Anonymous Class G Follis (1065-70) and no. 827 Anonymous Class C Follis (1042-50). Evidently there is a distinct possibility that Saraçhane deposit 43 actually dates to the end of the eleventh century or even to the first years of the twelfth century."[118]

In some cases, it seems that the classes are not clearly established, and there are few examples to group them. For instance, in Chapter Five of the Saraçhane Book, the UWW is defined by only two pages of description and a half-page illustration which do not provide any answers to some practical questions, such as differences in fabric inclusions and textures, or their dates. Not to mention that these are indeed not only fundamental criteria to differentiate fabric types, but they are also determiners for reconstructing the relationship between the fabric and the chronological continuance. Furthermore, Hayes leaves to the reader's imagination how UWW looked, from the seventh to the tenth century, by concluding, based on an assumption

[118] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 117.

about the infrequency of sherds, that UWW was abandoned in favour of glazed wares. Finally, after a gap of three-hundred years, Hayes continues with these two sentences:

> "Much the same is evident in the 10th-century groups, though here one sees a small series unglazed wares, constituting my UWW III. Distinguished by its smooth-textured white body (cf. GWW II), this is represented by a number of jugs and lids of various kinds."[119]

This incomplete definition should encourage us to question whether Hayes's categorisation is genuinely based on the fabric types, as he claims. Though his classification may well define the typological chronology, it is not convincing for the fabric types and their chronological changes. The multiple presences of hypothetical approaches which supposedly fill the gap of lacking evidence may lead us to conclude that the fabric is being manipulated to show only the continuity in forms. The examples, again, are not sufficient to characterise the established categories and Hayes weakly describes whether they are either "forerunner" or "later version" of the classes. Apart from the discussing the theory and describing when Hayes's classification is not always clear-cut, what should also be discussed is the applicability of this categorisation in practice.

As it is seen in Part one, Glazed White Ware is highly distributed pottery. Excluding the capital, the production centre, Corinth and Athens are the main cities of Byzantium where they have been unearthed in large number and are likely restorable and better sherds. On the other hand, sherds are rarely detected in undisturbed contexts and they are more likely fragments, either from the surface or mixed deposits counted as wastes, especially in

[119] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 39.

Anatolia. Practically, Hayes's conventional classification does not allow us to classify and to date, for example, a piece of the rim with a whitish fabric covered with a transparent glaze. Therefore, researchers often call these pieces "Middle Byzantine Pottery" or "White Ware." No doubt, a specific clue, such as decoration can help to identify them; however, as was stressed earlier, sherds are usually badly fragmented and small.

In general, the assessments of Hayes regarding the ornamentation of Glazed White Wares are not sufficiently descriptive. Besides, we barely come across a piece of information about some of the well-known wares, such as Petal Ware. Although he underlines the fact that Saraçhane lacks the ninth century context, he could have used the Great Palace sherds to fill this gap as he often does to support his dating sequences and typology. Additionally, his unspoken effort to limit the decoration as if they belong to certain groups in certain periods limits our ability to follow artistic repertoire. Luckily, with new discoveries from other sites, considerable treatment can be reconstructed by implementing an Art Historical approach.

2.2.1.1 *Unglazed White Wares I – V (UWW I - V)*

2.2.1.1.a Unglazed White Ware I

What we can extract from Chapter Five and the Fifth Report is limited but it follows that the fabric of **UWW I** is non-white and pale brown, grey and reddish. It has rare grits (quartz) without mica covered by a thin darker slip, usually brown or orange. Although more than one-thousand fragments are mentioned in the Fifth Report, Hayes illustrates only seven examples whose forms are jugs and lids.[120] Along with the concave shaped lids with a central knob of the seventh century, a particular type is recognisable in this class. By a horizontal loop, the lid is attached to the vertical loop on which is located the top of the handle, which indicates the lid is attached before firing. Though this type is more common in the seventh century, it continued in the UWW jug series until the eleventh century, demonstrating a uniqueness of Constantinopolitan pottery, as noted by Hayes.[121] Furthermore, the detected glaze spots, which are similar to the standard glaze of GWW, on the UWW I may be indicative of production at the same workshop.[122] It is more hard-textured than the Colour-Coated White Ware, which is believed to be the forerunner of the UWW II.[123]

2.2.1.1.b Unglazed White Ware II

The **UWW II** is white or pinkish, soft and gritty. The inclusions are quartz and large red particles, and it is smooth on the surface. Except for its non-micaceous temper, it looks like the later twelfth century UWW V, except that the UWW V lacks the red grits. This group is represented by a group of household pottery, and it is rarer than the contemporaneous UWW I. Forms are usually large vessels: basins, lids and large jugs. Hayes notes that this group could also be a tempered version of colour-coated wares.[124]

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[120] Striker and Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', 206.
[121] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 38.
[122] J. Hayes *et al*., "Excavations at Saraçhane in Istanbul: Fifth Preliminary Report, 216.
[123] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 38.
[124] Striker and Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', 206; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 38.

2.2.1.1.c Unglazed White Ware III

The **UWW III** has a distinguishable white and smooth-textured body. Forms are primarily jugs and lids in a variety of types. Since the jugs are fragmentary and a small portion of lids are attached to the handle, Hayes cannot establish a solid typology for this group. A small number of stoppers, a hollow-bodied vessel together with some rarer forms, such as a lamp and a handle are other shapes amongst the finds in this class.[125]

2.2.1.1.d Unglazed White Ware IV

Hayes indicates that small vessels are more common than jugs in contrast to the earlier groups. The finds in Deposit 43 illustrate that the forms are jars, bowls, dishes and a censer together with a group of sherds whose functions are unidentifiable.[126] There is not any description for the fabric of the **UWW IV**, but Hayes mentions a particular problem that derives from the alikeness of the Turkish Ware X fabric. However, Hayes underlines the distinguishing forms of the two groups. Lastly, there are not any dates suggested for this class.

2.2.1.1.e Unglazed White Ware V

Hayes defines the **UWW V** as thin-walled, white or pinkish, densely micaceous sand tempered according to the finds found at the Deposits 50 and 51. Forms are mainly almost

[125] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 39.
[126] Ibid.

cylindrical jugs with a narrow neck and pinched mouth, and also various other types. Jars usually double-rimmed; rarer forms include “egg-cups”, a small size pot and a “censer” mentioned in the previous group. This class is more abundant in the middle and the late twelfth century, though it also occurs in an early stage of the period, which is represented by a small portion at the Deposit 50. Although Hayes briefly mentions about the continuation referring to the parallel examples at the Stage Vb in Great Palace, he suggests production of the UWW V declined and was replaced by the same forms of the red wares in the thirteenth century.[127]

2.2.1.2 *Glazed White Wares I - V (GWW I - V)*

2.2.1.2.a Glazed White Ware I

According to Hayes, this is the earliest type of Constantinopolitan glazed wares.[128] The fabric of the **GWW I** is light or pale brown, orange and reddish, rare brown or red particles. A slip, darker than the fabric, lies under a glaze which is generally olive-green to sepia, dark yellow and brown to orange-brown that covers only the interior or the top. The early (7th century) and late (8th and after) sherds can be separated by form. Early forms (in Deposit 30) are usually closed or semi-closed shaped and undecorated, while the later examples (in Deposits 32-35) are mostly dishes. The latter group also bears incised decoration, such as scrolls, curvy designs, crosses, engraved inscriptions and fish.[129]

[127] Ibid., 39–40.
[128] Ibid., 15.
[129] Ibid., 15–16.

The dating and to some extent the typology in this class appear to be problematic. Although Hayes places the GWW I to the middle of the seventh century, this is not supported by any associated coin evidence. Therefore, he admits that the chronological ties among the various types cannot be built. Also, the sherds from the Deposit 36, which could be the latest assemblages of this group, are dated to ca. 800-850 because of the new amphora types, which seem to be the early examples of GWW II.

Additionally, some GWW I jars from Deposit 32 and the Coarse Glazed Wares, especially CGW II, from Deposit 34 are not markedly distinguishable. There is not a particular feature to distinguish Glazed White Ware I (GWW I) from Coarse Glazed Ware I and II (CGW I-II) since both have quite common colour varieties. This problem has been noticed by Böhlendorf-Arslan who eventually re-categorised some of the glazed wares of Saraçhane in Early Plain Glazed Red Ware.[130] In contrast, the same sherds were studied[131] and placed in GWW I[132] by Hayes, confidently.

2.2.1.2.b Glazed White Ware II

The GWW II is called *par excellence* of the Glazed White Wares, by Hayes.[133] The fabric is white, smooth and slightly granular. There is not intermediate slip as in the previous group; therefore, usually, a pale yellow or speckled dark green glaze is directly applied on the surface. Nevertheless, the usage of slip appears in this group as a decorative element of the

[130] Beate Böhlendorf-Arslan, 'Spätantike, byzantinische und postbyzantinische Keramik. Staatliche Museen zu Berlin - Preußischer Kulturbesitz, Skulpturensammlung und Museum für Byzantinische Kunst, Bestandskataloge 3' (Wiesbaden, 2013), 26.
[131] Striker and Kuban, 'Work at Kalenderhane Camii in Istanbul: Fifth Preliminary Report (1970-74)', 203–5.
[132] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 15.
[133] Ibid., 18.

brown staining decoration. It is observed that the usage of the glaze can be distinguished by the colour of the glaze and also the forms. For instance, the yellow glaze is applied generally on the interior of the open forms, but occasionally also up to the foot on the exterior. Small open-mouth mugs are glazed in yellow, inside. In contrast, the green glaze tends to cover both the interior and exterior of the open forms and only the exterior of the closed forms, excluding the foot. In the eleventh century, there seems to be a shift in colour and a blurring of the glaze: yellow to olive-green or dark orange, and the dark green is rare. A change can also be detected in the fabric in which the iron oxide deteriorates and turns the colour into pinkish-red. Forms are mainly open and closed shapes in various types: dishes, chafing-dishes, frying-pans, bowls, cups, jugs, mugs and lids.[134]

The common decoration of the GWW II is impressed and brown staining decorations. The incised decoration rarely occurs and is different from the earlier group in styles, such as cross-hatching, wavy lines, herringbone, or palm-branch motifs. Other than the small dishes from the eleventh century, most dishes of the Impressed Wares bear a figure or a geometric motif in low relief, which leads Hayes to think that the stamp is “a measurement of internal control” rather than a decorative element. The brown staining decoration is common for both open and closed shapes. Radial or vertical stripes can adorn both the exterior and interior of dishes and bowls. Hayes evaluates the GWW II sherds under 12 forms and 17 types.[135]

Two main problems arise about Hayes’s GWW II. Hayes defines two different fabric colours, white and pink, in early and late phases of GWW II. From the tenth century deposit, the early white fabric has a smooth texture. After the eleventh century, the colour of the fabric turns to pink, either the entire body or the core only, and the texture becomes rougher. The

[134] Ibid., 18–29.
[135] Ibid.

deterioration of the iron oxide in fabric is considered the cause of the pink colour by Hayes. What missing in Hayes's colour scale of GWW II is the examples in grey and pinkish-grey fabric.[136]

The second problem is the ninth-century examples are lacking in Saraçhane; therefore, the available data is not sufficient to evaluate the earlier sherds. However, Hayes counts some of the sherds of the GWW I as if they belong to the early phase of the GWW II and uses the Great Palace examples to date them right before 900 CE. Relatedly, the absence of the ninth century evidence prevents assessments of decorative features of Petal Ware which is rare in Saraçhane.

2.2.1.2.c Glazed White Ware III

The fabric of the GWW III is white and hard with red and grey particles. The glaze usually covers the entire body in green, bluish-green and dark brown to sepia, and it tends to flake off. It appears relatively thicker, on the floor or base, than the other groups. This allows Hayes to make parallels between them and Islamic glazes. The textural similarity in fabric and example of a clear glazed sherd suggests a close link with the Polychrome Ware. Forms are usually dishes and one-handled cups. Hayes dates this group to the second half of the eleventh and maybe the twelfth centuries.[137]

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[136] See, especially, Impressed Wares unearthed at Corinth excavations, C 1933 600, 851; C 1934 895; C 1935 519, 605; C 1936 253a, 276, 516, 647, 690, 697, 838, 890, 897; C 1937 690, 705, 708, 756, 792, 1125 http://ascsa.net/research?v=default

[137] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 29–30.

Hayes admits that the categorisation of the eleventh and the twelfth century White Wares bears several problems. Hayes mentions that this group of pottery unearthed along with the well-defined GWW II shows variation in fabric and a difference in glaze application. Placing GWW III in between the Polychrome Ware (from the late tenth century) and the GWW IV (twelfth to the thirteenth century), Hayes illustrates the similarity in the fabric of Stevenson B 4b and B 4c.[138] Eventually, it leads Hayes to think these sherds would have come from some "smallish pottery-making centres" which competed with the GWW II manufacturers. The obscurity in glaze application and decoration creates problem differentiating pottery sherds from other groups, especially the Polychrome Ware. For instance, while evidence of using a clear glaze on a vessel from the Deposit 43 implies the relationship with the late Polychrome Ware, black and white interlocking motifs, a dish with three-colour marbling design is counted as related or a rare form of GWW V by Hayes.

2.2.1.2.d Glazed White Ware IV

The fabric colours of this group are white-beige and pink which are defined high and low quality, respectively, by Hayes. The texture of the fabric is gritty, sandy and micaceous. The glaze is thin and clear with greenish, yellowish or a beige tint. It tends to decay as in GWW III and is applied only to the interior but also to the exterior in closed forms. Forms are defined by dishes in the early context and by bowls later in the period, and five dishes and bowls types together with five more various shapes present in the group (Fig. 14). The painted decoration is usually a speckled design in green or sepia with a blurred pattern in green and

[138] Harrison and Firatli, 'Excavations at Sarachane in Istanbul: Fourth Preliminary Report', 30.

black. Rarely this painting occurs in blue, which is not present in Saraçhane, though Hayes suggests that the blue painting variant could have occurred later in the thirteenth century.[139]

Hayes dates GWW IV from the middle of the twelfth century to early thirteenth century.[140] However, a high quantity of GWW IV examples (Glazed White Ware of Latin Date and Purple and Green Painted White Ware) found at Kalenderhane and Küçükyalı are dated to the mid-thirteenth century.[141] Furthermore, the late thirteenth century examples of GWW IV from the Novy Svet shipwreck[142] suggest that GWW IV spans from mid-twelfth to the end of the thirteenth century, as opposed to Hayes's proposition.

2.2.1.2.e Glazed White Ware V

Hayes dates GWW V to the late eleventh and the twelfth centuries, tentatively grouping them among the glazed White Wares.[143] GWW V combines the characteristics of fabric of GWW IV and the glaze application of GWW II. Forms are juglets and frying-pans and an illustrative group of juglets come from a cemetery in the atrium area. It features what looks to be a patchy or thin external coat glaze on the exterior which is usually yellowish, brownish, or reddish.[144]

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[139] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30–33.
[140] Ibid., 30.
[141] Herrin and Sabuncu, '2. Byzantine Pottery', 81–85; Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul), A Ceramic Assemblage from the Asian Hinterland of Constantinople (4th-14th Centuries CE)', 46–47.
[142] Morozova, Zelenko, and Timoshenko, 'Green and Brown White Wares from the Collection of the Archaeological Museum, National University of Kiev (Ukraine)', 127–28; S Yona Waksman and Iryna Teslenko, '"Novy Svet Ware", an Exceptional Cargo of Glazed Wares from a 13th-Century Shipwreck near Sudak (Crimea, Ukraine)—Morphological Typology and Laboratory Investigations', *International Journal of Nautical Archaeology* 39, no. 2 (2010): 357.
[143] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 33–34.
[144] Ibid.

Hayes dates this class to the twelfth century which may also cover the late eleventh century without stratigraphic confirmation. Perhaps, he chose to rely on the coin evidence that Stevenson used to date Stage Va. On the other hand, Hayes ignores a very particular coin belonging to Alexius III (1195-1203) since Stevenson sees it an intrusive. But, in fact, Stevenson uses the coin of Alexius III (1195-1203) (unclear whether it is the same coin) together with one coin of Manuel I (1143-80) to date Stage Vb which is a tentative sub-stage, of Steveson. Although Stevenson admits this stage cannot be stratigraphically confirmed, what is really conspicuous about this stage is that it extends the number of the white-bodied B Series (Talbot-Rice's B 4, White Painted Ware) of Stage Va.[145] The pottery finds of this class seem to be a variation of GWW IV. Consequently, Hayes's GWW V is not well-defined and can be considered unreliable.

2.2.1.2.f Polychrome Ware

The Polychrome Ware of Hayes comprises Group A 1 and Class II of Talbot-Rice. The fabric is white, smooth and contains small dark and red inclusions. Hayes mentions the glaze is prone to decay and it is alike GWW III with its thin and transparent feature.[146]

Hayes divides Polychrome Ware into three based on decoration. The first class **(Class 1)** is thickly applied yellow and green decoration, similar to *cuerda seca*, outlined by black colour. Motifs are geometric and floral patterns, animals, such as lion and fish and rarely human figures and inscriptions. On the rim, a band with chevron, chequer or a scroll is usual. While

[145] The coin evidence follows: two Constantine IX (1042-54); two Michael VI (1056-7); one Romanus IV (1067-71); six the 10th to 11th century; one Alexius III (1195-1203) in Stevenson's "Chapter II The Pottery, 52-6.
[146] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 35.

dishes are decorated on the interior and also occasionally vertical stripes occur on the exterior, the closed forms like bowls are decorated on both sides.[147]

The second class **(Class 2)** comprises green and black motifs and the red dots in the background is characteristic of this class. Forms are small bowls and cups bearing interlacing vine-leaf decoration on their exterior faces. A very common motif, 'black cross with cross-strokes' on the arms is depicted on the inside floor. Although examples are few, Class 2 decoration is usually combined with Class 1 according to Hayes's analogy between Saraçhane and Corinth.[148]

Finally, the third class **(Class 3)** includes pseudo-kufic design or thick black and white interlock patterns covered with orange-brown glaze. Large bowls and dishes are decorated with black and white design on the interior and the cups bear four dots on the outside in which the same colour applies the centre. Forms are covered by orange-brown or yellow-brown glaze both on the interior and the exterior.[149]

Classes 1 and 2, the yellow and green and the red dotted variation, are counted earlier by Hayes. The examples of these groups were unearthed in the fills of narthex and the atrium at Saraçhane (i.e., Deposit 41 and 42) which are dated to the late tenth and the eleventh centuries. The Class 3 is the commonest decorative group, especially the black and white interlocking pattern, found in many layers of Saraçhane dating to the late eleventh and the early twelfth centuries.

The issue of Hayes's Polychrome Ware stems from its lacking in examples to provide information about dating. Finds are mostly fragmentary and do not come from the best

[147] Ibid., 36.
[148] Ibid., 37.
[149] Ibid.

context, usually from fills with residual materials. Hayes takes consideration of no polychrome finds at Deposit 37 (late 10th century) and Deposit 51 (post-1150), and places this group between the late tenth and early twelfth centuries. Also, few sherds coming from the late twelfth century contexts are believed to be residual by Hayes.[150]

Also, Hayes does not include the polychrome counterparts of GWW III to Polychrome Ware. In fact, he barely mentions the similarity in both; however, there is no pictures which belong to polychrome variant of GWW III. Therefore, Hayes's Polychrome Ware class and relatedly his classification are not inclusive in general.

2.2.1.3 Summary of the critique

To summarise the problem occurring from the Hayes classification, the fabric descriptions do not clearly identify the characteristics of the fabric which are meant to frame the differentiation of the classes. Also, the lack of evidence in context at Saraçhane and overlooked coin evidence make it difficult to assemble the early and the later versions of GWW. A similar problem occurs in the GWW III. According to Hayes, the fabric is different than GWW II; however, the glaze is similar to that of Polychrome Ware. Still, its definition is not clear enough to differentiate the monochrome varieties of GWW III from the previous class (later examples of GWW II). As a result, the unearthed pottery is not classified as certain, and therefore, quite often, the classification of sherds comes with a question mark as

[150] Ibid., 35.

in Sigtuna, Sweden and Kaman-Kalehöyük.[151] This blurry definition gives reason to question whether Hayes's conventional classification is applicable or not in other sites where finds are rare and fragmented. Furthermore, the fabric of GWW V is similar to the GWW IV, but the former seems to be separated to define different vessel types, mostly juglets, of GWW IV. Hence, it suggests that the GWW V is a variant of the GWW IV and should be evaluated in the same group. To eliminate the predisposing factors deriving from any bias, the fabric classification of Glazed White Wares ought to be re-organised by using an analytical method.

The other problem which derives from Hayes's limited consideration is the way of his treating the decoration. His categorisation at Saraçhane naturally restricts the decoration in specific classes linked to certain periods. Contrary to what Hayes's categorisation proposes, his system of dating is not accurate for all finds. For instance, while Petal Ware at Saraçhane falls under the GWW II and is dated to the late ninth and eleventh centuries, this group of pottery also occurs in Stages II and III at the Great Palace which is dated from the eight to the tenth centuries. Hayes's implicit proposal for dating Petal Ware in between the ninth and the twelfth centuries seems to be accepted by Dark.[152] It exemplifies how using Hayes's categorisation is limiting and misleads the reader, therefore, it should be a reminder to cautiously use this information for those who tend to rely on Hayes's classification.

Relatedly, the limitation in decorative styles of Saraçhane urges us to reconsider Hayes's proposition for dates. As a result of this limit, one is unable to follow and understand the mobility of designs and motifs through the time. Also, one can hardly appreciate the fact that the description and the features of decorations in some of the classes are not mentioned.

[151] Mats Roslund, 'Crumbs from the Rich Man's Table. Byzantine Finds in Lund and Sigtuna, c. 980—1250', *Visions of the Past. Lund Studies in Medieval Archaeology* 19 (1997): 268–69, Fig. 16; Vroom, 'Some Byzantine Pottery Finds from Kaman-Kalehöyük: A First Observation', 166, Fig. 5A-B.
[152] Dark, *Byzantine Pottery*, 122–23.

Apparently, Saraçhane is not the best context for all decorative attributions of Glazed White Wares since it lacks some early and late examples of decorative groups. The decoration of Glazed White Ware is more complex in comparison to its fabric (Table X). Therefore, it should be separated from Hayes's classification must be re-analysed by implementing a more effective approach to be able to interpret all features of the ornamentation of Glazed White Wares.

2.3. Conclusion

The bibliography above is given in a locational order and makes a point on the production and consumption of CGWW pottery. In the capital, this pottery group is represented by all classes which were uncovered in various excavations, but the numbers are not necessarily high, excluding Saraçhane and the Great Palace, numbering 20,000 and 7,000, respectively. A high quantity does not always mean a stable chronological continuation always exists in certain site in Istanbul as shown by Saraçhane case. Therefore, to rely on merely one site's dating reference is not always sufficient to rightly evaluate Glazed White Wares.

On the other hand, except for a few major sites in Europe, the diffusion of CGWW is limited both in classes and also the numbers. The highest to the lowest distribution on the routes is as follows: the Aegean Sea, the Balkans and the Black Sea, the Western Asia Minor, the Western Mediterranean, the Eastern Mediterranean and Anatolia. For Glazed White Ware, the ninth century is blurred in the outside of the capital. From the mid-tenth century, the mostly distributed classes are Glazed White Ware II and Polychrome Ware, and yet the other groups are scarcely mentioned. In the Aegean Sea, however, only the Corinth excavations revealed all groups together (with only two sherds of GWW I) of Byzantine White Ware. Still, a dramatic decline in the consumption of the White Wares at Corinth in the late eleventh century should be related to the emergence of the Green and Brown Painted Decoration in local earthenware. Not surprisingly, this date coincides with the emergence of the Green and Brown Painted White Ware (Hayes's GWW IV) at the capital. Running contrary to the great number of local production and its wider distribution, only a few sites and museums have just a small amount of Green and Brown Painted White Ware in Europe. This valuable data concludes that the capital's exportation to the cities in the Aegean Sea was considerably high, especially between the mid-tenth and the late eleventh centuries. In general, the most common exported ware types are Plain-glazed, Impressed and Red Slip-painted White Ware (Hayes's GWW II). The least common uncovered wares are Green and Brown Painted Ware, Polychrome Ware and Petal Ware.

The Balkans and the Black Sea are the second most distributed regions by CGWW pottery. Polychrome is the least in quantity; Impressed and Plain-glazed White Wares are moderate in quantity; Green and Brown Painted White Ware is most widely diffused class. Considering the stratigraphical evidence and also the decorative types of the above-mentioned pottery groups, it can be said that the maritime trade between the capital and the north was initiated in the tenth century and it lasted into the late thirteenth century. Novy Svet was surely transporting the latest occurring examples of Green and Brown White Ware which mark the end of the capital's white ware production.

On the other hand, Anatolia seems to be the least diffused land for CGWW pottery. The recovered pottery sherds are few and fragmented even in the major sites, such as Smyrna and Iznik. Therefore, it is hard to clearly establish a date for the circulation. However, the existence of Red-slip Painted Ware, Plain-glazed White Wares, Impressed Wares which are higher in number than Polychrome Ware and Green and Brown White Ware at the sites may suggest a mid-ninth to the late thirteenth century for dating of the circulated Byzantine White Ware in Anatolia.

Considering Glazed White Ware I, the sites on Map 1 may suggest a random contact, as Hayes suggested,[153] than an established trade link. Yassı Ada Shipwreck is such an example which illustrates Glazed White Ware I was used in the ship for “table settings for officers or important passengers,” rather than being an exported good. On the other hand, on Map 2, this class seems to be dispersed over a fairly large geographical area. Besides this, the diffused sites on the Black Sea position the cities on a line up to the north which can also suggest oppositely to Hayes. Hence, one can suggest that the commercial network between the capital and the northwest Black Sea was possibly established in the late seventh and the eight centuries, if these vessels are genuinely Constantinopolitan.

The second point to be drawn is how other scholars use the established classifications of the primary excavations of Constantinople/Istanbul. It appears that the primary classifications are either art historical or archaeological, and Hayes’s classification with dating references for GWW I-V seems to be the most preferable system. Considering the need of findings and of the studied sites, researchers adopt the categorisation partially. However, some scholars tend to build new categorisations but still relying on Hayes’s dating. Therefore, the earliest date which is the mid-tenth century for the most abundant type, GWW II, in the distributed sites corresponds to Hayes’s secured dating for those in Saraçhane finds. Yet, rarely, the ninth century reference which is used for GWW II does not clearly identify whether these potsherds

[153] Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 18.

are the earlier examples of GWW II, of which Saraçhane lacks. This situation may be related to the issue in the suggested date. Though Hayes suggests a date centring on the tenth century for White Ware groups, such as Plain Glazed Ware, Impressed Ware and Brown-slip Painted Ware, his general proposition to GWW II is "slightly" before 900 CE. As stressed in Part two, Saraçhane lacks of the ninth century context.

CHAPTER THREE: MATERIAL CHARACTERISATION OF GLAZED WHITE WARE AND TWO KAOLINITIC CLAY SOURCES IN ISTANBUL

This chapter comprises the results of material analysis of a group of CGWW which was unearthed at Parion excavations and kaolinitic clays taken from two possible raw material sources in Istanbul. To determine the chemical and physical properties of the pottery sherds, quantitative and semi-quantitative analyses, combining bulk chemical and microscopic methods, were applied to the fabric and the glaze, including XRF, XRD, SEM-EDS and TG/DSC. The results of the chemical and the physical characterisations and the mineralogical compositions of the ceramics and the raw material are presented under the Title 3.1, with the fabric categorisation of the pottery sherds which were found at Parion discussed in Section 3.2. Section 3.3 presents the elemental compositions of the glaze, manufacturing techniques and the use of colourants. The main body of the results and also discussion are presented in the Discussion (**Chapter five, 5.1**). However, Section 3.4 summarises the results of our laboratory investigations and also answers below questions which have been previously mentioned in Introduction, Chapter one. The questions are as follows:

- Which of the characteristics of the fabric is more countable for building a fabric-based White Ware classification on site?
- What could the physical, chemical and thermal analyses reveal about the production technology?
- What more can clay samples disclose about the raw material of White Ware pottery?

- What are the glaze composition and the colouring agents of the **PAR** batch and what kind of glaze is applied on the samples?

3.1 Chemical and mineralogical composition and the thermal behaviour of ceramic samples and the raw clay

3.1.1 The archaeological samples

The chemical composition of studied archaeological samples (PAR 1, 8, 16, 21, 24) carried out by X-ray fluorescence (XRF) is shown in Table 2. The quantitative data shows that the major components of White Ware samples are high levels of Silica and Aluminium, followed by low levels Iron. The minimum value obtained for Silica oxide (SiO_2) is 63.4 w%, and the maximum is 68.27 w%. Aluminium oxide (Al_2O_3) concentration is present with a minimum value of 26.1 w% and a maximum value of 30.88 w%. The minimum value for Iron oxide (Fe_2O_3) is 2.52 w% and the maximum value is 4.64 w%. The samples also contain relatively high concentrations of Titanium dioxide (TiO_2) (1.396- 1.541 w%) and Sodium oxide (Na_2O) (0.895 - 1.066 w%). The values of the other minor elements are smaller than $\simeq$1.00 weight percentage. From the highest to the lowest values, the minor elements are Magnesium oxide (MgO), Potassium oxide (K_2O), Calcium oxide (CaO), Phosphorus pentoxide (P_2O_5), Manganese (II) oxide (MnO), Chromium (III) oxide (Cr_2O_3) and Sulphur trioxide (SO_3).

Overall, the above data shows high Silica and Aluminium and low Iron concentrations and agrees with the semi-quantitative analysis of other pottery sherds (PAR 2-7, 11-12, 15, 17-20, 22, 25-26) which were analysed by SEM-EDS (Table 3). However, EDS points to two chemically different groups described below.

Group I

Group I is represented by the major chemical elements comprising high silica and aluminium levels, and low iron. While the minimum value of Silica is 20.20 wt%, the maximum is 42.41 wt%. The minimum concentration of Alumina is 12.63 wt% and the maximum is 15.87 wt%. The low concentration amount of Iron is measured minimum of 1.60 wt% and a maximum of 4.74 wt%. Other than major elements, only Titanium (Ti) is quite peculiarly revealed in PAR 7, measuring 1.53 wt%, in Group I. The majority of the samples belong to this group (PAR 3, 6, 7, 11, 12, 15, 17, 18, 19, 22, 26) (Fig. 1).

Group II

Group II comprises the samples PAR 2, 4, 5, 20 and 25 (Fig. 2). The characteristic feature of these samples is that they contain low silica (~4.33-18.54 wt%) and alumina (~2.01-9.88 wt%) contents with a high concentration of Calcium (~7.17-36.93 wt%). Potassium and Magnesium are an uncommon pair and are revealed together only in PAR 5 and 25. Magnesium also individually occurs in PAR 20, and Potassium in PAR 2 (see Table 3). However, their oxide forms remain in all samples, measured by XRF, as minor elements with values smaller than 1.00 weight percentage (Table 2). Besides that, the Iron content in Group II appears to be higher, between 4.75 and 8.92 wt%, than the samples of Group I excluding PAR 4 in which the iron concentration is 2.10 wt%.

The crystallinity phases of the minerals in the selected ceramic sherds (PAR 1, 8, 16, 21, 24) are shown in Fig. 4. The figure shows the main peaks characterising quartz mineral (SiO_2), and the XRD pattern is the same for all five samples. Our X-ray diffraction peaks correspond to Quartz as a Silica oxide mineral (Fig. 5), and it is known as stable until 860-870°C when it converts to Tridymite,[1] and its decomposition terminates at 1100°C.[2] The peaks characterising quartz mineral show the highest intensity at 2θ: 27, relatively high intensities at 2θ: 22 and 50 and the lowest intensities can also be detected at 2θ: 39, 41, 42, 46, 50, 55, 60, 68, 76, 80, 81, 85.

Thermogravimetric and differential scanning calorimetry analysis (TG/DSC) of selected archaeological samples (PAR 4, 11, 17, 20, 25) is shown in Appendix 1. The TG curves indicate that pottery sherds tend to gain weight, except PAR 17. In Fig. 6, the mass loss of the representative sample (PAR 17) is 2.38 w% from 20 to 100°C. This corresponds to the exothermic peak occurring in all samples about at 200°C in DSC curves. The endothermic and exothermic peaks between 300 and 600°C are more visible in samples PAR 20 and 25 (Appendix 1), The final and the strongest exothermic peak occurs between 850 and 900°C. All of these peaks refer to dehydration of the water (~250°C), decomposition of hydroxyls (400-650°C) and decomposition of calcite (700-800°C), respectively.[3] In our case, the loss of hydroxyls which is represented by the endothermic peaks between 300 and 600°C can be attributed to dihydroxylation of kaolinitic materials. Since the examined White Wares are calcite free, as shown by XRF and SEM-EDS analyses, the final exothermic peak between

[1] S Sánchez Ramos et al., ‘Application of XRF, XRD, Thermal Analysis, and Voltammetric Techniques to the Study of Ancient Ceramics’, *Analytical and Bioanalytical Chemistry* 373, no. 8 (2002): 898.
[2] Ioannis E Grammatikakis et al., ‘Mineralogical Characterization and Firing Temperature Delineation on Minoan Pottery, Focusing on the Application of Micro-Raman Spectroscopy’, *Heritage* 2, no. 3 (2019): 2661.
[3] V.A. Drebushchak, ‘The Investigation of Ancient Pottery, Application of Thermal Analysis’, *Journal of Thermal Analysis and Calorimetry*, 2005, 9, https://doi.org/10.1007/s10973-005-0942-9.

850 and 900°C may be ascribed to Al-Si spinel phase which is the crystallisation of the metakaolin into the spinel structure and amorphous Silica.[4]

3.1.2 The raw clays

The chemical compositions of two possible raw material sources measured by X-ray fluorescence (XRF) are shown in Table 4. The closeness between the values of the bulk elements in these two kaolinitic clay sources and the values in the ceramic samples allows us to consider them as possible raw material sources. The major chemical elements in both clays are high Silica oxide (SiO_2) and Aluminium oxide (Al_2O_3) followed by a low Iron oxide (Fe_2O_3). Nevertheless, all values of the major elements seem to be slightly higher in Şile clay. The concentration of SiO_2 is 50.550 wt%, the value for Al_2O_3 is 27.200 wt% and for Fe_2O_3 is 2.561 wt%. Judging by the values of the minor elements in these two clays, which are lower than Iron oxide levels, they do not seem particularly distant (Table 4). From the highest to the lowest values, the minor elements are Potassium oxide (K_2O), Titanium dioxide (TiO_2), Sodium oxide (Na_2O), Magnesium oxide (MgO), Sulphur trioxide (SO_3), Phosphorus pentoxide (P_2O_5), Chromium (III) oxide (Cr_2O_3), Manganese (II) oxide (MnO) and Calcium oxide (CaO).

The crystalline phases of minerals in the raw clays from Şile and Ömerli measured by X-ray diffraction (XRD) are shown in Fig. 7. Both figures show the main peak characterising quartz mineral (SiO_2) with a very high intensity detected at 2θ: 27 which is the maximum in Şile

[4] Petr Ptáček et al., 'The Non-Isothermal Kinetics Analysis of the Thermal Decomposition of Kaolinite by Effluent Gas Analysis Technique', *Powder Technology* 203 (2010): 272, 274.

clay. Some peaks characterising Kaolinite ($Al_2Si_2O_5(OH)_4$) and Muscovite ($KAl_2(AlSi_3O_{10})(OH)_2$) with low intensities are also higher in Şile clay. The quantity of the minerals in the possible raw materials are as follows: 51% Quartz, 46% Kaolinite and 3% Muscovite for Ömerli clay, and 75% Quartz, 20% Kaolinite and 5% Muscovite for Şile clay.

Thermogravimetric and differential scanning calorimetry analysis (TG/DSC) of the raw clay is shown in Fig. 8. The TG curve of the powdered raw clay from Şile shows a gradual weight loss due to the dehydration of water between the range of room temperature and 1550°C. The figures show two endothermic peaks first between 50 and 100°C and second at 450-500°C (Fig. 8a). The second considerable weight loss at about 450-500°C corresponds to an endothermic peak on the DSC diagram at the same temperature (Fig. 8b). It is followed by an exothermic peak between 500 and 600°C occurring right before the strongest endothermic peak occurs at about 600°C. Lastly, an exothermic peak happens between 850-900°C.

3.2 Fabric Categorisation of "Parion" White Wares

The fabric types are designated by the standard approach which considers the colours, inclusions, and the porosity in texture. While their textural differences are determined by the help of SEM imaging, the chemical compositions of the samples, measured by XRF and SEM-EDS, are also taken into consideration to assist with grouping them if possible. The main criterion here is the textural differences of the fabrics that are grouped by colour, size and frequency of inclusions and voids. Based on an initial observation of White Wares amongst the Byzantine ceramics at Parion, three distinguishing fabric types can be recognised. These are fine, medium and coarse, which are called Fabric A, B and C, respectively (Fig. 3).

Fabric A

Fabric A (PAR 1-4, 7-8, 10, 20, 23) is white, greyish-white, pink and light pink, hard and non-porous. Rounded to subangular, coarse to fine sand-sized quartz and small black and red rounded iron-oxide nodules are common. A skeletal crystal shaped medium sand-sized particle occurs rarely in some samples (PAR 1, 8, 10). This group contains examples of Green and Brown staining glazed (PAR 1), Slip Painted (PAR 2), Blue glazed with Incised decoration (PAR 3), Brown glazed (PAR 4), Polychrome (PAR 7), Green and Yellow Slip Painted with Impressed design (PAR 8), Green Glazed (PAR 10), Green, Blue and Brown Glazed (PAR 20), Orange Glazed (PAR 23) (Fig. 3a).

Fabric B

Fabric B (Par 5-6, 14, 15, 25) is off-white to beige grey, very hard, very fine, and contains few quartz, common red and black nodules, aligned brown streaks and vughs. This group consists of the samples of Polychrome (PAR 5), Brown Glazed (PAR 6), Green Glazed (PAR 14), Yellow Glazed with Brown Staining (PAR 15), Green and Yellow Slip Painted (PAR 25) (Fig. 3b).

Fabric C

Fabric C (Par 9, 11-13, 16-19, 21-22, 24, 26) is pink, cream, fine, hard, and contains rare small red nodules, quartz and vughs. The group comprises samples of Green and Yellow Slip Painted with Impressed design (PAR 9), Polychrome (PAR 11), Yellow Glazed with

Impressed design (PAR 12), Green and Brown Glazed (PAR 13), Green and Yellow Slip Painted (PAR 16), Orange Glazed (PAR 17-18, 21), Yellow Glazed (PAR 19 and 22), Green Glazed (PAR 24) and Brown Glazed wares (PAR 26) (Fig. 3c).

3.3 Glaze

The results of the bulk composition of glazes on the selected archaeological samples, analysed by SEM-EDS, are shown in Table 5. The glazes contain between 30.46 to 73.95 wt% Lead (Pb), 7.46 to 32.04 wt% Silica (Si), 1.79 to 16. 63 wt% Alumina (Al). Calcium (Ca) content is usually low in the samples, between 2.12 and 7.15 wt%, however, some samples, such as PAR 6 and 19 contain a very high content of Ca, 20.11 wt% and 28.15 wt%, respectively. The SEM images show that the Calcium content in the glaze resulted in speckles on the glaze surface (Fig. 9a-b). Considering the low concentration of this element in the ceramic bodies, between 0.67 wt% to 16.57 wt% (Table 2-3), it is less likely that the aggregation of the calcium on the surface resulted from the diffusion of the element from the fabric. The EDS, for instance, shows no calcium in the fabric of PAR 3, 6, 7, 11, 15 and 19 (Table. 3); however, the highest Ca content detected in the glazes falls into this group (PAR 6 and 19; Table 5). This may be indicative of a deliberate addition of Calcium to the glaze.

The SEM-EDS detected lead (Pb) in eleven samples (PAR 4, 5, 7, 12, 15, 17, 18, 19 and 22) among the examined pottery sherds. They are compositionally grouped as lead-alkali (PAR 7 and 15) and high lead glazes (PAR 4, 7, 12, 17-19 and 22). In the lead-alkali group, PAR 7 contains 30.46 wt% lead, 7.46 wt% silica, 1.79 wt% aluminium, and PAR 15 contains 30.71

wt% lead, 20.47 wt% silica and 8.21 wt% aluminium. The high lead glazes contain between 42.5 to 73.95 wt% lead, 8.72 to 20.47 wt% silica and 3.74 to 7.3 wt% aluminium.

The SEM-EDS bulk composition analysis resulted in some individual variations in the use of glaze. A brown glazed sample (PAR 18) for example, contains 4.28 wt% Arsenic (As) which looks fused with other components, but mostly with lead, and evenly spread over the piece shown by EDS mapping (Fig. 10). This situation repeats in the line scan of the surface which exhibits the same result in which all peaks belonging to arsenic overlap with the diffractograms of lead (Fig. 11). In addition to that the EDS reveals two other brown glazed samples, PAR 17 and 26, contain the same element. While PAR 17 contains 2.87 wt% arsenic, the element could not be quantified in a multi-point scan of PAR 26. However, it appears in Kα line in the line scan of the same surface, for about 10 wt% (Fig. 12). The diffractogram of arsenic appears to be almost equal to two other main elements, lead and silica, the lines of which overlap with arsenic as happens in PAR 18, which can be seen in Figure 11.

The SEM images of the cross-section of the ceramic body show that there are no interaction layers in the majority of the samples (Fig.13). It points to a direct application of the glaze to the surface of the ceramic body. Nevertheless, some calcium-rich aggregates occur in the edge of the fabrics and air bubbles in the glaze, which can be seen in a higher magnification (Fig.12b). Generally, glazes are considered thin between 70 and 110 μm in width. However, a glaze belonging to a polychrome sample, PAR 5, reveals a thicker application which is about 400 μm. This sample also bears a slip (~100 μm) between the fabric and the glaze (Fig.14).

The minor elements in both glaze groups, as which revealed by SEM-EDS, are iron (Fe), sulphur (S), potassium (K), tin (Sn), magnesium (Mg), manganese (Mn), zircon (Zr), sodium

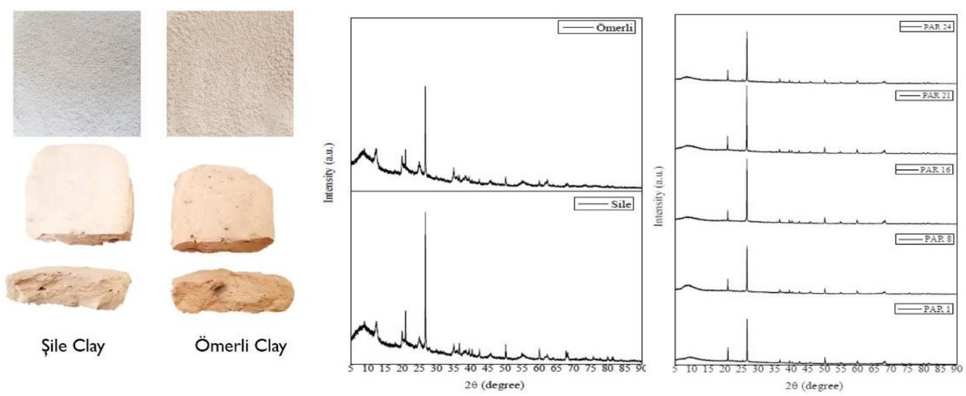
(Na) and phosphorus (P). Among them only iron, sulphur and potassium occur in more than two samples (PAR 2, 6 and 15) and the rest occur in pairs or individually in a single sample (see Table 5). While the iron content is between 1.77 to 5.50 wt% in eleven samples (PAR 2, 4-6, 11, 15, 17, 20, 22, 25 and 26), sulphur is between 3.26 to 17.44 wt% in six samples (PAR 2-3, 6, 11, 25-26) and potassium is between 1.22 to 2.88 wt% in three samples (PAR 2, 6 and 15).

Regarding the colourants of glazes, the yellow glazed samples (PAR 12,19 and 22) are shown to be covered by a colourless glaze. When the chemical compounds of the fabric and the glaze are compared, it appears that iron (Fe), manganese (Mn) and zircon (Zr) may have been used as colourants. With the data reduction of iron content which appears smaller in the glaze than in the fabric, the iron content is detected to be a diffusion of the element from the ceramic body in some of the samples (i.e., PAR 22). However, iron is primarily used to produce brown colour in Parion examples.

By all accounts of EDS, iron is determined to be used alone in orange-brown glaze (PAR 4) and brown-slip painted glaze (PAR 15). The first is iron and admixture of sulphur and/or tin in brown glazed samples (PAR 6 and 26), and the brown hues on green glazed samples (PAR 2 and 25). Iron also appears to be used in outlining motifs as happens in polychromatic surface treatments of PAR 5 and 11 and colouring broad vertical lines of PAR 20. On the other hand, in the other polychrome sample, PAR 7, the shiny-brown colour is achieved by manganese rather than iron. Also, the white colour on the same sherd is achieved by zircon. Copper oxide (CuO) is not present in any of the green and blue samples. Rather, SEM-EDS reveals that green, green-blue and blue colours in green glazed and in colourless polychrome samples (PAR 2, 3, 11, 20 and 25) are chemically associated with sulphur and tin.

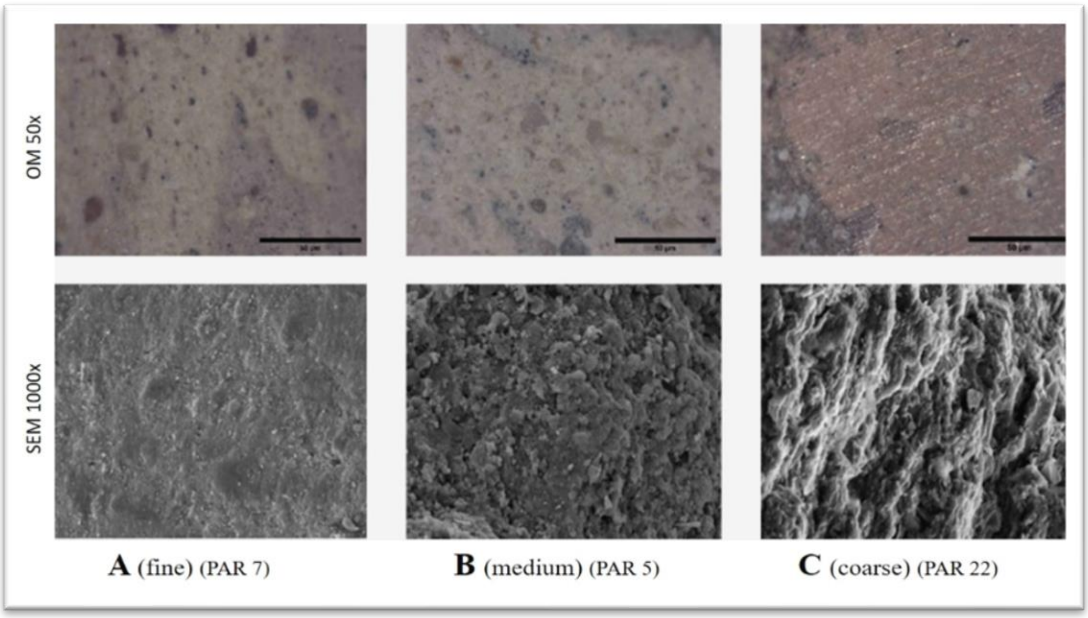
3.4 Conclusion

The integrated-approach that we used in the analysis helped to define several characteristic features of White Wares found at Parion excavations. Both quantitative and semi-quantitative analyses on fabrics, carried out by XRF and SEM-EDS, revealed that Parion samples and previously examined White Wares are produced in the same kaolinitic clay which is associated with Constantinople. Also, the two new clay sources from Istanbul, Şile and Ömerli, that I have discussed show that they are of the same nature with the archaeological samples. The thermogravimetric analysis (TG/DSC) and X-ray diffractometry (XRD) on both the pottery sherds and the clay sources support the results in this matter, and therefore, they can also be counted as possible raw material sources of the capital. Both clays contain a high content of Silica (63-70 wt%) and Aluminium (26-30 wt%) and low Iron (2-5 wt%). However, the quartz is higher in pottery sherds than in Şile and Ömerli clays which can either point to another source of clay or to a deliberate addition. The X-ray diffraction peaks correspond to only Quartz as a Silica oxide mineral, therefore 860-870°C is the suggested firing degree for the **PAR** batch. This result shows a good correspondence to the thermal behaviour indicating that maximal firing temperature did not exceed 900°C **(a)**.



a) Raw clay firing and X-ray diffractogram of Şile and Ömerli clays and the archaeological samples (Vol. II, Fig. 4, 7, Appendix 3).

Considering the effect of alteration of the colour of the raw clay (a), I suggest to use "the inclusion" as the basic criterion of White Ware fabric classification at sites. Regarding the size, shape and especially the frequency of inclusions, the fabric classification that I built in my case study illustrates that the examined Glazed White Wares can be divided into three according to the differences in the frequency, size and shape of the inclusions (**b**). Therefore, A, B and C correspond to fine, medium and coarse fabric, respectively. All three fabrics share common inclusions which are monocrystalline quartz, dark red to black coloured iron-oxide concentrations and red and white mica which are all visible to the eye.



b) Fabric classification of "Parion" White Wares (Vol. II, Fig. 3).

Further analysis on the archaeological samples revealed two chemically different fabric groups (**c**). The majority of the samples fall into Group I which contains high Silica, Aluminium and low Iron. Group II, on the other hand, contains low Silica and Aluminium and high Calcium and Iron. The representative samples in Group II also contain the same contents in the glazes; however, the amount is lower than in the fabric. This means that the elevated Iron and Calcium level is not because of the diffusion of these two elements from the glaze, but it is possible two different manufacturing technique may belong to different workshops. The ratio between quartz and glass fragments suggests a stonepaste fabric for Group II, which is known to be a special ceramic manufacturing technique in Islamic world (see Discussion).

Group I	**Group II (Ca-rich fabric)**
• (high) Silica 20- 42 % • (high) Aluminium 13 -16 % • (low) Iron 2 - 5 % (PAR 3, 6, 7, 11, 12, 15, 17, 18, 19, 22, 26)	• (low) Silica 4-19 % • (low) Aluminium 2 - 10 % • (high) Iron 5 - 9 % • (high) Calcium 7 -37 % (PAR 2, 4, 5, 20, 25**)** the glaze contains **Ca** (3 - 6 %) and **Fe** (1 - 5 %) which is lower than the amount in the fabric

c) Fabric groups of “Parion” White Wares.

Another common feature which corresponds to and supports the previous analytical works on Glazed White Wares is the manufacturing and application techniques of the glaze. Parion samples usually fall into two variations (lead-alkali and high lead) and an uncommon variant which may point to tin-opacified or arsenic sulphide glaze (d). The majority of samples belong to the high lead group which is common with the ones that have been noted at Istanbul and Corinth. In addition to that, the data suggests that the majority of the glaze was produced only by lead oxide, suspended in water, and applied directly onto unfired ceramic bodies. For the third variant, we are not able to compare it with any works due to the lack of comparable data covering Byzantine Ceramics. However, the ancient recipes include sulphur or arsenic sulphide which is known to be used to produce a shiny gold-brown colour in Lustre Ware (see Discussion) which corresponds to the colours of the archaeological samples. Therefore, PAR batch may contain the first direct evidence of Islamic glaze technology which was used in Byzantine Ceramics.

lead-alkali glaze	high lead glaze	tin-opacified / sulphur or arsenic sulphide
• Lead 30 % • Silica 8 - 20 % • Aluminium 2- 8 % (PAR 7, 15)	• Lead 42 - 74 % • Silica 9 - 20 % • Aluminium 4 - 7 % (PAR 4, 7, 12, 17,18, 19, 22)	• Arsenic 2 - 4 % (PAR 17, 18, 26) • Sulphur 3 - 17 % (PAR 2, 3, 6,11, 25, 26) • Tin 6 -18 % (PAR 3, 19)

d) Glaze Groups of “Parion” White Wares.

According to EDS analysis the brown colour is achieved predominantly by iron oxide in orange to brown coloured samples, brown hues, stains and lines. In addition to that, iron oxide was detected to be used in the black lines of a Polychrome sample. This result corresponds to Harriet White’s analysis at Corinth and supports her claim that iron oxide could be the source of black/brown lines rather than manganese which is believed to be used as colourant of the dark coloured lines used to outline motifs in Polychrome Wares. In our analysis, manganese was only detected where the shiny-brown colour is applied in a Polychrome sample. On the same sherd, zircon is also spotted where the white colour is applied.

e) Colourants of the glaze (Vol. II, Table 1, PAR 1-2, 4-5, 7, 11-12, 15, 17-20, 22, 25-26).

CHAPTER FOUR: CONSTANTINOPOLITAN GLAZED WHITE WARE DECORATION

As Chapter three discussed the material specification by examining archaeological ceramics of the PAR batch, this chapter discusses the surface treatments of CGWW pottery from the late seventh to the late thirteenth centuries. The art historical approach uses Glazed White Ware examples (Vol. II Pls. 1-35) to categorise them decoratively, thematically and historically. To evaluate each of them separately reveals uniquely and also commonly executed ornamental motifs and also the hidden styles which have never been examined in details. This Chapter includes three parts. By abandoning Talbot-Rice's sketchy categorisation in Part one and Hayes's typo-chronological classification in Part three, a more inclusive decorative categorisation of CGWW pottery is generated here in this thesis.

Part one: an art historical evaluation of the decorative data is where Glazed White Wares are first grouped to introduce the Decorative Classes (Table X). Though this part includes proposed dating for each of the groups, the decorative classes do not necessarily follow the order, as in the previous studies, to convey the all-decorative attributions, fluently. It rather identifies the embellishment techniques by separating the glaze painting and tool-made designs building two groups: **A. Decorative Painting** and **B. Decorative Technique**. The chromatic class system used in **A. Decorative Painting** also groups pottery according to the number of colours used in the decoration: monochrome, bichrome and trichrome (together) and polychrome. On the other hand, **B. Decorative Technique** includes two classes: Carved Decoration and Relief Decoration which identify the tool-made techniques, such as cut, incise, moulding and sculpting. These techniques create individual designs which are either used as a dominant décor or a complimentary decorative feature to add more embellishment to the surface together with the decorative painting. This part also investigates motifs, designs and styles by sub-grouping them, according to the similarity or to the difference, to explore the meaning and themes behind them in which the next part will enlighten further.

Part two: perception of the artistic repertoire: context, meaning and the themes designates the ornamental repertoire by searching thoroughly designs and styles in Thematic Classes. It uses the archaeological data to correlate CGWW decoration with the archaeological context, if available. Further it utilises the motifs of the previous classification, in Part one, to identify the meaning of the motifs in Imagery. It consists of four thematic sub-groups: Apotropaic and Religious Motifs, Imperial Motifs, Status and Others which bring forth the themes.

On the other hand, **Part three: reintegration the history of decoration in the archaeological context** uses the published examples to establish the integration of the new decorative classification with the historical sequences. Therefore, Historical Classes rely generally on the assessments of R. Stevenson at the Great Palace, and also J. Hayes at St. Polyeuktos, Saraçhane Excavations. Since the focus is decoration, both authors' classifications are evaluated, here, under three chronological sequences: Early-Glazed White Ware Decoration (7^{th}-9^{th} CE), Middle-Glazed White Ware Decoration (9^{th}-11^{th} CE) and Late-Glazed White Ware Decoration (11^{th}-13^{th} CE). One of the outcomes of this method is to disclose the mobility of the ornamentation and to comprehend the history of decoration of CGWW pottery. Returning to the Introduction in Chapter one, the research questions are as follows:

- Is it achievable to build a more comprehensible decorative classification of Constantinopolitan Glazed White Ware pottery?

- What themes do the motifs, styles and designs create and what is the origin of those components?
- What are the changes in the artistic scale of the decoration over six-hundred years from the late seventh to the late thirteenth century?

A-B. DECORATIVE CLASSES			
A. DECORATIVE PAINTING		B DECORATIVE TECHNIQUE	
A1 Plain-glazed Decoration	**A2 Painted Decoration**	**B1 Carved Decoration**	**B2 Relief Decoration**
A1.A. Green Glazed A1.B. Yellow Glazed A1.C. Brown Glazed A1.D. Mottled Glazed A1.E. Streaky Glazed	*A. Monochrome Painted Decoration* A1. Brown Slip-painted Design A2. Brown Glaze-painted Design A3. Spatter Painted Design A4. Blue Painted Design *B. Bichrome and Trichrome Painted Decoration* B1. Splash Design B1.a Blended Splash Style B1.b Stripped Splash Style B2. Green/Blue and Brown Painted Design B2.a Abstract, Geometric and Vegetative Style B2.b Faunal Style *C. Polychrome Painted Decoration* C1. Class I C2. Class II C2.a Class IIa C2.b Class IIb C3. Class III C3.a Class IIIa C3.b Class IIIb C4. Class IV	A. Cut Design A1. Cut-out Style A2. Fretwork Style B. Incised Design B1. Plain-incised Style B2. Elaborated-incised Style	A. Petal Design A1. Styles A1.a Style A A1.b Style B B. Moulded Relief Design B1. Variants B1.a Variant A B1.b Variant B B.2 Styles B2.a Centric Relief Style B2.b Slotted-circles Style C. Relief Sculpture Design C.1 High-relief Style C.2 Mid-relief Style

Table X. Decorative classification of Constantinopolitan Glazed White Ware pottery.

Part one: AN ART HISTORICAL EVALUATION OF THE DECORATIVE DATA

4.1 (A-B) DECORATIVE CLASSES

As mentioned above, the Decorative Classes investigates the technical features in decorative attributions. It separates the glaze painting and tool-made techniques as A. Decorative Painting and B. Decorative Technique whose groups and also sub-groups are built by the function of the glaze, the number of the colours and the different tool-made techniques used in the surface treatments. A. Decorative Painting identifies two main groups: A1. Plain Glazed Decoration and A2. Painted Decoration according to the use of the glaze which is functional and decorative, respectively. The chromatic class system is introduced in this section including A. Monochrome Painted Decoration, B. Bichrome and Trichrome Painted Decoration and lastly C. Polychrome Painted Decoration. All sub-groups which are included in each of these three main classes show the variety of different glaze painting creating the designs and styles of the decorative compositions. B. Decorative Technique, on the other hand, comprises B1. Carved Decoration and B2. Relief Decoration where cut, incise, moulding and sculpting techniques create the tool-made decorative components of Glazed White Ware pottery. It does also include variants which are sub-grouped to illustrate the combined designs used with glaze painting.

4.1 A. DECORATIVE PAINTING

A. Decorative Painting includes all types of glazes which is either used plainly or decoratively. This class includes two main groups: A1. Plain-glazed Decoration and A2. Painted Decoration. The glaze appears to be used in many forms from monochrome to polychrome, but Plain-glazed Decoration mainly involves a monochrome glaze which seems to be functional to seal surface to prevent the leak of the liquid. Nevertheless, the last two sub-groups of this class are likely to have been used for a decorative purpose. Painted Decoration, on the other hand, is divided into three according to number of colours applied on the surfaces: A. Monochrome Painted Decoration, B. Bichrome and Trichrome Painted Decoration and lastly C. Polychrome Painted Decoration.

A1. Plain-glazed Decoration

The Plain-glazed White Ware is one of the commonly unearthed pottery groups. As the name suggests this group is very modest in ornamentation. It does include a monochrome glaze in green, yellow or brown either alone without any other decorative means, such as a relief or incised design. The glaze application is quite functional, however, the variants, such as mottled and streaky designs indicate a decorative purpose. The colour of the glaze varies in green, yellow and brown in which the impurities give greyish or olive-green hues in yellow and dark green (pl.1.1-2, 8-9). Vessels which belong to this group are more abundant in the Middle-Glazed White Ware Decoration than the counterparts of Late-Glazed White Ware Decoration (see in **Part three**).

A1.A Green glaze

The green glaze is believed to be achieved by adding copper oxide to the glaze and the dark tones of this colour, which varies from olive to dark green, depend on a reduction atmosphere (pl.1.6-7, 11-12).[1] Examples illustrate that the green glaze tends to cover both the interior and the exterior of the vessels.

A1.B Yellow glaze

The yellow glaze covers only the interior and rims of the vessels, however, the traces of a wash on the outer of the sherds can be observed. A colourless lead or lead-alkali glaze usually turns to a pale-yellow colour. Nevertheless, the firing atmosphere and also the colour of the fabric has an effect on the tones. For instance, while the glaze seems yellow on white fabric (pl.1.8-9), it turns yellowish-pink on a pink fabric or even orange on a tan colour fabric (pl.1.5, 10). The yellow glazed examples make up the greatest proportion of the Plain Glazed White Wares.

A1.C Brown glaze

The brown glaze also shows variety in tones, from light to a dark brown together with the light or dark brown hues inside (pl.1.4).

A1.D Mottled glaze

[1] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 71.

The mottled glaze appears to be an alternating glaze technique and is also called “speckled” because of the appearance of the darker spots inside the glaze. These tinges are different from the hues in the plain green, yellow and brown glazed examples (mentioned above) with their appearance (pl.1.3, 6). Sanders states that a green mottled glaze could have been produced unintentionally by carelessly mixing the glaze admixtures, yet, the effect seems deliberate.[2] While an additional copper oxide can give darker green spots on a green glaze, iron oxide should supply the effect of the light and dark brown tinges on a green glazed example. Also, iron oxide should give the brown tinges on orange-yellow-coloured surfaces. In today’s practise, the mottled green is applied by dipping in liquid which contains iron or copper oxide constituents. This could be the case for the green glazed ones; however, the yellow glazed examples show that the glaze only covers the interior and the rims, and is therefore, more likely to be applied by a brush.

A1.E Streaky glaze

The streaky glaze is a peculiar decorative treatment in the Plain Glazed White Ware Decoration. The glaze includes green and brown and apparent yellow hues in blended form which tend to cover the whole surface and over the rim. Examples are few, however they are associated with the impressed and/or sculpted designs with incised decoration (pl.2.10).

Date: late 7th to late 13th century[3]

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[2] Ibid., 71, 250.

[3] Plain-glazed Decoration exists in GWW I-III and V, see Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 15, 18, 30, 33–34.

4.1.2 A2. Painted Decoration

This class embodies the painted decoration which is either executed rarely with a monochrome slip or commonly with glaze including two or more colours. According to the diversity of the colours that are applied on the surface of vessels, painted decoration can technically be divided into three: monochrome, bichrome and trichrome (together) and lastly the polychrome.

A2.A. Monochrome Painted Decoration

Monochrome painted decoration consists of a decoration applied by a single colour which is used to give a decorative effect on the surface of the vessels. The brown paint in this group creates petal-like strokes, geometric patterns and abstract designs by which are either applied in slip or glaze form.

A2.A1 Brown Slip-painted Design[4]

The Brown Slip-painted Design is born of red clay in the form of a slip which is executed under the glaze. The decoration is related to the Petal Design (B2.A) with the applied

[4] Stevenson's A0/2, Morgan's red painting in Impressed Design, Hayes's brown staining in GWW II, Sanders's E.2.Slip Painted.

technique and in its appearance.[5] The brown slip usually occurs in form of short vertical or radial stripes (pl.5.4-8) and blobs or a single or double chain of short lines and loops (pl.5.1-3). These painted forms are commonly depicted on the upper walls of the interior of the open forms which give the impression of surrounding the centre of the vessel. In the exterior, a streaky appearance occurs made by thinly applied paint under the rim of dishes and the walls of two-handled cups from both Istanbul and Corinth (pl.5.5).[6] The brown slip-painted decoration is usually used with yellow, light and dark orange and rarely with green glaze (pl.5.4-5).[7] A combination with impressed decoration also exists (**B2.B1.a Variant A**) where the brown slip paint usually surrounds the impressed tondo (pl.5. 9-10).

Date: mid-10th to mid-11th century[8]

A2.A2 Brown Glaze-painted Design

Brown Glaze-Painted Design consists of a reddish-brown glaze which is applied directly on the vessels without any intermediate slip on the surface. This painting can be executed either on the interior or the exterior surface of the vessels before a colourless or green glaze. The green glaze on top appears to be a wash and tends to decay which also deteriorates the underlying brown painting to some degree. Examples of this class are few, and the forms are therefore limited to dishes, bowls and two-handled mugs. On the interior design, three spirals which stem from the same centre form a Triskelion in which the brown colour is thinly

[5] Morgan, *The Byzantine Pottery*, 11:43; Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 21; Sanders, ‘Byzantine Glazed Pottery at Corinth to c. 1125’, 75; Stevenson, ‘Chapter II, The Pottery 1936-37’, 43.
[6] Morgan, *The Byzantine Pottery*, 11:43; Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 21; Stevenson, ‘Chapter II, The Pottery 1936-37’, 43.
[7] Sanders, ‘Byzantine Glazed Pottery at Corinth to c. 1125’, Pl.16b.
[8] Stevenson, ‘Chapter II, The Pottery 1936-37’, 43–46, Stage V.

applied on the centre of bowls and dishes (pl.8.1-2). This motif is also used in the biochromatic painted decoration (see below **A2.B2.a, pl.7. 5**). On the interior of a dish from the Crimea, the brown painting shapes a geometric form resembling an irregular rhombus. While the centre is left empty, the triangle corners are infilled with curvy lines in brown. This geometric form is integrated by complimentary circles which are individually drawn in between of the four sides of the rhombus on the walls of the vessel (pl.6.4).

On mugs, the brown glaze painting either wholly or partially covers the surfaces (pl.6.1-2). In the former, the brown glaze painting tends to cover the whole body and the handles and it is darker in some places where the glaze is applied thickly (pl.6.2). It leaves patchy appearance in the lighter areas which also happens on the surface of the dishes (pl.6.3). In the latter, it forms strokes which suggests it is probably applied by a brush creating an abstract design on the outside of the vessel (pl.6.1). Jugs are also the other forms on which the monochromatic brown painting furnishes the surface. An example from the Hermitage Museum bears a scroll motif on the spherical body and the brown colour is runny beneath the green wash (pl.12.3).

Date: 11^{th} to the late 13^{th} century

A2.A3 Spatter Painted Design

A few examples consist of a small group which is also associated with the Green and Brown Painted Ware. The name is derived from the decoration which consist of tiny reddish brown or green speckles which are flicked by a brush either on the interior (pl.6.5-6) or the exterior of the vessels (pl.6.7). Some fine examples from Varna and Anchialos show the same decorative features with which the unearthed sherds at the Great Palace, Saraçhane, Corinth and also the Hermitage Museum. A single vessel from Corinth (pl.6.8 a-b) shows polychromatic treatments also exist in spatter painted design and therefore it can be included in Bichrome and Trichrome Painted Decoration if further studies show a consistency.

Date: late 11th to mid-12th century

A2.A4 Blue Painted Design

A blue paint, alone, decorates vessels which is usually associated the group called Green and Brown Painted Ware and included in the same class.[9] Examples are rare but have been recovered in Istanbul, Corinth and Anchialos. The linear pattern in light blue on the interior of a dish from Anchialos is the only illustrated example of this class (pl.8.14). However, a similar design is noted at the Great Palace.[10]

Date: mid-11th to the early 12th century

A2. B. Bichrome and Trichrome Painted Decoration

This class includes two and three-colour glazes applied on the surface before a colourless glaze. Brown seems to be the main colour in bichrome class and green, blue, purple and red are the complimentary colours used together to generate the decorative elements. Among

[9] Talbot-Rice's B 4 White Painted Ware, Stevenson's B4a, Hayes's GWW IV.
[10] Stevenson, 'Chapter II, The Pottery 1936-37', 48.

them, green is the most commonly used secondary colour whose combination with brown composes the well-known group called Green and Brown Painted Ware.[11] The Bichrome Painted Decoration can be decoratively divided into two including abstract, vegetative and geometric motifs and faunal depictions. On the other hand, the Trichrome Painted Decoration is rather represented by a small group of vessels including a design which is called, here, Splash. While monochrome and bichrome applications exist in this group, the technique is more comprehensible in the trichrome treatment with green, yellow and brown glazes. It includes two stylistic classes: Blended Splash and Stripped Splash.

Date: mid-11th to the late 13th centuries

A2.B1 Splash Design

This class consists of three colour glazes which are green, yellow and brown. It has never been treated as a separate group, but the glaze is clearly different than the decorative glazes, mottled and streaky, in the Plain Glazed Decoration.[12] Here, in Splash Design, two variants can be recognised.

[11] Waagé's Black and Green Painted, Talbot-Rice's White Painted Ware, Morgan's Green and Brown Painted Wares, Stevenson's B 4a, Hayes's GWW IV, Sanders's Green and Brown Painted Ware.

[12] The technique in the use of colours seems to be similar with Hayes's notes which variously describe the same glaze decoration "stained yellow, green and sepia", "amber-yellow green", "yellow-amber green", "light yellow green with sepia patches". Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 128, Deposit 44.1, 3–6, 128.

A2.B1.a Blended Splash Style

Blended Splash is the first subgroup which embodies a thorough blending of the two or three colours in a soft streaky appearance. A deep bowl from the Corinth Excavations represents a green glazed kind on which the colour is used in dark and light tones. A light green is either directly applied on the fabric or on a light-yellow glaze base. On top, the dark green should have been dripped over the rim and let it run down to the floor. The top-down direction of the flow can be seen on both the interior and the exterior (pl.15.4 a-b). Therefore, monochrome variation can be separated from the polychrome treatment and treated as sub-group of Splash Design in the future works.

The look of the three coloured variant is likely to have resulted from blending of two well-suspended metal oxides with water, copper and iron in this case, and applying this on a bright cream and/or yellow glazed background before the colourless glaze on top. It looks as if it is flowing down like a cloud, therefore, the brown and green glazes might have been applied in more fluid form in some places and been blended by a brush. Examples are usually fragmented; however, a few relatively well-preserved dishes and plates are the forms that this decorative glaze technique appears on. A dish portraying three saints from the Hermitage Museum (pl.33.7), a prodigious griffin (pl.15.3), a classicised scene, (pl.33.6) and an emperor portrait (pl.15.2 a-b), which are born on the plates from Saraçhane, the Great Palace and Iznik, respectively, show that splash as technique is associated with carved and relief decorations (see B1.B2. Elaborate-incised Style and B2.C1. High-relief Style).

A2.B1.b Stripped Splash Style

This is the second subgroup, and the technique consists of the same three colours, yellow, brown and green, which are used together to apply on the whole interior. The presence of this polychromatic glaze decoration is rare and it is vaguely described in other works as “sort of marbling” or “polychrome marbled”[13] and pictures or drawings are not available. Nevertheless, an illustration of an “earthenware” plate from Corinth is included to show how so-called Byzantine marbled design pottery looks (pl.15.1). Though Morgan includes this plate in the local Green and Brown Decoration which was produced with a characteristic reddish clay in the late tenth and the eleventh centuries, Mango calls the same vessel “polychrome plate with marbled decoration.”[14] To segregate each of the techniques is tough; however, the absence of the characteristic central “Ebru” pattern makes this piece of art closer to the splash than to the marbled design. Therefore, here it is included in the Splash Design of White Ware pottery. In the design, a cream colour appears to be used as a background colour. On top, yellow, brown and green are executed in stained stripe forms, usually on top of each other, and also black may have been used to put emphasise on the stripes. A slightly visible flocculation over the rim suggests that the slurry glazes probably are dripped individually on the rim to be lined by a brush through the inner wall and to gather down in the centre. After this, a colourless glaze is probably used to seal the decoration on the top.

A2.B2 Green/Blue and Brown Painted Design

[13] Stevenson, ‘Chapter II, The Pottery 1936-37’, 48; Sanders, ‘Byzantine Glazed Pottery at Corinth to c. 1125’, 154.

[14] Though Morgan includes this plate in the local Green and Brown Decoration which was produced with a characteristic reddish clay in the late tenth and the eleventh centuries, Mango calls the same vessel “polychrome plate with marbled decoration”. see Morgan, *The Byzantine Pottery*, 11:72, 214, Pl.XIXa No. 404; Marlia Mundell Mango, ‘Polychrome Tiles Found at Istanbul: Typology, Chronology, and Function’, *Lost Art Rediscovered: The Architectural Ceramics of Byzantium*, 2001, 29, Fig. 11.

This decorative class includes two classes of Saraçhane Excavations.[15] Brown is the main colour, and green, blue and purple are complimentary colours. Though blue, blue-green and orange-red are included colours, the high proportion of green and brown painted examples represent the most abundant class, Green and Brown Painted White Ware. However, there is another variant that we know from Kalenderhane (Chapter one, Table VII) which is purple and brown. This ware type is usually called Green and Brown Painted White Ware or GWW IV which is latest group of CGWW. According to the choice of motifs, this decorative class can be divided into two. A2.B2.a Abstract, Geometric and Vegetative Style and A2.B2.b Faunal Style.

A2.B2.a Abstract, Geometric and Vegetative Style

This class encompasses vegetal and geometrical motifs executed in brown together with the complimentary colours mentioned above. This class is very rich having beautifully executed different designs which consist of abstract leaves, flower-like patterns, angular forms and circles which commonly are either depicted isolated or in a composition on the interior or the exterior surfaces of plates, dishes, bowls and jugs.

The vegetative decoration includes flowers and abstract leaf forms on the interior of the vessels. A flower pattern consists of three or four oval or pointed ended petals which are depicted on the centre of dishes (pls.7.1-2, 11.1, 12.5, 13.3). This pattern is usually painted in brown and infilled in green. In some examples, between the petals are the triangle forms shaping leaves on which the brown colour combing can be observed (pls.7.1-2, 13.3). A

[15] Glazed White Ware III and IV. see Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 29–33.

unique dish from the Hermitage Museum (pl.11.1) bears flower-like circles surrounding the centrally depicted flower. This arrangement evokes a similar execution in relief decoration (see Relief Decoration, B2).

Abstract leaf decoration is a unique decorative group in Green and Brown Painted Decoration and few examples have survived. A plate from Saraçhane bears big three-leaf motifs covering the interior surface up to upper walls of the vessel (pl.13.2). Each of the leaf is slightly irregularly placed onto the surface and infilled with scrolls. While the outline is executed in brown, green is used to fill inside the centre of the spirals of the scrolls. A similar design is depicted with a bird on another vessel of the same findspot (pl.12.1).

Geometrical designs in this class include stripes in linear, diagonal and curved forms, and, also spirals and circles. The stripes are usually depicted in curved forms on the outer surface of bowls (pls.7.4, 8.10). Some rim sherds bear short straight, diagonal and wavy lines alternating in green and brown over broader rims on which two types of decorative treatments can be observed. In the first, these short lines over the rim are framed by a parallel brown line which creates a decorative band on the edge interior surface (pl. 8.7-8). In the second, the lines are freely executed on the edge of the rim in straight, diagonal and wavy forms (pls.7.14, 8.9, 9.1, 3, 5-6, 11.1, 13.3, 5). All of these lines are covering the surface of the rims either partially or completely.

Two types of spirals exist in geometric design. The first type consists of a Triskelion and comprises three spirals stemming from the same root. A green and brown painted example (pl.7.5) bearing this motif shows an artistic association with the same motif executed in brown mentioned above, (pl.8.1-2). In the second type, spirals are depicted in brown which is similarly depicted in the previous type, yet the form is designed thicker than the triple spirals which constitute the triskelion motif. In addition, the arrangements of the spirals are different. The characteristic feature is that spirals are executed separately, outlined by brown and infilled in green (pl.8.3-4). There seem to be no connection in the spiral motifs which is contrary to the triskelion whose spirals emerge from the same centre. Though examples show that the centre of the vessels bear three or more spirals, there is an individual design which depicts a single spiral whose nodular end resembles a wing (pl.8.6).

Circles are another geometrical form used in this class. While a single circle can play a complimentary role in decorative compositions, the concentric circles generate a central design which is associated with the previous class. Similarly, the main motif is depicted in thick dark brown and infilled in green. Also, an abstract motif in brown adorns inside the central circle (pl.7.3). A chain of circles is another design generating a distinct style which appears only on the exterior of jugs. This chain can horizontally surround the body of a jug (pl.11.5) or create a composition with other geometric forms inside a brown parallel line (pl.11.2, 4). The centre of the circles is usually infilled in green which gives a similar ornamental effect as that in the concentric circles depicted on the tondo. An ovular shaped body is common in jug forms (pl.11.4-7, 12.1-3); however, a handled wide-mouthed jug with spout, and a piriform bottle-like vessel show the variety in forms (pl.11.2-3). Also, one sherd bears brown circles on the centre surrounded by radial lines. It generates an abstract sunburst design and inside is painted in navy blue (pl.8.5). This is a unique example in blue and brown painted group which also scarcely appear in general.

Lastly, a group of vessels which is painted in orange-red, blue-green or olive green shows a completely different artistic execution. The fragmented pieces do not allow for the definition of all decorative features, but, the angular ends in these olive-green geometric forms resembling lozenges (pl.8.11). In the visible sides, a dot seems to be placed in the centre of these forms. In another example, a broad parallel line in olive-green, which is flanked by radial lines in the same colour, is cut by orange-red perpendicular lines (pl.8.12). The last example similarly shows a parallel line in blue-green (pl.8.13). A characteristic feature in this decorative treatment is that the tiny circles which are orange-red and brown are used as fillers. The shape and the size of these circles suggest that they are shaped by a hollow tool, possibly a thin reed.

A2.B2.b Faunal Style

The faunal depictions consist of quadrupeds and birds, possibly preys and predators. The figures commonly include birds and then hares, and, three other kinds of animals can be identified: a feline, a dog and a pack animal of which the latter two are the rarest. The palette of the colour is restricted to two sorts of bichrome painting with which the body is outlined in brown and infilled, partially, in green or rarely in blue and purple. Each colour is also used to emphasize some features of the body, such as long or rounded feathers in tails, wings and necks of birds or to enliven the appearance of the body as in quadrupeds. Generally, animals are realistically depicted on the centre of the vessel, but some examples exist in which the overemphasis in the blurred glaze causes distortion of forms, leaving a mark of an unrealistic effect on the figures (i.e., pl.9.4).

There seems to be a relationship between the size of the depiction and the form of the vessels. For instance, big-sized birds usually tend to cover the whole surface of the interior of plates (pls.7.8, 9.1-6), small-sized birds are depicted on the tondo of bowls (pls.7.7, 10.1-2, 4).

Vessels usually bear a single bird; however, there are examples depicting two or four images of the same kind of bird (pl.9.5-6). The size and imagery of birds help to recognise different kinds. Yet, partially recovered vessels and the blurred characteristic of the glaze prevent identification of them, individually. A big-sized bird which is depicted frontally in full body with outstretched wings and the head faces to the right resembles eagles (pl.7.8) which are popularly used in various media of Byzantine Art. A complete vessel from the Crimea (pl.14. 4) depicts another eagle figure posed in right profile and the detail engraved in the body helps to identify two different vessels bearing a similar figure (pl.9.2-3). A long-leg, long-neck and rounded wing which ends in the same shape with the triangulated body may suggest for a waterbird, possibly a copy of a crane (pl.9.1,5-6). The small-sized birds may be doves or pigeons. Their bodies are depicted in profile to the right with the wings either settled on the body or raised (pls.8.15-16, 10.1-2, 4).

Hares are the second most commonly depicted animals in the faunal depiction of the bichrome painting. The figures are drawn in profile facing to the right. The head is depicted coherently with the body, but sometimes turned to back (left). Two postures exist in depiction of hares: standing still and in motion. The animated feature is usually given by a raised front leg or two as if leaping. The outline of the figures is shaped in brown and infilled in green. The brown colour is also used in small oval forms on the body and the neck (pls.7.13-15, 10.5-7).

A feline and a pack animal, which are possibly a lynx and a mule, and a dog are rare animals included in the bichrome faunal depictions. The lynxes are depicted with the same features in the same stylistic manner which are assigned to the body parts. A round face, eyes and nose which is connected with a single lined nasal bridge to the arches of eyebrows and pointed ears on top are depicted the same (pls.7.10-12, 14.7). A unique example, which is painted in blue rather than the abundant green, shows the full depiction of the body and the face (pl.14.7). The body is shaped as a reverted and upturned S on which the rotation is quite stylistic together with the face which is frontally placed on the long-reverted neck. The thigh of the animal is drawn considerably higher than the chest, and a similar proportion is applied to the rear and forelegs in which the former is taller than the latter. An aerial-curved tail seems to be misplaced in the lower back; however, this feels intentional to pursue the S style as happens in the body. Other vessels are broken; however, the remaining parts share the identical decorative features and details with the complete figure mentioned above. The outline of the lynx is in brown and partially infilled in blue or green. The wavy lines in brown colour are drawn on the body of the lynx and tend to cover the whole both in brown and in the secondary colour. Additionally, in the blue and brown painted example, these curvy lines surround the face, upper head, through the neck and chest to capture this furry animal.

A dog and a mule, on the other hand, are represented by single examples which are depicted on a plate (pl.14.6) and a jug (pl.12.2), respectively. The dog is depicted in profile, facing the right and raising one of the front legs. Its body is drawn in black which is also used in the details of the body and infilled partially in green. The S shape in the upper part of the body from the nose to the lower back resembles the lynx mentioned above, however the lower part is blurred. The tail, again, is likewise misplaced in the lower back of its thigh and it is shaped high. It is realistically depicted with careful details apparent in the body parts. For instance, the pointy teeth are emphasised in the upper section of the open mouth which is drawn upward with the head and its fixed pointy ears on top. Another detail in this illustration is the leaves drawn in several places next to the rim. Though the leaves seem to be used to fill the empty spaces on the vessel, they are rendered in relationship with the dog, such as below its feet, in front of the body and on the top of the head. This is a very expressive depiction that probably suggests an excited dog which enjoys playing in the leaves.

Lastly the mule is similarly outlined by brown and a part of its body infilled in green (pl.12.2). However, the style in depiction is completely different than the all-animal figures in the class defined above. Though the stress on body parts, such as ears and hooves, shows a clear effort to achieve a realistic form for the mule, it is almost depicted comically and feels in a sense that it is rather a careless application of the bichrome decoration. However, the style in the use of the palette, especially in the green strokes, bears a resemblance to other green and brown painted jugs from the Hermitage Museum (i.e., pl.12.1 and pl.11).

Date: mid-11th to 12th[16] and mid-12th to late 13th[17]

A2. C. Polychrome Painted Decoration[18]

Polychrome decoration consists of four and usually up to five colours achieving elaborately painted motifs on both vessels and tiles of the white fabric of Byzantine Pottery. The former comprises plates, dishes, bowls, juglets, cups with handles and goblets and the latter includes plaques, revetment tiles and icons. The pallet of those wares is defined by a combination of the primary colours (yellow, red and blue), the secondary (green, orange and purple) and the

[16] For orange-red class Stevenson, 'Chapter II, The Pottery 1936-37', 49, B 4c; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30, GWW III.
[17] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30, GWW IV; Y. Morozova and H. Oniz, eds., 'The Green and Brown Painted White Ware of Novy Svet Shipwreck Is Dated to the Mid-Twelfth to the Late Thirteenth Centuries. See Iana Morozova et. al, "Green and Brown" White Wares from the Collection of the Archaeological Museum, National University of Kiev (Ukraine', in *SOMA 2010 Proceedings of the 14th Symposium on Mediterranenan Archaeology* (Oxford, 2010), 127.
[18] Talbot-Rice's Group A 1 (1930) and Class II (1957), Morgan's Polychrome Wares, Hayes' Polychrome Ware, Sanders' D2. Polychrome Glazed

tertiary colours (i.e., blue-green and yellow-brown) together with iron oxide or manganese as dark outliners. Over the top, a thin colourless glaze covers both inside and usually outside. A further categorisation of Polychrome Wares can be made by the distinctly used motifs, colours, designs and styles which generate decoratively distinguishable groups.

A2.C1 Class I[19]

This group bear the most modest decorative treatments executed among all Polychrome classes. The most characteristic feature of this class is a mere brown cross design on the inside floor of the cups. The shape of the cross varies from a basic (pl.16.6) or cross recrossed (pl.16.2-4) to a very complex design (pl.16.11a) which is almost depicted as a vegetative ornamentation (see also pl.36). A very peculiar shape which is double-lined with dots placed over the corners (pl.16.11) feels as if they are unfinished examples of the coloured counterparts in the Class IIa (pls.17.6, 18.5-8). Regarding the latter, it is probable that it can be a flower or cross-like motif rather than a cross.

A full form is a rare instance since the recovered vessels are fragmented, usually from the bottom part where the manganese-lined cross is placed. Nevertheless, a double-handled cup from Mesembria (pl.16.5) shows a rinceau motif surrounding the whole body in a horizontal band on the exterior. Similar treatment can be seen on the exterior of another cup which is included in this class (pls.16.3). Besides that, the vertical and diagonal zigzag lines are other decorative means which adorn the outer surfaces (pl.16.8-9). A cup from Xanthos bears a

[19] Based on the chromatic class system this group should fall into the Brown Glazed-Painted Decoration (A2.A2), however, it is included in the Polychrome Decoration to prevent the aforementioned confusion in the Methodology. Some of Sanders's Group 1 and Hayes's Polychrome Ware Class 1.

different decoration executed on the upper section of the exterior (pl. 16.12b). On one side of the cup, a band of concentric circles (probably the same guilloche design in Class IIa) is separated by a checkerboard with dots inside. Some of these cups show traces of other colours such as warm yellow on the rims or inside the double lines below it and over the base (pl.16.5, 8-9, 12b).

The Class I uses the same yellow/brown and worn-out green as in Brown-slip Painted Ware (pl.5.4, 6a). Also, the downsized cup forms and similar designs on the exterior connect these two groups together (pl.5.7). On the other hand, the worn-out blue-green and/or turquoise blue[20] also suggests that these colours may have been included in the palette which associate these examples and the Class IIa.

Date: mid-10th to late 10th century[21]

A2.C2 Class II[22]

This group includes figures and motifs which are outlined by a manganese or iron oxide black or brown colour on a light background. The filler colours are blue, blue-green, manganese/brown and yellow. According to the difference in colours and the composition of the decoration, this group can be divided into two.

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[20] The colour is noted by the author. See Pamela Armstrong, 'From Constantinople to Chersonesos and Lycia: Polychrome White Ware Cups', in *Исторические, Культурные, Межнациональные, Религиозные и Политические Связи Крыма Со Средиземноморским Регионом и Странами Востока*, 2020, 12.
[21] Polychrome Ware was found with Red-brown painted Ware at Stage IV, A 2b Stevenson, 'Chapter II, The Pottery 1936-37', 43–46.
[22] Sanders's Group 2a-b, Hayes Polychrome Ware 2., Morgan's Group I.

A2.C2.a Class IIa[23] consists of brown/manganese outlined festoons, guilloches, geometric forms and other vegetative motifs which are infilled with yellow, yellow-brown, blue, blue-green and purple. This group includes both closed and open forms. The rims of the cups are accentuated by manganese lines infilled with yellow and yellow-brown and rarely white both inside and outside (pls.17.1, 7, 10, 13, 18.3, 9-10).

(1) The closed forms are mainly cups, probably one-or two-handled, and juglets. Of the cups, the colourful glaze decoration can cover the whole interior excluding the group with manganese-lined cross standing inside the bottom (pl.17.1a, 13a). The exterior of these cups is similarly outlined by the brown bands as in Class I, however the blue-green, green, yellow, black and white infill inside the parallel lines, guilloches and concentric circles (pl.17.1b, 4-5, 13b). This group seems to cover the colourful examples of the Class I.

Similarly, the other cups include cross-like designs on the interior floor. But, the filled and encircled style of these motifs are different than the brown-lined cross group, mentioned in Class I and IIa. A largely depicted cross on the interior floor of the cup is a unique example. The cross is outlined in white and infilled with blue. Between the arms, the design is worn out, yet, it is painted in blue, yellow and white. On the exterior, a doubled brown vertical line is infilled with the same blue applied inside (pl.17.7a-b). The most abundant cross-like type, on the other hand, is the black and white design. A thickly applied white colour shapes a cross-like motif on a black background covering the floor (pls.17.6a, 18.5-8). The rest of these cups is usually painted with yellow inside and outside (pl.17.6b). However, some sherds with the black or brown pseudo-kufic designs on the exterior share the same yellow applied inside (pl.18.9 a-b, 10 a-b). The pseudo-kufic characters feature an alternative design on the exterior

[23] Sanders's Group 2a-b, Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 72–73.

decoration of these small cups. An example from Corinth shows a similar application, except the blue infill, illustrating the whole body can be covered by this decoration (pl.17.10). This class is not the only one including pseudo-kufic decoration. It is also used in two other classes of the Polychrome Painted Decoration, such as Class IIIb and Class IV (see below).

Also, a few examples show animal figures are included in the decoration. A bird on the floor of a cup from the Benaki Museum is a curious example with its elaborate depiction of the details of the body which is conformed to the small size of the cup. The inside floor is encircled with a thin parallel manganese line which is infilled with yellow. On the centre, the bird is depicted in a crescent shape in which the body is oriented to the left, and the head is turned to the right. The rinceau motif on the outside surrounds the walls of the cup inside a line which shares a similar design inside of the cup (pl.17.14 a-b). There are two other cups which share the same motifs and designs depicted on the exterior (pls.16.5, 18.3).

Juglets are the rarest forms of this class. On the exterior of a juglet from Corinth, a dark brown is used to outline the narrow panels which are drawn between the rim and the neck. These panels are infilled in yellow and light brown, alternately. The same yellow and brown painting can also be seen on the handle (pl.17.9). A similar alternating panel design decorates another juglet from Saraçhane. It is rather a rare example with a bearded male figure which is depicted in right profile on the body of the vessel (pl.33.3). This example has high importance because it shows that this class is not limited to figures of animal depictions, in addition to the vegetative motifs and geometric forms.

(2) The open forms are dishes and rarely plates. Their interior surfaces are usually decorated with vegetative motifs, geometric forms and animal figures. Vessels are fragmented, however the remaining parts show that new motifs are added to the decorative repertoire of Class IIa. A further subdivision is not necessary; however, it should be noted that three stylistically different groups can be recognised. The colour pallet consisting of blue-green, yellow, black and white is common for all subgroups. However, the choice in the main colours is different in the first and the second groups. In the first subgroup **(2a)**, blue-green and yellow are used in broad areas and the details are pronounced by black and white. On the other hand, in the second subgroup **(2b)**, black and white are used as the main colours and the details are in blue-green and yellow. Finally, the third subgroup **(2c)** uses a very specific application technique in the paint which is utterly different than the previous subgroups. Its dissimilar features include a plain white or cream background, cross-hatching design in the body of animals and a thick second coat.

(2a) A plate (pl.18.1) bears an eight-pointed star in a medallion depicted on the centre. The star seems to be enlarged inside the medallion by repeating the form which is infilled in yellow and blue-green. The central medallion is tied up with two large medallions standing on each side and the curvilinear design on top. Birds (?) are depicted inside these medallions.[24] The band on the rim consists of tongue motifs which are painted in the same colours on the interior design, black, yellow and green. Another rim sherd in this class bears the same motif (pl.17.2). A tongue motif together with dart motif is favourably used in polychrome tiles.

Diagonally arranged parallel lines which are outlined in black render an interlaced design, probably depicting another eight-pointed star on another dish (pl.18.2). An additional black line in the middle divides this parallel line into two which tends to a triangular form. The bottom half is painted in yellow, and the top half is worn out, however blue-green traces can be seen. The dividing line together with these two different colours creates a dimensional

[24] This illustration is taken from Morgan's Byzantine Glazed Pottery. The depiction inside the medallions is unclear, however Morgan defines them as birds. See Morgan, 206, No. 307, Pl. XIII a.

effect by adding more volume to the sides.[25] Also, a motif which is outlined in black and placed in one of the corners of the star appears to be antithetical and it may be repeated in the other corners as well. A semi-circular motif on the centre is unclear; however semi-circular brown lines which are infilled in yellow may form a four-petal flower.

A unique cross design on the tondo of a dish is another example associating the executed motifs with the polychrome revetment tiles (pl.18.4). The cross is stepped by eight cubicles which are outlined in black. The inside is infilled in white and the square centre is yellow. The corners of the central cross are curved parallel lines which are infilled in white. These lines, probably, shape four corner medallions which are painted in blue-green and yellow. The same cross design also appears on a single polychrome tile.[26] A few sherds bear monochrome and bichrome dots on the background (pl.17.3, 8) which is a shared feature with some examples in Class IIIa (Pl.22.5, 7). However, the choice of colour in dots makes them different than the Class III on which the dots are red, explicitly.

(2b) Some rim and body sherds fall into this stylistic subgroup. The main difference the use of black and white in the main decoration on broad areas. Since the vessels are fragmented, there is no clue in the decoration of the tondo. But black and white seem to be used on the upper walls depicting close to the rims on the interior. While black seems to be the background colour, white decorates the top of it. A rim sherd (pl.18.15) bears a rinceau motif which shares a similar design with cups in Class I and IIa. Other ornamentations are not legible, but probably similar vegetative motifs are rendered which are nothing like those in Class IV, the black and white pseudo-kufic design.

[25] The use of trompe-l'œil is unusual for Byzantine Ceramics, however it appears in aniconic designs of mural paintings, especially in Cappadocia (based on the author's own observation during the fieldworks in the region).
[26] Jeffrey C. Anderson, 'Introduction to Ornamental Tiles', in *A Lost Art Rediscovered, The Architectural Ceramics of Byzantium*, ed. Sharon E. J Grestel and Julie A Lauffenburger (PA: The Pennsylvania State University Press, 2001), 101, no.27 (drawing 32, Cat. VI.15).

In this subgroup, yellow and blue-green are used in details, such as thin bordures on the rims and in between the main decoration. Narrow bordures are outlined in black and filled in yellow. Inside these bordures, black wavy lines (pl.18.13), parallel lines alternating vertically and horizontally (pl.18.14) and a meander motif are rendered (pl.18.16). In these examples, blue-green seems to be used only to paint the rims.

Two unpublished examples recovered from Iznik Museum (pl.19.1-2) includes two broken plates show partially the body of a griffon and an eagle. According to the form of the vessels, the choice of colours and the heraldic animal figures, this group is linked with the plates which were unearthed Veliki Preslav and Crete (**Appendix 5**). However, the choice of the motif, animal figures, is associated with Class IIb. But the differences are the lack of the central roundel and also the red dots on the figures. There is no clue that these figures are surrounded by panels as in Class IIb. Therefore, it can be deduced that the animal figures are freely and largely painted in the centre. These figures are outlined in black and infilled in warm yellow and blue-green. The cross-hatching section in between the upper legs of the eagle (Pl.19.2a) can either be an artistic detail or a stylistic nuance which does not exist in the following group (Class IIb). The runny feature of blue-green glaze and its darker appearance (rather blue) (pl.19.1a) is suggestive of a thick second coat if it is compared to the worn-out surface of the other figure (pl.19.2a). The exterior of the vessels (pl.19.1b-2b) are undecorated and unglazed, the same treatment appears in an example in Class 2b (pl.20.6).

Date: late 10th and mid-11th centuries

A2.C2.b Class IIb[27] is distinguishable with its panel design which surrounds the central medallion on the interior of plates and dishes. Inside of the medallions, usually depicted is an animal and rarely human figures on a light-coloured background, white or cream. In general, figures are outlined in black and infilled with brown, blue, blue-green and yellow. Rarely, are the figures unpainted which means they keep the same colour as the background. Though human figure is rare, animal figures are mostly depicted the both realistic and unrealistic kinds. Lions/leopard are the most commonly imitated animals, on the other hand, antithetic birds, ox, stag, deer and winged horse are among the rarely depicted ones. A common feature in the depiction of the animal figures is the black dots on their bodies.

The bordure which surrounds the central medallion is usually encompassed by another panel, however different treatments also exist. Three particular arrangements with their different decorative treatments inside these bordures can be recognised. **a)** The central medallion is surrounded by two decorative bordures in which are depicted vegetative motifs and geometric forms. The depicted motifs in the bordures are closely associated with the decoration of the polychrome tiles.

The better-preserved portions of three dishes from the Hermitage Museum and one example from Iznik Museum are helpful to reconstruct the decorative bordures of this group. The outer bordure of a dish (pl.20.1a) is panelled which is outlined in black and infilled in yellow. The insides of these panels are decorated by hearts with five-pointed leaves and eight-petalled flowers, alternately. These motifs are double outlined. In the first panel, two heart motifs are horizontally placed and the end of the motifs are the same out-curved half-palmette on the corners. The heart motifs are connected to each other by a loop in the middle. The inside of

[27] G. Sanders's Group 2c, Byzantine Glazed Pottery, 73.

the hearts is infilled in blue, and the rest is white. In the second panel, a four/eight-petal flower or a stepped cross is depicted side by side. It is infilled in blue and a yellow dot is placed in the centre of the motif. The filler motif is a half-quatrefoil which is reciprocally placed on the top and the bottom. The inner bordure is wider than the exterior. It bears a rinceau which is executed with a care and delicacy. It has extra involuted sections which end with half-palmettes. The yellow and blue infills, which can partially be seen on a part of the stem of the motif, in both the lower and upper parts, add more volume to the motif.

In the central medallion of this dish, two human figures are depicted in a natural environment: two males face toward a palm tree which is depicted on the left (pl.20.1b). The tree and the figures are outlined in black. While the tree is painted in blue and yellow, the figures are unpainted. Only the details of the garments on the figures are drawn in black. A very peculiar feature about these figures is that one is mounted on the other.[28] The figure on top points to the tree with his right open hand and an inscription in Greek letters, on the sides of his head, reads ΥΠΑΗ ΠΕΤΑ.[29] The other figure below is kneeling and points to the ground with his right open hand and the tree with his left index finger.

Another dish from the Hermitage Museum bears a similar bordure design (pl.20. 2). However, this example has three bordures while the majority bears two. The outer bordure includes a rinceau which adorns through the everted rim just below the lip, which is painted with yellow, white and metallic blue. The upper side of the rinceau motif is painted in white and the lower side is with blue. This feature adds a volume to the motif as happens in the same motif rendered on the previous example (pl.20. 1a).

[28] In Zalesskaya's reconstructed drawing, these figures are mistakenly drawn in a harvesting scene: one figure is collecting fruits from the ground, and the other is picking from the tree (pl.20 1b) Vera N Zalesskaya, *Masterpieces of Byzantine Applied Art. Byzantine Ceramics of the 9th – 15th Centuries, Catalogue of the Collection* (St. Petersburg: The State Hermitage Museum Publisher, 2011), 51, cat. no. 27.
[29] Ibid.

The middle bordure has eight panels which are alternately adorned by pseudo-kufic design and small black V shaped lines which are enliven by blue brush strokes on a white background. On a white background, the pseudo-kufic decoration consist of U shape which is narrowed down on the bottom coherently with the shape of the panels. Inside this U shape, a circle and, on top, a trefoil motif are rendered. Also, three more doubled-lines may belong to the other stalks of the kufic design.[30] The style of this design is floriated which, interestingly, the same style is performed in the Class IIIb as well (see pl. 23. 1-4). The decoration of the other panels is quite complex. The small black V shape forms are the most recognisable features in other panels of the middle bordure. However, a Greek inscription is hidden inside these forms which is in the panel right across the head of the stag, but it is unreadable, unfortunately.

On the other hand, the inner bordure is left plain. The same metallic blue which is applied over the rim and in between the panels on the outer bordure fills inside this bordure. The warm yellow which fills the parallel lines to separate the bordures is only applied in between the outer and the middle bordures. Inside the other two separator parallel lines are left unpainted. In a sense, it feels that it is unfinished.

Inside the central medallion, the animal figure is rendered facing to the left and one of its forelegs is raised. This depiction belongs to a stag regarding the apparent antlers on above of the remaining part of the depiction. Also, the motif which is depicted behind the stag is a tree with its visible trunk and crow. The colour palette and the shape of the leaves of the tree are quite similar with the one depicted on previous dish (pl.20.1).

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[30] The dish is restored, and some parts of the motif do not give the impression of a true copy. Therefore, the definition is partially described here which is based on what seemed to be original.

On another dish (pl.20.4), the outer bordure is depicted with a series of broad hearts which are connected with a looped-circle in between of each motif. Each of the hearts encloses three lobed leaves stretching to the sides and in between is a five-pointed leaf creating a trefoil palmette motif. The inner bordure is narrower than the outer and has an alternating decoration of two motifs. A palmette which is surrounded by an open-ended heart motif, and a stepped cross design is rendered in this bordure. In the both bordures, motifs are outlined in black and infilled with white and yellow, but the background is left in blue. The central medallion bears a lion depicted in left profile and one of the front legs is raised. The body of the lion is painted in brown, but a small white section can be seen on its mane which should have been painted similarly with another lion depiction on another vessel from the Hermitage Museum (pl.21.1).

Another dish from the Hermitage Museum has also two bordures style (pl.20.5). It is a unique example not only with its extraordinary ornamentation but also the vivid colours applied on it. The outer bordure consists of half quatrefoils which are depicted inside the zigzags creating triangle forms. These forms are alternately infilled in green and royal blue. Inside, the half quatrefoils are infilled in white, and the semi-circles in the centres are in dark yellow, closer to amber. The inner bordure is plainer with its undecorated panel design than the outer bordure. However, the same green and blue alternating again, but this time inside the rectangle forms. This arrangement generates a vigorous effect diverting the attention to the main decoration inside the central medallion which is rendered on a plain background. On the white background, a tree is executed in the centre and two birds are placed on the sides of the tree. While the body of the birds are antithetically depicted, the heads are turned and slightly touch the tree by the beaks. The bodies are outlined in black and infilled in green and blue. Yellow is used on the wings and a part of the tails. The voluted and diagonal black lines on the wings are unprecedented features in the decoration of the polychrome group.

The last example of this group is an unpublished example from Iznik Museum (pl.20.6). The outer bordure is decorated by a rinceau which is outlined in black and infilled in white on a turquoise blue background. The inner bordure is panelled and decorated with successive quatrefoils by leaving a panel empty. The panels where the quatrefoil motif is rendered are painted in beige and the empty panels are in the same blue on the background of the outer bordure. The central medallion bears an ox figure faces to the right. The figure is painted in white on a blue background. The features on the face, such as nose and mouth are shaped by black lines, and also these lines are placed in the chest and belly. Besides, the black dots cover the rest of the body, excluding the hooves and the crescent shaped horns. Although the figure is left plainly, it seems that yellow is partially used on the ears and in between the parallel line over the neck. Also, a branch which ends with a leaf-like standing at the upper back of the ox is infilled in yellow.

In this class, a single dish is decorated differently than the order described above (pl.20.3). The depiction of an animal inside a medallion on the centre is alike; however, it lacks the bordures which surround the central medallion. Instead, a very stylistic rinceau creates semi-circular forms which are repeated to create a band on the wall of the vessel. The rinceau band forms half-medallions in which other animal figures are rendered. It is not regular; however, each band is connected to the central medallion by a loop which is placed in the centre. The corner of each half-medallions has a triangular section on which the depicted motif is triple three-lobed palmettes. The animal figures inside the half-medallions are wild beasts, such as bear, falcon and leopard which can be identified. The figures are outlined in black and infilled with brown on a royal blue background. The black dots are common feature whit the other animal depictions in this class and also the details on the bodies of these beasts are stressed by white, such as the fur on the neck of the bear and the on feathers of the falcon. The everted rim is decorated by dart motifs in which the centres are the brown stylistic trefoils. Also, this tiny motif appears in Class IIIb in red.

The central medallion consists of a meander band which is encircled by two parallel lines representing the finest of its kinds amongst the all vessels. A black colour is used both outlining the motif and filling the spaces in the exterior part as if creating a black background. While the meander motif is infilled with white, the outside parallel line is infilled with the same brown which is used on the figures. Inside this meander band, a monumental fantastic creature is rendered depicting a hybrid animal which is a winged horse with claws. The head of the beast is broken; however, the wing and the claws may suggest a Hippogriff which is rather rare in Byzantine Art. The black dots on the body are common with other animal figures, and the wing is interestingly depicted in the same style occurring in the tree motifs mentioned above (pl.20.1-2).

A group of sherds similarly bear quadrupeds, lion, leopard and deer, depiction on the tondo (pl.21.1-6). A medallion which is drawn in black and infilled in yellow and the black dots on the figures' bodies (pl.21.1-2, 4-6) are similar to those in the Class IIb. But there is no evidence to identify the panelled decoration following the central medallion. Therefore, they either belong to Class IIa or IIb.

Date: mid-10th and late 11th centuries

A2.C3 Class III[31]

[31] Sanders, 'Byzantine Polychrome Pottery', 92-6 Polychrome 2a-c.

The characteristic feature of this group is red dotted background. The palette for the motif is brown, blue-green, red and yellow, and the red dots sprawl on the space between motifs. According to the different treatments in using varying colours as fillers and the choice of motifs, this group can be divided into two.

The first sub-group, **A2.C3.a Class IIIa**, comprises cups, bowls, dishes and plates (pl.22.1-12). The decoration on these vessels are usually vegetative motifs and rarely animal figures. Having the motif inside a broad parallel line which is drawn in between the rim and base is a common feature for the cups (pl.22.1-4, 8). A warm yellow colour over the rims and short horizontal lines on the handles are also typical. An exceptional example from Cherson is divided into by a parallel horizontal line and each part bears different motifs (pl.22.12). Two examples from Corinth show a two or three-lobed leaf motif alternate inside the parallel line on the exterior (pl.22.1-2). The pattern is shaped in brown/black and infilled with blue-green. The same blue-green is also used as filler in a guilloche motif (pl.22. 4) and a small eight-pointed flower or star motifs (pl.22.3-4).

Two more cups from Cherson show complete and also different forms. A ring base and the spherical form are common; however, the form of the upper section is different for both. The cup with pursuing spherical form which ends with a slightly everted rim is common with previous examples (pl.22.8). On the other hand, a flaring upper body which is probably shaped in quatrefoil is a particular feature (pl.22.12). Nevertheless, these two cups may suggest either the ornaments are sketched but unpainted or the glaze on their surfaces are worn-out very badly. Motifs are drawn by black/brown, and the red dots sprawl outside of the motifs as if adorning the background. The drawn motifs on the outer body are disks with four circles inside (pl.22.8) and a circled palmette with guilloche (pl.22.12). The former resembles to one which is depicted on a cup from Corinth. A blue-green colour fills the circles inside the disk, and its rim is painted with warm yellow (pl.22.6). The latter bear a very specific pattern which is unique. However, the other guilloche motif in this class is also infilled with blue-green (pl. 22.4). The circled palmette with guilloche makes the motif closer to the design in the Class IIIb, the circled palmettes and also the scrolling tendrils (pl.23.1-5).

Disk flowers are the commonest kind which is depicted on plates. It usually produces a composition by repeating the motif. In this case, many disk flowers encircle a central motif to generate an enlarged flower-like motif. The central flower can either be the same motif or a different kind (pl.22.5, 7, 10). The usual attribution of this ornament is to shape the flower with brown/black dots and infill with pastel colours, such as blue-grey and light brown (pl.22.7, 10). A lattice motif is another unusual form which can be seen on the plates (pl.22.9). The motif is marked by a circle which is infilled with black or brown at the intersection, and inside each cell is a flower motif. While the small dots cover inside the arms of the lattice and flowers, relatively bigger dots are painted on the background. The last example of this class is a plate with an animal depiction (pl.22.11). It is broken; however, the pointy ears, the beak and an upturned wing probably portray a griffon facing to the left. The black dots on the its face and the big-sized depiction resembles to animals of the Class IIb; however, this plate falls into IIa with its red dotted background.

The second sub-group **A2.C3.b Class IIIb** includes mostly plates. The majority of the examples from the Hermitage Museum are characterised by a wide bordure which surrounds the encircled motif on the centre. The bordures on the wall of the plates consist of pseudo-kufic characters (pl.23.1-4). The rims are separated from the bordures by a brown/black line on the inner edge of the rim. Over the rims, generally, are the half-circles (pls.23.1, 3, 5, 24.1) and sometimes dots are placed in between these motifs (pl.23.2). A single example bears small full circles resembling beaded dishes and bowls in other decorative groups of White Wares (pl.23.4). The restored plates from the Hermitage Museum are fine examples to show the full surface treatments; however, a group of sherds show the applied colours better (pl.24.1-6). Among them, a plate (pl.24.1) bears an indefinable vegetative composition which is depicted freely, therefore it should be bore in mind that this group is not limited with a bordure design. This class has more motifs and different compositions have yet to be completed by new discoveries. However, the better-preserved examples show that three different bordure designs can be identified in this class. The main difference in each of the bordures is an individual decorative nuance which usually repeats itself both in the bordure and the central motif.

a) The bordure includes floriated kufic design on which the ends consisting antithetically depicted half-palmettes. These half-palmettes are connected each other by a stem which forms an angled U shape. A linear drop shape is rendered in between the half-palmettes and it is alternately infilled with a dark colour. The filler motifs are stylised tiny red trefoils which are drawn at the bottom (single or double) and two sides of the drop shape (pl.23.1-2). The circled scrolling tendrils on the tondo are the five-pointed palmettes. The centres of these motifs are encircled and infilled either brown or yellow. In between the palmette motifs, the same linear drop shape is placed.

b) The design of the bordure is almost identical with the previous bordure; however small alterations occur. The bordure bears the same U shaped floriated kufic character. Also, this shape ends differently and looks rather a script. In between the U shape, a stylised S formed palmette-like motif is depicted. The alternating colour in this central motif is the same with the previous example. However, the stylised red trefoils are more randomly placed around this central floriated motif. The brown infill in the circle, which encircles the tondo, is another difference between two. In it, the scrolling tendrils are ended by three-pointed palmettes and inside are the same red trefoils. Also, the corners are floriated rather than depicting the linear drop shapes (pl.23.3). The red dots on the background show a random treatment in which the dots are larger and unordered comparing to the previous example.

c) The floriated kufic design is similar with the previous examples. But the bordure is taller and narrower than "**a**" and "**b**". Also, the outline of the kufic form is more likely V shape which is stressed by the everted upper section. In the middle of this form, three-pointed palmette is rendered with other motifs on top which are a circle and a crescent, respectively. Also, two circles which are infilled with brown are depicted on both sides of this composition. The centre of the plate is smaller than the ones in "**a**" and "**b**." The inside motifs are three-pointed palmettes which surround the quatrefoil on the centre. They are enclosed, and, therefore, they seem different, as shells or half-circles with palmette. This is more likely resulted from the limited space which naturally narrowed down the motif in the centre.

The last example in this class bears four circles with palmette varieties. Two motifs mirror on the sides of the stylised flower motif on the centre (pl.23.5). Two of the opposing circles bear the same palmette motif. The palmette is depicted twice, one on top of the other, and foliated inside and outside of the motif. In the two other circles, the heart motifs with five-pointed split palmettes are depicted. In the centre, a stylised flower motif consists of four linear drop shapes which encompass, possibly, a small quatrefoil on the centre.

Date: late 10th and late 11th or early 12th centuries

A2.C4 Class IV[32]

This group favours black and white decoration employing geometric forms and pseudo-kufic characters in vegetal, script and abstract forms. Royal blue and turquoise expand the colour scale of the decoration which usually covers the whole interior of the open forms and also the exterior of closed forms. The executed lines tend to be clear; however, careless applications result in the loss of distinct lines between motifs. The overglaze is variable in colour which is transparent yellowish or light brownish commonly applied on cups, and the exterior of dishes and bowls can bear a transparent mottled green glaze. This group consists of the smallest portion of Glazed White Wares. Though the decoration seems to be fairly varied by motifs depicted on sherds, it is hard to make a further subdivision.

The pseudo-kufic characters are either be depicted inside a bordure on the flared rims, just below the lips (pl.25.4-5), or on the interior of dishes (pl.25.1a) and the exterior of cups (pl.25.8) covering the whole surface. The pseudo-kufic characters in this class are different than the previous class, **Class IIIb.a-b**. Apparently, the floriated sort is replaced by the cursive style. Relatedly, the U shape is gone and the new form is more complex and bonded. It is rather depicted as a script mimicking the original Kufic (see Discussion). The whole surface covering is a rare feature that is usually accompanied with vegetative motifs and the complimentary geometric forms. Nevertheless, a cursive script covers the whole interior surface of a dish from Corinth (pl.25.1a). The script is divided by horizontal lines in which a royal blue painting is placed between two white lines. The same design is also used for

[32] Talbot-Rice's Black and White Class, Morgan's Group III, Hayes's Class 3, Sanders's Group 3.

separating the body of the vessel from the rim. A band of alternating trefoils inside a zigzag line decorate the rim of this vessel (pl.25.1b).

Another cursive script on a band over the flared rim of a dish uncovered from Saraçhane seems to be decorated with vegetative motifs. The motif is a rinceau which ends with five-pointed palmettes which probably covers the whole interior up to the lower part of the rim. In between the main decoration of the surface and the rim, horizontal lines are depicted which is similar to the previous example (pl.25.1a). Instead of royal blue line, circles compose a pearl band which are rendered in between two lines. This band seem to be used in other vessels as well (pl.25.3, 6-7).

The vegetative motifs and geometric forms are also the decorative elements of this class. The pearl bands which are made by white circles are painted on either a black (pl.25.3, 4, 6, 7) or blue (pl.25.3) background on the vessels from Saraçhane and Hermitage Museum. A guilloche motif is also depicted in some examples which bear vegetative and geometric motifs, together. An example from Corinth which consists of a circle with rosette which is rendered on tondo (pl.25.2). The outline of the flower is white on a black background and the eight petals are alternately infilled with black and blue. The rest of the vessel is broken; however, the guilloche motif can be identified by the shape on the remaining part. The other guilloche motif is depicted on a dish which is recovered at Parion excavations (pl.25.9). The interior of the dish includes square medallions where the guilloche is depicted as a band. Only the diagonal lines are identifiable inside this medallion. Another square medallion is placed on the right side. Off this, the remaining part is the vertical lines and semi-circles. The whole decoration is unusual for both the polychrome wares and the tiles. Nevertheless, an example from Thessaloniki bears a similar motif of which the bilateral appearance may suggest a square form (pl.25.10). Diagonal lines also adorn the other sherds from Thessaloniki (pl.25.11).

Date: mid to late 11th or early 12th century[33]

4.2. B. DECORATIVE TECHNIQUE

The Decorative Technique basically defines tool-made decorative embellishments which are used in the ornamentation of CGWW pottery. This class consists of two main groups: Carved Decoration and Relief decoration, and further subgroups show the use of these techniques in two forms.

B1. *Carved Decoration*

Carved decoration comprises two designs which are constituted by two specific techniques. The first one specifies the ornaments on the surfaces which are cut out by a cutting tool either partially or wholly. The second one is incisions that appear to be shallow lines which are drawn by pressuring a sgraffito tool slightly onto the wet surface to highlight the counter of the chosen motifs. Carved Decoration includes two groups: B1.A Cut Design and B1.B Incised Design and also sub-groups which form different styles. There are instances that these two designs are combined on surfaces.

[33] Stevenson, 'Chapter II, The Pottery 1936-37', 43–46, 52 Stage Va; Sanders, 'Byzantine Polychrome Pottery', 97.

B1.A Cut Design

B1.A1 Cut-out Style

Cut-out Style represents a small group by occasional pieces of Glazed White Wares. This decorative technique is used for notching rims and bases (pl.26.2, 9). On rims, below lips, thin bands are decorated with dogtooth design (pl.26.5). This feature occasionally occurs on below the rim outside of the vessels (pl.26.4). The little nicks round inside the edge of the rims are used together with wavy-tumb nail design on the exterior groove of chafing dishes. Cut decoration also appears in form of fretwork on the body of the vessels, especially in chafing dishes (pl.26.1, 7).

B1.A2 Fretwork Style

Fretwork is the rarest decorative technique and a fine example from Athens illustrates that cutting is elaborately used in decoration covering the body rather than applying only for perforation (pl.26.1). Perforations seem to be used generally on the base of chafing dishes, fruit stands and goblets either alone or accompanied with incised decoration (pl.26.6, 8).

Date: late 8th to mid-10th centuries[34]

B1.B Incised Design[35]

[34] Stevenson, ‘Chapter II, The Pottery 1936-37’, 34–38, Stage I-II.
[35] Talbot-Rice A4 White Inscribed Ware, Stevenson A 0/4, Morgan Inscribed Ware, Hayes Incised decoration in GWW I-II, Sanders F2. “Incised” in Incised Decoration.

As mentioned above, Incised Decoration exemplifies the earliest designs of shallow sgraffito technique in Byzantine pottery. The designs of this decorative class are composed by a pointed tool, stylus, cutting through the wet fabric, and, then the vessels are covered by a glaze. The incised technique in Glazed White Ware pottery is executed either alone or with other decorative means. It is not only combined with other techniques in Carved Decoration, but also with the others in Relief Decoration and Decorative Painting. Two subgroups, plain and elaborate, can be distinguished by the difference in the style of the technique which occurs in the Early-Glazed White Ware Decoration and Middle-Glazed White Ware Decoration, respectively (see Part three).

B1.B1 Plain-incised Design

This group comprises of the earliest examples of White Wares, therefore, not only the incised design, but also the applied glaze is plain. Vegetative motifs, geometric forms and also animal figures are incised, generally, by a single line and covered by a plain yellow, green or brown glaze. Simple linear designs consisting of zig-zag and wavy lines over rims on the interiors (pl.27.7, 9) and also the exteriors are among the components of the decorative repertoire. Rinceau motifs are either plainly single-incised (pls.27.1, 5-6; 28.2) or foliated by doubled (pl.28.1). Though this motif is usually depicted close to the rims, it also encircles the central depiction which can be a geometric form (pl.28.1) or an inscription (pl.28.2). An example of cross in wreath, possibly from Istanbul,[36] is another depiction which exemplifies vegetative forms surrounding inscriptions. The inscription creates a non-monogram cross consisting of

[36] Dark, *Byzantine Pottery*, pic. no. 22.

Greek letters, φως ζωη (see Part two), which are arranged vertically and horizontally inside the wreath. The other crosses (pl.27.2-4), which are shaped by radial lines and also animals, such as fish and birds (pl.27.8-9) are other rendered motifs on the surfaces of so-called Incised Ware in early and later periods of Early-Glazed White Ware Decoration (see Part three).

Date: late 7th to late 9th centuries[37]

B1.B2 Elaborated-incised Design

This subgroup is represented by a small proportion of fragmented vessels. Nevertheless, the pottery sherds uncovered from the Great Palace, Saraçhane, Corinth and a single example from Iznik Museum demonstrate that the incised decoration is clearly arranged more elaborately than the plain-incised class. One particular difference is to use the incised decoration together with plain and also Splash Design. In the variant with the Plain-glazed, the brown colour is either used inside the incised forms (pls.28.4, 29.5) and also the beads over the rims (pl.28.4-5), or it covers the whole surface (pl.29.3).

The majority of the examples in this group consist only incised lines which are vertically, horizontally and radially executed. A common characteristic feature of these lines is that they are doubled. Also, a hatched rhombus is another form which is composed by incisions (pl.29.3-4). The doubled-incised lines and hatching are usually executed on the walls and the rims creating compositions either depicted freely (pl.29.3) or connected by other incised

[37] Stevenson, 'Chapter II, The Pottery 1936-37', 34–36 Stage I-II, A 0; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 17 GWW I.

forms (pl.29.1-2, 4). Also, plain incised lines decorate the rims in wavy or short vertical forms (pl.29. 3, 5) as in the Plain-incised class (pl.27.7- 9).

Though the incised lines appear to be used as the main decorative elements, in some examples, it feels that the incision is used to stress or decorate the background of the central depiction. The abstract design in one of the examples in this group (pl.28.4) shows that the incision stresses the form of the main motif. The limbs of the arms are ovate and their ends are trifurcated. With a complimentary ovate form which repeats on the four corners, it, possibly, depicts either an abstract cross or an eight-pointed star. The closest parallel of this abstract cross design is the cross recrossed examples which are similarly painted in brown in the Polychrome group (pl.16.4, 12a, pl.36.m). An incised example of eight-pointed star can be found in Plain-incised Decoration (pl.28.1).

On a single example, the emperor's head, (pls.15.2, 29.1), the incised design which is combined with the splash-glazed adorns the background and also the details of the human figure which is depicted on the centre. Only the sculpted head of the figure is survived; however, the remnants of the thigh, tail and hooves which highly possible to belong a horse that are incised below the figure (see **B2.C Relief Sculpture Design**). The incised designs show the best of its kind in the elaborated-incised style as if creating a space on the background of the figure.

Date: late 11th to early 12th centuries[38]

[38] The Siege of Nicea (1097) provides terminus post quem for the emperor's head. See a similar examples in Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 128, 44.1; pl.5k.

B2. *Relief Decoration*

The Relief Decoration in White Wares defines a sculptural technique for depicting sculpted forms which are raised from the flat clay surface either on the interior or the exterior. The motifs and figures can either be sculpted in low-relief as in Petal and Moulded Relief Designs or also in mid-relief or even in high relief in Relief Sculpture Design. These three decorative groups in Relief Decoration also define the applied sculptural techniques: petal, moulded and relief sculpture. These techniques are used with complimentary incisions to shape the decoration and to acquire the desired relief embellishments.

B2.A Petal Design

The Petal Design defines the decorative technique which consists of small clay pellets which are arranged in rows on the exterior of the closed shape pottery, such as cups and relatedly lids and rarely on fruit stands.[39]

B2.A1.a Style A

This ornamentation is either embodied two different coloured clays by adjoined and smeared onto the surface[40] (pl.30.1-3), or the pellets are slightly raised by incising the white clay body (pl.30.4a). Examples are few; however, the commonest type consists of one or two rows red clay pellets which alternate with white ones to decorate surfaces. After firing, the red clayed-

[39] Peschlow, ‘Byzantinische Keramik Aus Istanbul: Ein Fundkomplex Bei Der Irenenkirche’, 403, Abb. 13 Kat. no. 91, Tafel 139.4.
[40] Sanders, ‘Byzantine Glazed Pottery at Corinth to c. 1125’, 74.

pellets turn into dark brown and the white pellets turn into cream (pl.30.1-2). Also, there are few examples that the red clay is replaced with pink on which the yellow glaze turns pink pellets into yellowish-orange colour, and the white clay turns into yellow (pl.30.3).

B2.A1.a Style B

A single example from Corinth shows that petals are shaped by incisions on white body without any alteration with red or pink clay (pl.30.4a). Incisions are not only used to outline the pellets, but they also give the leaf shapes to the pellets by vertically arranged incised lines (pl.30.3).

Date: late 8th and late 10th centuries[41]

B2.B Moulded Relief Design[42]

The moulded relief is another technique which is used in the surface treatments of Glazed White Ware pottery. The vessels which are adorned by this decorative mean is generally called “Impressed Ware” which was first suggested by Talbot-Rice.[43] However, here, the term moulded is preferred because of the lack of evidence to be certain that the motifs were executed in impressed technique, as Sanders points out.[44] Considering the technique which was used on the wet surface, the pressure resulting from the impressed tool could have caused damage or deformation over the fragile surface. Therefore, the relief motifs might have been

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[41] Stevenson, ‘Chapter II, The Pottery 1936-37’, 35–40, Stage II A 0/2 and III A2.
[42] Talbot-Rice’s A5 White Ware, Impressed Design, Stevenson’s A o/5 and A 3/5, Morgan’s Impressed Wares, Hayes’s Impressed Wares in GWW II, Sanders’s Moulded Relief in Relief Decoration.
[43] Talbot-Rice, *Byzantine Glazed Pottery*, 25: White Ware, Impressed Design A(5).
[44] Sanders, ‘Byzantine Glazed Pottery at Corinth to c. 1125’, 77.

acquired by slightly pressing the clay onto a mould that bears the impressed design. This challenge in the technique may explain the presence of the ineligible motifs which are poorly executed.

The motifs of the Moulded Relief Design are variable. Human and animal are commonly executed figures which are both realistically depicted. Birds, horses, lions or a group fantastic animal, such as griffins are also generally rendered ones. This decorative group includes crosses, flower-like designs, geometric forms as well. Besides that, abstract forms or even a depiction of a church[45] are the subjects of rendered motifs. The motifs are executed in low-relief standing on the centre of the interior of vessels in two different styles: Centric Relief and Slotted-Circle Style (see below).[46]

There are, indeed, numerous examples that moulded motifs are the sole decorative subject of the wares, however, some combinations with other techniques are present as well. It can be categorised as variants in which the moulded design is combined with the painted and the incised decoration. In this case, the relief motif is dominant which stands in the centre and it is accompanied with these complimentary decorative means.

Date: late 9^{th} and early 12^{th} centuries[47]

B2.B1 Variants

[45] Dark, *Byzantine Pottery*, Fig.23.
[46] Armstrong points out two different techniques: simple tondo designs and a more complex decoration extending up the walls which correspond to the Centric Relief and Slotted-circle Styles, respectively. Armstrong, 'From Constantinople to Lakedaimon: Impressed White Wares', 61.
[47] Stevenson, 'Chapter II, The Pottery 1936-37', 40, 42, A 3/5; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18–21, GWW II.

Variants defines a combinative use of Moulded Relief Design with Decorative Painting.

B2.B1.a Variant A comprises the moulded relief design which is combined with brown slip painting. This group includes the examples of the Moulded Relief Design with Brown Slip-Painted Decoration in Decorative Painting (pls.5. 2, 9-10; 31. 1-4, 6). The central relief motif is surrounded by brown slip-painting in the form of double or single wavy and, also possibly short vertical, lines. Also, a group of two-handled cups from Corinth bear the relief motif in the interior floor and the brown slip painting on the walls of the exterior.[48]

B2.B1.b Variant B

It consists of moulded relief design which is accompanied with incised decoration. The incised decoration is usually applied over the rims of the vessels creating wavy and diagonal doubled lines.[49] This decorative technique is rare, but it should be considered to be used with the Elaborated-Incised Decoration (**B1.B2**). A beautiful representative of this group is a vessel from Saraçhane (pl.15. 3). A big-sized winged lion facing to the right covers almost the whole surface. The figure is surrounded by incised double-lined zigzag which infilled with a wavy line,[50] as if decorating the background. On the other hand, the incisions are not decorative attributions which appear on the main relief motif. However, two reported examples from Sparta exemplify otherwise.[51]

B2.B2 Styles

[48] i.e., Morgan, *The Byzantine Pottery*, 11:45, Pl.VI.
[49] see in ibid., 11:187, Fig. 166.
[50] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 128, Deposit 44.1.
[51] Armstrong, 'From Constantinople to Lakedaimon: Impressed White Wares', 63, Pl.6.2 Fig. 13-14.

Besides the unintelligible reliefs on Impressed Wares which are high in proportion at Istanbul and Corinth excavations, the well-executed designs are helpful for reconstructing the stylistic features of this design. The result from the revaluating of White Wares at Istanbul and Corinth demonstrates that the impressed or relief design on so-called Impressed Wares appears to be executed in two styles. To separate both the technical and stylistic features, here, the styles are called as Centric Relief Style and Slotted-circle Style.

B2.B2.a Centric Relief Style

As the name suggests that the Centric Relief Style is to execute the relief design on the centre of vessels. The central relief is usually encircled by a roundel; however, some examples do not bear this ornamental feature. In this case, the relief motif appears to be freely executed on the centre of the vessels (pls. 2. 2, 4-8, 11, 13; 3. 2, 9; 4. 2-5; 5. 10; 31. 1-4, 6).[52] Though the mark of the edge of the mould is slightly visible in these examples, it does have nothing alike with the decorative roundels. These roundels are outlined by doubled-lines. Usually, between the doubled line is embellished by another relief motif which consists of radiating bars, chevrons, broken zig-zags and wavy line and guilloche (pls. 2. 3, 10; 5. 2).[53]

B2.B2.b Slotted-circles Style

The term slotted circle[54] suggests to define the composition of adjoint roundels that surround the centric roundel in which the relief design stands (pls. 2. 10, 12; 3. 4, 6-7; 4. 1; 31. 5, 7). The surrounding roundels are either depicted side by side (pls.4. 1; 31. 5, 7) or wide apart

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[52] This example is encircled by a roundel in Morgan's illustration in Byzantine Pottery, No. 96, Fig.33D. However, there is no clue for the roundel, and the remnants of the brown slip painting apparent on the upper side of the vessel. See C-1937 -1984 at http://corinth.ascsa.net/research

[53] Morgan, *The Byzantine Pottery*, 11:186: For guilloche motif see Fig.166, c, No. 93.

[54] Stevenson, 'Chapter II, The Pottery 1936-37', 50.

(pl.3. 6). There seems no order in the chosen motifs inside the roundels which can be different than the central one.

B2.C Relief Sculpture Design

The term relief sculpture is used to define the technique which is used to achieve sculpted forms in the Relief Designs of Glazed White Ware pottery. It is a marvellous work which brings together the three dimensions of the sculpturing with the two dimensions of the glaze painting in plain or splash form. Therefore, it is a time-consuming decorative technique which may explain why it is one of the rarest decorative groups of Glazed White Ware pottery. Regarding the technique, it can be suggested that forms must have been achieved by adjoining the clay balls onto the vessels' surfaces and shaped by a pointy tool. This group includes two subgroups in which the sculpted figures are shaped either in high-relief or mid-relief.

B2.C1 High-relief Style

It is usually applied in the heads of the figures (pls. 15. 2b; 32. 1, 3-4) and also rarely in the body (pl.32. 3). It seems that the incise technique is combined with high-relief to shape the features of the heads, such as the eyes, mouths, noses and ears of human and animal figures. Figures are partially sculpted in high-relief, and the incisions are used to maintain the relief form in the rest of the bodies as if sculpting them in a low-relief. For instance, a musician which is depicted on the chafing dish from Corinth (pl.32. 1) shows the use of the combined technique. The head and the right hand with the trumpet-like instrument holding are sculpted considerably higher than his upper body which is slightly raised from the clay floor by the help of incisions.

The combine method can be characteristic feature of the Relief Sculpture Design. A vessel from Iznik Museum (pls.15. 2b, also 29. 1) is another example illustrating this feature. The plate, which is also included in both the Splash Design and Incised Design upon its combined decorative attributions, bears a sculpted head which depicts to a male figure. The head is outlined by incisions to emphasise the parts of the face, such as eyes, mouth, nose and beard, and also a crown which is surmounted by a cross together with a pendilium hanging on the right side of the head. The rest of the figure is missing; however, the body parts of an animal which is highly possible to be a horse is outlined by incisions. The missing part is the male figure's body which should have been depicted in the back of the horse. The dish more likely commemorates the triumph of Alexius I Comnenus at the Siege of Nicaea in 1097.

B2.C2 Mid-relief Style

A mid-relief depiction can be seen in the full forms of animals (pl.32. 2). Judging by a few numbers of fragmented findings, the sculpted forms are restricted in human and animal figures which are either depicted alone or in a theatral composition, which are being conveyers of the cultural panorama of Byzantium (see Part two).

Date: late 11th to early 12th centuries[55]

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[55] Hayes suggests that the end of the Impressed Ware is contemporaneous with the late GWW II with incised decoration. Hayes's suggestion also corresponds to the suggested date for the Elaborated-incised Design with splash glaze. Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 21, 128, Deposit 44.1 pl.5k.

PART two: PERCEPTION OF THE ARTISTIC REPERTOIRE: CONTEXT, MEANING AND THE THEMES

4.2. C. THEMATIC CLASSES

The thematic investigation on Glazed White Ware pottery revealed three different themes which are the history, portrait and everyday life. While the history consists of religious and historical imagery, the portrait involves individuals who are depicted either alone or in a group. Lastly, the principal content of everyday life is the scenic views which are usually conveyed by animated figures.

C1 Imagery

Three contents are identifiable in the figural art of CGWW: apotropaic and religious, imperial and others.

C1.1 Apotropaic and Religious Motifs

The earliest motifs of the artistic repertoire are apotropaic; therefore, it can be said that the story of Glazed White Wares begins with this content. Between the late seventh and early ninth century, crosses and cross-like motifs and also a non-monogram cross including a Bible verse[56] supply the repertoire of this group. All together with a few animals, such as fish and bird with their symbolic meanings is included in this class. All of them group a certain repertoire that these ceramics may have been used as church objects. This is supported by findings of St. Polyeuktos Church (pl.27.2-4, 8) and the Narthex findings at the Great Palace

[56] φως ζωη (light for life): In him was life; and the life was the light of men (John 1:4).

(pl.27.9). Together with the others which were found somewhere in Istanbul (pl.28.1-3), these vessels illustrate the earliest art content of Glazed White Ware pottery. All of them are incised in the form of Plain-incised Decoration which is also revealed to be the earliest decorative style of Glazed White Ware pottery (D1. Early-Glazed White Ware Decoration). However, the plate with Bible verse fos zoi (φως ζωη) that I mentioned above is an interesting case. To depict a cross and enclose with a wreath is a quite common practise in the Late Antiquity, but it is rarely depicted in the Middle Byzantine Period.

From the early 9th to the late 10th century, the apotropaic imagery seems to be continued by appearing, first, in Moulded Relief, and, after in the earliest type of the Polychrome Ware (Class I). The similarity is apparent in the alikeness in the forms of the crosses, from a simple four-armed to the cross recrossed, in both the Moulded Relief (pls.2.9, 11) and the earliest type of Polychrome Decoration (pl.36). In the Polychrome Class I, the crosses which are depicted by a brown-glazed painting on the floor of two handled cups are associated to be a part of religious ritual (pl.16 1-4, 6-7).[57] On the other hand, the crosses in the moulded relief, together with the widened repertoire for animals, feels that the use of the motifs is likely apotropaic[58] than being an object for a rite.

These apotropaic symbols were being used to decorate surfaces during the emergence of the new content (secular art) in the later examples of the Moulded Relief Design (see below). Between the late 10th and the early 12th century, the religious imagery kept appearing on the Glazed White Ware pottery. A number of images of the mythical beasts of the classical world

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[57] Zalesskaya notes the similarity in both the cup form and the cross-painting of the Class I and the "κυλιχνια" which is a cup form smaller than kylixes. Vera Zalesskaya, 'Byzantine White-Clay Painted Bowls and Cylix-Type Cups', *Church and People in Byzantium*, 1986, 223.

[58] Véronique François, 'Ύπαγε Σατανά, Des Fonctions Apotropaïque et Prophylactique de La Vaisselle de Table à Byzance', *Cahiers Archéologiques*, no. 51 (2003): 56–58, pl.1. 1-7; Armstrong, 'From Constantinople to Lakedaimon: Impressed White Wares', 59–62, pl.6.2 17.

had remained in the Byzantine Art bearing similar meanings. Griffins, for instance, which were associated with light, as the protector from evil and sacred to god Apollo were adopted and used as Christian art symbols for protection of dead in Early Byzantine Art. In time, Griffins became the emblem of the royal status and also the protector of the dead of the royal (see Imperial Imagery).[59] The plate from St. Polyeuktos Church[60] bears a depiction of this beast (pl.15. 3) in a moulded relief design.

The cross motif kept appearing on small cups in the Polychrome Ware, especially in Class IIa which is related to the Class I (mentioned above). However, a few vessels bear particular images which are likely to be used in commemorative rites. The image of Virgin Hodegetria on a Polychrome Ware (pl.33.1) and the moulded relief of Three Holies depiction with Blended-Splash Glaze (pl.33.7) represent singular examples of the Religious Imagery.

Hodegetria is one of the iconographic depictions of Theotokos, the protector and also the patron of Constantinople. In the depiction of Theotokos, Virgin is holding the Child in her left arm and showing him by her right hand. The Child is depicted in leaning down towards to Virgin's head, holding a scroll in his left hand and blessing with right hand. In the narration of the historical sources, the icons of Virgin Hodegetria are used in the triumphal commemorations and celebratorily ceremonies in relation with imperial rituals which were taken places in Hodegon Monastery, Hagia Sophia and the Blachernai in the late tenth and eleventh centuries.[61] This dish was unearthed at a salvage excavation at Sultanahmet Cezaevi

[59] Helen C. Evans, Melanie Holcomb, and Robert Hallman, 'The Arts of Byzantium', *The Metropolitan Museum of Art Bulletin* 58, no. 4 (2001): 29, 58–59, https://doi.org/10.2307/3269176.
[60] There are two plates bearing moulded relief griffins among the findings of St. Polyeuktos. These plates were unearthed at Y-bb 13/15 Area, levels 1323 and 1327 which correspond to the area covering church. Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 21, 128 Pl.5 j-k.
[61] Christine Angeldi and Titos Papamastorakis, 'Picturing the Spiritual Protector: From Blachernitissa to Hodegetria in Images of the Mother of God', in *Perception of the Theotokos in Byzantium*, ed. M. Vassilaki and Ashgate, 2005, 213–15.

which is right across the Hagia Sophia. Also, this place is located in the west, for about 600 meters, of the Hodegon Monastery. Nevertheless, Hagia Sophia seems to be the closest sacred architecture for this commemoration context that the dish may have been used.

On a dish from Cherson, the Three Holies is rendered in moulded relief and painted with blended-splash glaze (pl.33.7). The exact location of this pedestal dish is unknown; however, the context is possible to be religious in which the bronze icon with Deesis scene, bronze pendant and reliquary crosses and also cross-shaped applique unearthed together.[62] The name[63] “three holies” is a suggestion for the three figures which are depicted with niche-like halos surrounding their heads. They are seating on taborets and holding vessel-like objects. The three figures and the objects that they hold resemble to the Biblical Magi, referring to *Wise Men* or *Kings* who are associated with the Nativity in the Bible.[64]

C1.2 Imperial Motifs

Besides the religious imagery, there are some motifs which are symbolically associated with the imperial court. Two different types of sceptres are depicted by incisions on a dish which, is in Iznik Museum (pl.15.2a). As a symbol of power and authority these two sceptres stand on both sides of a figure which is a depiction of an emperor standing proud. The relief head of the male figure bears an imperial crown which is surmounted by a cross and the figure is depicted on horseback (pl.15.2b). To the best of my knowledge, this depiction is unique

[62] Yashaeva, Denisova, and Ginkut, *The Legacy of Byzantine Cherson*, 630, No. 416 The findspot is North-eastern area, block XCVI. See other objects coming from the same context: 489 No.138, 512 No.184, 518 No.192, 535 No.227.
[63] Ibid., 630 The depiction is called “Three Saints” in the book; however, there is no clue to prove that they are saints.
[64] The Adoration of Wise Men is one of the Christological scenes from the life of Christ which is depicted in various media of the Late Antique and Byzantine Art. However, the seating pose and the halo on the Cherson dish are utterly different than the pictorial pattern. Wise Men are usually depicted in standing and facing to Virgin and the Child on her lap. Also, halo is not a common feature: an exclusive example is depicted in a mural painting in the Karanlık Church in Cappadocia which is dated to the second half of the tenth century.

among the visual data of Byzantine Pottery. Taking the late eleventh or the early twelfth century as a dating reference for the pottery,[65] the requisite analogy of an emperor with an imperial crown is made by other visual references, such as murals, mosaics, illuminated manuscripts and coins which were produced during this period. The result brought two emperors' names up to the scene: Alexius I Comnenus (1081-1118) and John II Comnenus (1118-1143), and showed that both emperors are portrayed with common features, an imperial crown with a surmounted cross and a beard which appears on the Iznik dish as well. The alikeness of the depiction of the two emperors forced the focus to move onto the other details: an emperor sits on horseback flanked by ceremonial insignia. At that point, the correlation between the history and the location where the dish was unearthed allocated an interpretation of the depiction on the dish, a military procession. Therefore, the dish is more likely commemorates the triumph of Alexius I Komnenos at the Siege of Nicaea in 1097 which provides *terminus post quem*.

Heraldic animals, such as one or two headed eagles are also associated with the imperial court. However, there is not always easy to distinguish the animals depicted on Glazed White Ware pottery. The challenge is that they are moulded and the result is low relief which is usually indistinctive. Therefore, the animals which are linked to the imperial court is included in C.1.3. Status.

C1.2a Sports and Games

The majority of the animal depictions in CGWW decoration is one way or another related to the imperial court and the games. For instance, the considerable amount of horse riders in

[65] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 128, Deposit 44.1.

moulded relief decoration (Pl.4) can be the exemplifiers of the equestrian games, such as chariot racing, possibly hunting and is especially related to Tzykanisterion, a place for throwing balls or a polo field.[66]

The game and animal parks and relatedly the game animals are other subjects which are also associated with the Imperial court. N. P. Sevcenko divides animal related entertainment places in Byzantium into three: game parks, menageries and animal parks.[67] The game parks were the places of the imperial hunts taken places. On the other hand, the menageries were the farms for the beasts which would eventually use at the animal combats at Hippodrome of Constantinople. Lastly, the animal parks are supposedly the places where tamer animals and rare species were allowed to live.[68]

I believe that the animals of prey and predator which are delicately rendered on Polychrome Ware and also Green/Blue and Brown Ware are the visualised examples of the above-mentioned themes. Also, the depictions of the exotic animals, such as parrot/parakeet (Pl. 20.5) from the Hermitage Museum and elephants from Crete (pl.34. 1) can be added to the menageries and the animal park themes. As diplomatic gifts, the exotic animals were "the language of both the diplomacy and the royal ceremony," says Sevcenko.[69] These two vessels are especially important to appreciate the potters' effort in adding an artistic value to refer the exotic origin of the animals. This feature can be clearly seen on the vibrant colours and the accentuated body part of the animals. It utterly differentiates the style of the depicting of these two animals from the rest of the animal depictions in Polychrome Ware. The Oriental effect which is achieved by the S shape forms and the half palmette ended tail of the elephant,

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[66] Alexander Kazdhan, 'Tzykanisterion', *Oxford Dictionary of Byzantium,* Volume III, 1991: 2137.
[67] Nancy P. Sevcenko, 'Wild Animals in the Byzantine Park', in *Byzantine Garden Culture,* ed. Antony Littlewood et. al., (Washington, D.C, 2002), 69.
[68] Ibid., 69–82.
[69] Ibid., 76.

perhaps, refer to both the origin of the animals and the origin of the artistic interpretation (34. 1-2, 35. 4).

C1.2b Feasting and Banquets

The Hybrid animals in the ceramics is associated with feasting cycles of the Byzantine silverware.[70] H. Maguire argues that the relation in between the hybrid animals and the served food of the imperial banquets is to share the common unnatural characteristic. In an imperial banquet, this composition can represent either the emperor's or the host's extraordinary power.[71]

So the dish, with its mixture of opposites, is evidence of the pirate-king's mastery over nature, which in turn is expressed by his prowess on the battlefield, where he transforms his enemies into worm-ridden corpses, which would be eaten by dogs. We may imagine that the clish that Nikephoros Phokas sent to Liudprand was intended to convey a similar kind of message; its richness in a time of shortage and famine, and its marvellous combination of ingredients, a goat, fish, and vegetables, was evidence of the emperor's power and control over the elements of nature. While the actual cuisine of the imperial court was obviously more subtle and less outlandish than that of the fictional pirate king, the subtext may have been similar.[72]

Considering many other peculiar fantastic-looking meat foods, such as fish made to look like chicken which also are shared by A. Kaldellis, the connection with these banquets with hybrid animals can be seen better. Therefore, the Hippogriff which is depicted on a Polychrome Ware from Hermitage Museum (Pl. 20. 3) can be included into this context as well. Regarding its hybrid character which comprises an eagle on the front and a horse at the back, it can be

[70] Henry Maguire, 'The Feasting Cycle and the Meaning of Hybrids in Byzantine Ceramics in VIIe Congrés International sur la Céramique Médiévale en Méditerranée', ed. Ch (Thessaloniki, 11 October 1999), 210.
[71] Ibid.
[72] Ibid.

nominated after sirens and sphinxes which were depicted on the Byzantine silverwares and ceramic variations.[73]

The chafing dish from the Corinth Excavations (pl.32.1) is another example can be included in this group. The outer surface of the dish is depicted with a theatral composition including the musicians, acrobats and animals. Considering the embellishment and also the utilitarian feature of the dish, this piece may have been used in a dining context which is in a relation with an imperial banquet (see Discussion).

C1.3 Status

As mentioned earlier, some heraldic animals depicted on artefacts are believed to be used as emblem of the status. The use of griffins with other animals, such lion and eagles on elaborate textiles is hypostasised that these animals can symbolise the "social and political achievement" of the court members who could wear these garments.[74] A special case is Gnezdova where a Polychrome Painted White Ware, on which a griffin is depicted, unearthed in a burial mound. Its diffusion in the site is thought to be a diplomatic contact rather than a trade network. Therefore, its presence in wealthy people's graves suggests a high social and economic status.[75]

In Byzantium, eagles are the heraldic animals which are associated with the imperial families. The symbol of strength was the insignia of the Roman Empire and later adopted by the

[73] Ibid.
[74] Alicia Walker, 'Islamicising Motifs in Byzantine Lead Seals: Exoticising Style and the Expression of Identity', *The Medieval History Journal* 15, no. 2 (October 2012): 402, https://doi.org/10.1177/097194581201500207.
[75] Eniosova and Pushkina, 'Finds of Byzantine Origin from the Early Urban Centre Gnézdovo in the Light of the Contacts between Rus' and Constantinople (10th-Early 11th Centuries AD)', 230.

Byzantine.[76] In the architecture, as an insignia, both the single and double-headed eagles appear from the late twelfth century onwards.[77] But in the eleventh century, "the majestic eagles" which were depicted with a frontal body and turned head appear to be used in silk textiles which were produced at Constantinople.[78] Feng Huang is another type of bird (Pl.3. 9) which is thought to be associated with the social status.[79] The bird is originated from China and rarely appears in Byzantine Art; however, it is a cross-cultural artistic interaction, says Walker.[80]

C1.4 Others

This class includes individual depictions which do not fall either of the classes above. All of the examples depict human figures in different styles and compositions. Among the Saraçhane finds, a piece of jug (Pl.33. 3) bears a bearded man. Considering his modest look and the place where the pottery was uncovered, it may be thought the figure depicts the Saint himself, St. Polyeuktos. However, it is not always easy to identify human figures either in religious or secular contexts. For instance, another dish, which was unearthed at Corinth excavations, depicts another human figure whose pose in orant inside a short tunic and a turban on his head can be deceptive (Pl.33. 2). The Greek inscription, which is placed on the both sides of the figure, reads ΠΟΛΑ ΤΑ ΕΤΗ ΤΟΝ Κ[Ε]ΡΑΤΑΔ[Ω]Ν which means "long live the cuckolds."[81] Morgan thinks that the figure's clothes and the turban depict a Muslim man, and

[76] Marilyn Jenkins, 'Muslim: An Early Fatimid Ceramist', *The Metropolitan Museum of Art Bulletin*, 1968, 362.
[77] Robert Ousterhout, 'Byzantium Between East and West and the Origins of Heraldry, Byzantine Art: Recent Studies: Essays in Honor of Lois Drewer', *Arizona Center for Medieval and Renaissance Studies, Colum Hourihane Ed*, 2009, 159.
[78] Ioli Kalavrezou, 'Luxury Objects" in Glory of Byzantium. Art and Culture of the Middle Byzantine Era A.D', *843-1261*, no. 149 (n.d.): 224–25.
[79] Alicia Walker, 'Patterns of Flight: Middle Byzantine Appropriation of the Chinese Feng-Huang Bird', *Ars Orientalis* 37 (2010): 211, footnote 26.
[80] Ibid., 192–93.
[81] Morgan, *The Byzantine Pottery*, 11:68, No. 369, Pl. XVI, b.

the inscription does mean “a dare to joke about his piety” by the potter.[82] A. K. Vionis, on the other hand, does not agree that the figure represents a Muslim man. He believes that the “insult inscribed” should have been targeted to “immortality and adultery in Islam” rather than directly insulting the figure’s piety.[83]

The rest of the examples (Pl.33. 4-6) in this group are the representers of a classical scene. I believe that they are differently imitated version of a single depiction: a nude man in a fishing. All of three dishes are in moulded relief and the one which was recovered from St. Polyeuktos (Pl.33. 4) is far best in depiction and style and, therefore, it should be original depiction of the mould. The body of the male figure is portrayed in ¾ view, standing with legs cross and leaning with his back and his left hand to the rock behind him. The surrounding nature is a stream with fish which are caught by the man via a fishing rod. One of the figures in the copied examples of the Great Palace (Pl.33.5) is thought to be a woman[84] perhaps, it is because of the imprecisely incised breasts over the mould. Lastly, the other copy is utterly different. The figure can be either male or female whose body is dressed with a short tunic (Pl.33.5). Nevertheless, a crane stands in right of the figure (Pl.33. 4-6) and three fish which, are probably hanging over a bough, on the left are common motifs for all three variants (Pl. 33.4-5).

[82] Ibid., 11:68.
[83] Athanasios K Vionis, ‘Imperial Impacts, Regional Diversities and Local Responses: Island Identities as Reflected on Byzantine Naxos’, in *Imperial Lineages and Legacies in the Eastern Mediterranean* (Routledge, 2016), 178.
[84] Lale Doğer, ‘Kadın Figürlü Bizans Seramikleri’, *Sanat Tarihi Dergisi* 20, no. 2 (2011): 47, Res. 2.

PART three: REINTEGRATION THE HISTORY OF DECORATION IN THE ARCHAEOLOGICAL CONTEXT

As previous part examines the motifs and themes of Glazed White Wares, Part three uses available information from the published studies' examinations to reconstruct the new decorative classification, which was built in Part one, within a chronological order. To disclose the development of surface treatments through the historical sequences, the chronological review of this chapter relies mainly on the assessments of R. Stevenson and J. Hayes for the Great Palace and Saraçhane Excavations, respectively. To some extent, further studies on Glazed White Ware are used to fill the historical gaps which occur in the above-mentioned sites or to allocate more information about the decorative characteristic of the pottery.

Since the focus is decoration, the overwhelmingly detailed raw information is reduced as much as possible to be able to follow the correspondence between the "new categorisation" and the "old categorisations." It is designed to emancipate the decoration from the fabric-based classification. Therefore, the "thousands" of pottery sherds of V Stages at the Great Palace and Glazed White Ware of Saraçhane are evaluated, here, under three chronological sequences: early, middle and late.

4.3. D. HISTORICAL CLASSES

D1. Early-Glazed White Ware Decoration (7^{th} -9^{th} CE)

The term Early-Glazed White Ware Decoration, here, is used to define pottery groups of White Wares that were produced in the period from the late seventh to the mid-ninth centuries that chronologically correspond with Stevenson's Stage I – II and Hayes's GWW I. To be able to follow the evolution, this period is divided in two: 'early' and 'later', which is based on any change in decorative attribution, the fabric colour and also the glaze application.

With the help of a reconstructive data approach applied here, for the excavation finds in Constantinople, it has been revealed that this period produced the earliest examples of well-known ornamentation techniques; carved and relief, namely incised, cut-out, petal and moulded relief (in **B1** and **B2,** Part one). A common characteristic feature of the early examples of this period is that the fabric colour is not white as it is described in the following period. Additionally, the red clay appears to be used as a decorative element, such as in Petal Ware.[85] Therefore, the early phase of this period can be seen as 'Transitional.' This is not only because it is represented by a glazed buff-coloured fabric that moved from the red Late Roman to the white Middle Byzantine, but it also possesses the primitive representation of elegantly executed ornaments of Byzantine ceramics at the later periods.

The fabric colour in the early period is red to buff which is covered with a dark green, olive green, red, red-brown, orange or orange-green glaze.[86] The decorative attributions of this group at Great Palace are vaguely described, perhaps, due to the fact that finds are fragmentary, or most of the sherds from the seventh century might be undecorated as in Saraçhane.[87] However, shallow incised scrolls form on rims or, on the walls close to rims, prove the presence of the earliest incised decoration at Stage I, dated to the early Isaurian

[85] Stevenson, 'Chapter II, The Pottery 1936-37', 37.
[86] It falls under Stevenson's A 0, ibid., 34; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 15–18 Hayes's Glazed White Ware I (GWW I).
[87] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 15.

Period,[88] at the Great Palace (Pl.27. 5-7). Similarly, a sherd of rim among the eighth century finds of Saraçhane[89] bears a parallel motif (pl.27. 1a-b). In addition, examples of linear radial lines[90] reveal another unique composition of incised decoration at the early period which is proven by the seventh and also the eighth century's deposits at Saraçhane (pl.27. 2-4).

The existence of Petal Ware (B2.A Petal Design) in the early period is questionable. Though Stevenson informs us of a piece of sherd which falls in the A 0/2 (petal decoration) and is found at Stage I, his reference should be cautiously used to assert Petal Ware's emergence into the seventh century. We cannot see the referred piece in pictures or plates, but, Stevenson's definition of decorative and technical detail is enough to think that what we have come across is an odd piece. Generally speaking, it does not sound similar to neither how he defines petal decoration in the later period nor what we know about this decoration. He uses the word 'blob' which one can assume that this word defines pellets, but the defined technique is completely different, as follows: "white slip above which the glaze was yellow in contrast to the orange-red above the red body; on each blob had been incised a dot or circle."[91] It has already been argued that the colour differences in the glaze depend on the colour of the pellets beneath it.[92] In other words, the glaze absorbs some amount of iron oxide that the pellets carry. But incised dots or circles are not the decorative means that was used in petal technique, at least, no one mentions them rather than Stevenson.

[88] Stage I is dated to the early Isaurian Period by the help of associated coins found at the deposit: Phocas (602-610) and Constantine IV (668-85), Stevenson, 'Chapter II, The Pottery 1936-37', 34–35, Pl. 21.4.
[89] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 15, Fig. 5.3.
[90] Ibid., 16, Fig. 5. 1-2, 4.
[91] Stevenson, 'Chapter II, The Pottery 1936-37', 35.
[92] Ibid.; Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 74.

The later period seems to be prolifically represented by pottery sherds of Stage II, dated to the latter part of the Isaurian Period,[93] at Great Palace; therefore, the decorative techniques and treatments are more tangible comparing to the early phase. On the other hand, the fabric of this period is white or more likely pink which is washed or smoothed by cream or brownish-pink slip under a translucent glaze.[94] A particular difference of the later period is that it is not only limited by the colour of the fabric, but, also by a fair variation in the colour of the glaze. The colour scale expands it from orange to orange-brown and greyish-brown, yellow to yellow-green and grey-green. It may be assumed to be caused by the firing rather than any colourants of the glaze composition, however, Stevenson refers to an experiment on the glaze technology by Mr. William de Morgan[95] and concludes that the change in the colour of either the fabric or the glaze is due to the iron oxide which is strongly associated with reducing or oxidising atmosphere. The glaze appears to become orange over a pink or whitish fabric which is covered by a pink slip; yellow on white fabric; green when the fabric or the slip turns grey during the firing that is correlated with the air which is let in a reduced atmosphere.[96]

In relation to the incised decoration in the early period, the incised zigzag, thumb-nail and diagonal lines on the rims (pl.27. 7,9) and the exterior are quite characteristic decorative elements of the open bowls or dishes of the later period.[97] The nicked, cut-out and, especially, the rows of triangular cut-out decorations on rims are also associated with the incised decoration (pl.26. 5).[98] An effort to propose the earliest date for those which have cut-out decorated rims, apparently, brought confusion. Hayes refers to Stevenson’s cross-reference of

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[93] Stage II is dated by the associated coin evidence in the deposits. Four Justinian II (?) (685-95, 705-11), two Constantine V with Leo IV (771-5), one Leo V (813-20), Stevenson, ‘Chapter II, The Pottery 1936-37’, 38.
[94] Ibid., 35.
[95] Ibid., 35, footnote 3.
[96] Ibid., 35–36.
[97] Ibid., 36, Pl. 15, 19–22.
[98] Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 13, 17.

an external flange on a bowl to typologically support the sherd which has been found at the seventh century deposit at Saraçhane.[99] Apart from the vagueness of the reference for the existence of the external flange at Stage I, by Stevenson,[100] the rim that Hayes mentions belongs to Stage II at Great Palace which is dated to the latter Isaurian. Hayes proposes a date ca. 650-70 CE for the Deposit 30 at Saraçhane, by the associated coin evidence (Constans II), supporting this by the date of Yassı Ada.[101] He, especially, links up the same piece with a rim that has a flange cut-out decoration which was found in the Yassı Ada shipwreck.[102] As it is well-known, the pottery has been dated to the first half of the seventh century as well as the shipwreck by the help of associated coins, 625/6 CE.[103] However, this date seems to be disputed by Vroom who underlines the fact that the ship was carrying amphorae and coarse wares from the late seventh to the eighth centuries. Therefore, by relying on only the coin evidence, the ship is dated about fifty years earlier than when it sunk.[104] Although Hayes calls the Yassı Ada sherd the earliest example, he admits that there is not any evidence to prove the existence of Glazed Wares earlier than the middle of the seventh century.[105]

Among the later period of Early-Glazed White Ware Decoration, Petal Wares of Great Palace are the earliest instances of known Petal Design in B2. Relief Decoration, Part one. A particular feature that may seem to confound is the presence of red clay as a decorative element. Although Sanders states the petal decoration comprises white or white and pink

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[99] Harrison, Fıratlı, and Hayes, ‘Excavations at Saraçhane in Istanbul: Fifth Preliminary Report, with a Contribution on A Seventh-Century Pottery Group’’, 205, no. 8; see the referenced example of Great Palace Pl. 15.31 Stevenson, ‘Chapter II, The Pottery 1936-37’, 36.
[100] Stevenson, ‘Chapter II, The Pottery 1936-37’, 34.
[101] Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 13.
[102] Harrison, Fıratlı, and Hayes, ‘Excavations at Saraçhane in Istanbul: Fifth Preliminary Report, with a Contribution on A Seventh-Century Pottery Group’’, 205, footnote 21.
[103] Bass and Van Doorninck, ‘The Pottery’, 317.
[104] Joanita Vroom, ‘Byzantine Sea Trade in Ceramics: Some Case Studies in Eastern Mediterranean (ca. Seventh-Fourteenth Centuries’, in *Trade in Byzantium, Papers from the Third International Sevgi Gönül Byzantine Studies Symposium*, ed. Eds., vol. 159 (Istanbul, 2013), 159, 169.
[105] Harrison, Fıratlı, and Hayes, ‘Excavations at Saraçhane in Istanbul: Fifth Preliminary Report, with a Contribution on A Seventh-Century Pottery Group’’, 216 see especially footnote 39.

pellets, he also adds that two different red clay, as Stevenson calls them a dull red clay and pink,[106] whose iron oxide amounts, from low to high, change the pellets' colour from orange-red to dark orange to brown.[107] It seems that petal decoration is not limited only by colour adornment arranged in rows. Also, some finds show the existence of two variations of petal decoration in this period. For instance, from Stevenson's account, a piece of juglet, which belongs to Stage II, is combined with an impressed sunk circles design on the exterior. Furthermore, the pellets which also adorn the exterior are modelled as if they are small leaves.[108] The former may not be supported by finds, however, a similar treatment on a lid found from Saraçhane[109] is approved latter style on other forms.

Relatedly, another important result of cross-examining the features of petal decoration in Constantinople and Corinth has revealed a particular difference in forms. Of the pottery sherds at Great Palace Stage II, three out of four belong to different juglets, and the one which is not labelled as juglet by Stevenson also shows a very akin profile in the illustration.[110] The eight century lids fragments which "are of fairly large dimensions" from Saraçhane,[111] may be related to chafing dishes.[112] Mugs/cups among the finds from Corinth excavations[113] are apparently the evidence of a later form on which the petal decoration appears.

Impressed Decoration (B. Moulded Relief in Part one), (Stevenson's A 0/5) reconstructed from Great Place finds, is the last group can that be placed in the later period of the Early-Glazed White Ware Decoration. Only two base fragments were found, probably belonging to

[106] Stevenson, 'Chapter II, The Pottery 1936-37', 37.
[107] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 74.
[108] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 37, Pls. 21.9; 15.32.
[109] Ibid., 14, Fig. 4.15.
[110] Stevenson, 'Chapter II, The Pottery 1936-37', 37, Pl.21.11.
[111] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18, Fig. 4.15.
[112] Morgan associates a lid with petal decoration to chafing dishes according to their utilitarian purposes. Morgan, *The Byzantine Pottery*, 11:40, Fig. 28.
[113] C-1933 544, C-1933 616, C-1937 661, C- 1937 1643, C-1937 1657a (same in pl.30. 2). http://ascsa.net/research?v=icons&q=petal+ware

bowls, which bear a stamped cross design in the centre. Stevenson finds them to stray from the context and differentiates their relief design together with the other examples of later periods from the Late Roman sunk stamp decoration.[114] Nonetheless, the relief technique of the cross design is surely different from the late Roman one, but these two crosses also (Maltese and Latin) do not match with the later examples in style. Here, either Maltese or Latin crosses are stamped very plainly and in isolation on which contrary to the later instances which come in a body with a complex design, and, therefore it is agreeable that they are stray, but, not to their own context. The other issue which should be stressed is that these two sherds are not the only items with the traces of impressed design that one can come across in Stevenson's account. Although he does not count the cross and cruciform impressed designs inside the juglets,[115] which has been mentioned above in petal decoration, in this group, he uses the term to define the decorative technique. Relying on the description of Stevenson, it can be said that petal decoration which is combined with the impressed design is a peculiar decorative attribution that has not been noted either in Constantinople or Corinth. Consequently, it may demonstrate that the Great Palace does, indeed, provide the earliest examples of Impressed Ware.

D2. Middle-Glazed White Ware Decoration (9th-11th CE)

The Middle-Glazed White Ware Decoration incorporates ornamental attributions of White Wares which corresponds the finds of Stevenson's Stage III and IV at the Great Palace and some of Hayes' GWW II and Polychrome Ware. The fabric is made of a very smooth-

[114] Stevenson, 'Chapter II, The Pottery 1936-37', 37, Pl. 27.7.
[115] Ibid., 37, Pl. 15.41-42, 21.12.

textured white clay and covered with yellow or green glazed without any intermediate slip. The appearance of both the ware and the glazed is compared with Medieval Staintonge and Stamford Wares of Europe by Hayes.[116] The early instances give little to elucidate since the 9th century context lacks in Saraçhane, however, the sherds of these two Stages of the Great Palace appear to be different from each other according to colour of the fabrics. Also, when they are compared with the earlier strata, Stage II, the application of the glaze is similar but the quality of it is different like the fabric which is whiter and smoother in texture.[117]

In the Stage III at the Great Palace, which is dated to early Macedonian Dynasty by the associated coins of the 9th-century,[118] there seem a continuation of incised, petal and impressed decoration on vessels. Stevenson's A3, Simple Glazed Ware, (Plain-glazed Decoration in Part one) comprises ninety percent[119] of total sherds in this Stage. The incised and impressed decoration are the common decorative means of these wares. The colour of the glaze shows only two kinds, yellow and green with streaky or mottled appearances in their lighter and darker tones. While the green glaze is applied both on the interior and the exterior, the yellow glaze appears only on the interior, however, a trace of flux on the exterior is mentioned by Stevenson. The incised decoration in this group shows a characteristic of little nicks round inside edge of the rims which accompany with wavy-tumb nail design on the exterior groove of chafing dishes. Also, perforation is used as another decorative attribution which are treated on the bases of chafing dishes and goblets. This treatment is seemed comparable with the fretwork of Stage II.[120] The quantity of the impressed and petal

[116] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18.
[117] The sherds come from deposits located at the floor level in the north-west Pier 2 and between the arcade of Pier 7 of the North-West Building in Site B I, Cd VII 4, VIII I, Stevenson, 'Chapter II, The Pottery 1936-37', 38–39.
[118] Ibid., 40.
[119] Ibid., 39.
[120] Ibid., 39–40.

decoration in this Stage is not high. However, a considerable number of base fragments of chafing dishes and other vessels demonstrate the low relief, impressed design (Stevenson's A 3/5). The motif is cruciform alone, but also the 'slotted circle' design occurs in this group.[121] Only two fragments of Petal Ware (Stevenson's A 2) have been uncovered and they are arranged as flattish petal form in rows which white and pink clays alternate by resulting yellow and orange colour in glaze.[122]

A large assemblage of pottery sherds which have been unearthed with a tenth century coin at Deposits 37 and 38 at Saraçhane is thought to be more advanced than those in Stage III by Hayes.[123] While Petal Ware is rare as in the Great Palace, impressed and brown-slip painted decoration (brown staining of Hayes and red-brown painted of Stevenson) are the main pottery groups which are about 12 to 15 percent.[124] Similarly, four strata at the Site B I, Cd VII 4, VIII 1 of the Great Palace revealed some contemporary pottery sherds of Stage IV,[125] which is dated to the latter half of the Macedonian Dynasty. Though Stevenson remarks the tenth century associated coin evidence for dating, the ninth century coins keep occurring in the strata.[126]

The diversity in decoration of the White Ware ceramics in Stage IV can be summarised as a continuation of incised and impressed design and the emergence of red slip painted and polychrome decoration. Pottery sherds show a pale buff and pink characteristic in Stage IV at the Great Palace which corresponds to Hayes's pink and rough fabric in GWW II, which

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[121] Ibid., 40, Pl. 16.20, 22 Stevenson attributes non-contextual three other bases to this group because they bear bird stamps on.
[122] Ibid., 40.
[123] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 18.
[124] Ibid., 19.
[125] The sherds have been found between -4.00 m and -2.15 m between the arcades and the Pier 7 of the North-West Building, Stevenson, 'Chapter II, The Pottery 1936-37', 41.
[126] The coins are Leo V (813-820), Michael II (820-9), Romanus I (914-44), Constantine VII (945), John I (969-76) together with other unidentifiable successive coins, ibid., 46.

emerged after the eleventh century. In Plain Glazed Ware (Stevenson's A3 Simple Glazed Ware), the application of the glaze is still identical to those found at Stage III that the green glaze covers both the interior and the exterior, while the yellow applies only on the interior. However, the quality of the glaze appears to be weaker than Stage III with its lesser smooth and careless applications. Relatedly, a lack of purity in the glaze is resulted from the colour of the fabric giving a brownish effect to the glaze.

In this stage, a dominant form is large dishes with broad rims. The incised wavy lines and nicks on the rim and the groove of the exterior in Stage III appears to be vanished at Stage IV. But the bead rim fragments may suggest that it substitutes the incised decoration in Plain Glazed Wares of the earlier stage. Also, what base fragments in this stage reveal a lesser execution of the decorative elements in lower part of vessels which are more pronounced in Stage III.[127] Considering the diversity in forms, the decorative programme of this period is more fulfilling at Saraçhane. Dishes, chafing dishes, frying pans, large and small bowls, two-handled bowls, open cups with handles, open-bowled lamps, mugs, jugs and lids are common forms of GWW II.[128]

The Incised Decoration in Stage IV (Stevenson's A ¾ Incised Ware) and GWW II are utterly different than those in Stage II and GWW I.[129] Decorative forms are rectilinear, cross hatching, herringbone and wavy combing and they are more elaborately and clearly depicted creating a composition. Brown and sepia glaze is the characteristic which is used with this sort of decoration.[130] The moulded relief (Stevenson's A 3/5) at Stage IV looks similar to those at Stage III, however, the decorative repertoire is expanded together with a new style of

[127] Ibid., 41–42.
[128] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 22–29.
[129] Ibid., 21; Stevenson, 'Chapter II, The Pottery 1936-37', 43.
[130] Stevenson, 'Chapter II, The Pottery 1936-37', 43.

the glaze. While the usual glaze on the top is yellow, green and brown, a streaked greenish-yellow-brown glaze emerges in this stage.[131] Motifs are rendered in geometric forms, animals, such as birds and griffins and human figures which are either depicted individually at the centre or surrounded by slotted-circle frames.[132] A small class encompassing moulded relief human and animal figures which is used with complex incised design (Elaborated-incised in Part one). This class indicates a date for the end of the Impressed Ware series which is contemporary with the late incise decoration in GWW II, according to Hayes.[133]

Two more classes, Brown Slip Painted and Polychrome Ware (Stevenson's A 2b Red-Brown Painted Ware and A1 Polychrome Ware) in Stage IV prove the emergence of new decorative styles which are included in Middle-Glazed White Ware Decoration. The former represents 14% of the pottery sherds in these strata. Its yellow glaze is similar to Plain Glazed Ware, but the brown slip paint beneath it turns the glaze brownish-red to dark brown. At Stage IV, four common cup forms are detected with this group of decoration.[134] A broad-rimmed dish, over 30 cm in diameter, and a bead rim plate are glazed thinly inside, up to or on the rim. The yellow glaze on both forms show variety which has green tinge or pinkish hue because of the fabric colour. The decoration of two forms is consisted by streaks, elongated petal-like forms and festoons. A tan colour slip is detectable on the outer of vessels.[135] The third type is a large bowl with double rim glazed on both the interior and the exterior with a yellow or green-yellow glaze. In between two horizontal ribs of the rim, there stands either incised wavy line or petal-like dots by brown slip paint which also occurs on the interior, similar to the former two vessel types. The decoration on the exterior is wavy lines (rarely), splashes and streaks.

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[131] Ibid., 42–43.
[132] Ibid., 42–43, Pl. 17.1-10, 22.16-20, 22, 24.
[133] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 21.
[134] Ibid., 43–44.
[135] Stevenson, 'Chapter II, The Pottery 1936-37', 43–44.

Some of the sherds of this form can bear impressed design in the centre [136] (Moulded Relief Decoration, **B2.B1 Variants**). The last form of the vessels is a large carinated cup which is glazed on both the interior and the exterior. It is finer and better moulded compare to the similar examples of Stevenson's A3, Simple Glazed Ware.

The brown paint appears to be unevenly applied on the lower part of the rim on the exterior together with vertical incised lines.[137] Similarly, the incised wavy lines over the slip can be seen on the early examples of among this group at Saraçhane.[138] From the same context, an elaborately painted church model shows a unique instance that the brown slip paint is used unlikely to the pattern. Also, there are a few examples which the slip paint tends to cover all over the vessels and a white slip-on top of brown behaves as a decorative instrument.[139] The brown slip paint in the yellow glazed ones becomes frequent in later examples in parallel with the typological change that the bowl part becomes deeper and takes almost a conical shape in time.[140] A few pottery sherds which bear polychrome decoration have been found at the lower layers in these strata of Stage IV at the Great Palace. Although Stevenson defines the fabric as slightly harder than the 'A Series', he mentions that it cannot easily be distinguished.[141] In fact, Stevenson underlines the difference of this Middle Byzantine ware by pointing out the vivid decoration, rather than its slightly different fabric. Two forms in these strata are common out-turn and rarely in-turn rimmed plate and a straight-sided cup with a ring handle and a rounded foot.[142] The decoration of these wares is varying and samples almost the all groups of Polychrome Decoration, such as black and white, blue, manganese and yellow

[136] Ibid., 44.
[137] Ibid.
[138] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.'40.21, 50.59, Pl. 5b.
[139] Ibid., 21, Fig. 10.11 Pl. 5b.
[140] Ibid., 22.
[141] Stevenson, 'Chapter II, The Pottery 1936-37', 44.
[142] Ibid., 45.

infilled motifs outlined with black or manganese colour and red dotted background style. The main colours on the Polychrome Ware are dark brown or black bearing metallic appearance which is used as the background the opaque white colour which forms the patterns. A "friable" green and yellow are the other colours on uncovered sherds. Stevenson makes two subdivisions according to the ornamentation on the floor of the cups: a black cross depiction and the figural, a horse rider.[143] Stevenson's definition of the above group corresponds to the Class 2a in Part one (pl. 17-18).

For Stage IV, Stevenson also mentions a distinct class which is higher in number than the Polychrome Ware. The fabric of the class is similar to Stevenson's Simple Glaze Ware. But its glaze, yellow-green to blue-green with brown or red specks, tends to decay which is a characteristic of the "B Series". There are not any pictures available, however, a cross-section drawing of an unstratified dish is used to exemplify the group.[144] Therefore, it is tough to understand which of the classes of White Ware could correspond to those pieces.

D3. Late-Glazed White Ware Decoration (11th-13th CE)

The term Late-Glazed White Ware Decoration is used to define pottery groups of White Wares that were produced in the period from the late eleventh to the late thirteenth centuries that chronologically correspond with Stevenson's Stages Va-b and Hayes's III-V. At the Great Palace, these two Stages supply rarely "A" and commonly "B" series of White Ware pottery. Stevenson asserts that the three major groups of the Stage IV, Simple, Impressed and

143 Ibid., 45, Pl. 17.14, 19.
144 Ibid., 46, Pl. 16.48.

Incised, had diminished at the time of dumping. Only twelve sherds of Polychrome Ware (A 1) were found together with numerous of Simple Ware (A 3b), which is new variety of "A" series emerged at Stage Va.[145] The body of this ware is pink or buff which is usually covered by a cream slip that is enlivened by horizontally arranged red streaky bands.[146] Except the defined slightly different fabric, the forms of the vessels and especially the decoration do not characterise a distinct group than those in Simple Ware of Stage IV. However, the fragments of the "B" series represent the emergency of the new group which is the latest phase of the decoration of White Wares.

The "B" series comprises the most of the Bichrome and Trichrome Decoration in Part one. According to Stevenson, the white-bodied "B" series of Talbot-Rice is a complicated group and, therefore, he divides the pottery into three subgroups: B 4a, B 4b and B 4c. Though all subgroups occur in Stage Va, only B 4a survived in Stage Vb which is a tentative sub-stage assigned by Stevenson. At Saraçhane, the GWW III corresponds to Stevenson's 4b and GWW IV equals to 4a. The GWW V has no equivalent at the Great Palace; however, it is also a tentative subgroup which was created by Hayes. This subgroup represents a group of juglets which are related to GWW IV in fabric and to GWW II in glaze application.

At Stage Va, the fabric of B 4a is hard and gritty with its micaceous sandy texture. A pink shade in the mantle is an often feature. The glaze is different than the "A" series with its opaque and matt appearance. It is thinly applied and tends to decay. A pale cream colour glaze is used as background colour for streaks and dots which are painted in green, purple and purply black on top. Motifs are blue linear patterns, birds and crosses which are usually

[145] The coins which are associated to Stage Va belong to Constantine IX (1042-54), Michael VI (1056-57), Romanus IV (1067-71), Alexius III (1195-1203) and also 6 unidentified (?) coins which are dated 10th-11th centuries. Hayes's GWW IV is dated to 11th to 13th centuries, and GWW V is dated between 11th and 12th centuries.
[146] Stevenson, 'Chapter II, The Pottery 1936-37', 47.

painted in green on bowls and dishes. Marbling red or dark green treatment is also included in this class. Some sherds belong to a particular form, wide-mouthed jug, which is covered by a plain green glaze.[147] At Stage Vb, the B 4a appears to be exactly the same with some slight changes. Monochrome green glazed jugs are more common, the linear designs are less frequent and occasional pieces bear unique designs, such as a bird which is depicted as a comic.[148] The coins which are associated to Stage Va belong to Constantine IX (1042-54), Michael VI (1056-57), Romanus IV (1067-71), Alexius III (1195-1203) and also six coins which were found at these strata are dated 10th-11th centuries.[149]

Hayes states that the GWW IV, together with its unglazed version GWW V, is the commonest ware type at Saraçhane. The fabric and the glazed are identical to Stevenson's B 4a. It usually covers inside the open forms and outside the close forms. The same base, slip/wash, speckling decoration and marbling are common, but the blurred pattern is a feature that only Hayes mentions for GWW IV. Two coloured decoration is common with the fillers green and the blue in this sort of decoration is rare at Saraçhane.[150]

The forms are clearer than those in Stage Va and Vb. Hayes underlines the uniformity in forms by stating that dishes are common in the early contexts and bowls are late comers. However, five common types are diagnosed for dishes and bowls (Type 1-5), and the other forms are small, footed and large shallow bowls and rounded-bodied small cups (Type 6-10). The examples of the small forms are badly fragmented to classify, but the rare open forms may belong to chafing dishes and stemmed bowls. This class is dated to mid-twelfth to early

[147] Ibid., 47–48.
[148] Ibid., 52–53.
[149] Ibid., 52.
[150] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30–31.

thirteenth centuries, especially by the examples from the Deposit 51 (1150-75) and Deposit 57-58 which are believed to run down to early 13th century.[151]

Stevenson defines the fabric of B 4b as “a smoother paste” which is softer than the previous group and also less distinguishable from the “A” series.[152] The fabric of the counterpart at Saraçhane, GWW III, is found similar to Polychrome Ware and the inclusions of the fabric are noted small red and greyish particles which are also identical to that of B 4b.[153] The glaze is opaque and thick green and bluish-green,[154] greyish-white which are rarely accompanied with purple and dark blue.[155] Not only the fabric, but also the glaze has a common feature with Polychrome Ware: the use of the same white glaze, especially the one which is used in black and white decoration.[156] Decorative forms on the vessels are dots and streaks. Forms are large or small-sized bowls, cups, juglets and goblets.[157] Stevenson asserts that the sherds found at Stage IV in the Church which are dated in the second half of the eleventh century, by the help of Michael VII (1071-8) coin, should belong to B 4b as earlier examples of this group.[158] A similar comment for its contemporaneous, GWW III, is made by Hayes who dates these wares to the second half of the eleventh century by taking into account of the possibility that their occurrence in the early twelfth century. According to Hayes, the alikeness of the fabric and the glaze and also, similarly, the short circulation of GWW III make closer this group to Polychrome Ware.[159]

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151 Ibid., 33.
152 Stevenson, ‘Chapter II, The Pottery 1936-37’, 48.
153 Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 30.
154 Ibid.
155 Stevenson, ‘Chapter II, The Pottery 1936-37’, 48.
156 Ibid.; Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 30.
157 Stevenson, ‘Chapter II, The Pottery 1936-37’, 49.
158 Ibid.
159 Hayes, ‘Excavations at Saraçhane in Istanbul II. The Pottery.’, 30.

B 4c is the last class of the white-bodied "B" series at the Great Palace. The fabric of this class is smooth and similar with the previous subgroup, B 4b; however, the inclusions are rarer. The glaze is usually thin, "almost colourless" and tend to decay, but there are instances that the glaze is thick and yellowish. Forms are ring-based bowls and cups with handles, and the decoration shows a likeness with the previous group's decorative forms, dots and streak, and also in the colours, green, red, blue and purple. The thick yellowish glaze and the red dots used in the decoration are linked with the Polychrome Ware, according to Stevenson. This subgroup is also dated to the early Comnene which is the suggested date for Stage Va.[160] As mentioned previously, the last class of Glazed White Wares is the GWW V comprises a group of juglets at Saraçhane. Though Hayes mentions the similarity of this class with a subgroup at the Great Palace, his reference is not clear,[161] but the best guess would be the last class of Stage Va, B 4c. Nevertheless, besides the juglets, Hayes adds a couple more forms: frying pans from Saraçhane, a lamp with attached saucer from the Great Palace by dating them to the twelfth century.[162]

The subgroups, B 4a-c, of the white-bodied of "B" series at the Great Palace and its counterparts at Saraçhane, GWW III-V, suggest that the circulation of this group of White Ware pottery span from the mid-eleventh to the early thirteenth centuries. However, the common deeper bowls of Green and Brown Painted Ware which were uncovered at Kalenderhane and Küçükyalı[163] confidently expand the date for the group to the mid-thirteenth century at Constantinople. Nevertheless, the production of the Green and Brown

[160] A particular coin, Alexius III (1195-1203), among them is seen as intrusive and, probably, the same coin is used to date Vb, together with a coin of Manuel I (1143-80), Stevenson, 'Chapter II, The Pottery 1936-37', 50, 52, 55.
[161] According to Hayes, Stevenson mentions a specific group (on the pages 51-52) which is not treated as a different group. However, on these pages, Stevenson mentions all three subgroups, B 4a-c. Therefore, it is not clear which subgroup of that Hayes's cross-reference correspond.
[162] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30.
[163] Wohmann, 'Tableware and Cargo Amphorae of the Late Antique to Late Byzantine Periods from Küçükyalı (Istanbul), A Ceramic Assemblage from the Asian Hinterland of Constantinople (4th-14th Centuries CE)', 46.

Painted Ware must have continued until the end of the thirteenth century which is proven by the help of the parallel findings of a cargo ship, Novy Svet, which was discovered in the south-eastern coast Crimea.[164] It is called the second biggest pottery class of the shipwreck which were found together with Günsenin Type 3 amphorae nearby the prow.[165]

4.4. Conclusion

To reveal the entire surface treatments of CGWW pottery from the late seventh to the late thirteenth centuries, three different categorisations are offered in Chapter four, (A-B. Decorative Classes, C. Thematic Classes and D. Historical Classes). In A-B. Decorative Classes, the entire ornamentation is classified based on separating glaze painting and tool-made decoration. Glazed White Ware examples, used in Vol. II, are grouped under two titles**:** A. Decorative Painting and B. Decorative Technique.

A. Decorative Painting includes various sorts of glaze painting from monochrome to polychrome. Based on the use of the glaze, which may either be functional or decorative, Decorative Painting examples can be divided into two: **A1. Plain-glazed Decoration** and **A2. Painted Decoration**. The majority of sub-groups in Plain-glazed Decoration which includes green, yellow and brown examples (A1. A-C), seems to exemplify the functional use of the glaze. However, the mottled and streaky appearance in some sub-groups (A1. D-E) may be thought of as a decorative effort. A2. Painted Decoration, on the other hand, includes glaze

[164] Morozova and Oniz, 'The Green and Brown Painted White Ware of Novy Svet Shipwreck is dated to the mid-twelfth to the late thirteenth centuries. See Iana Morozova et. al, "Green and Brown" White Wares from the Collection of the Archaeological Museum, National University of Kiev (Ukraine', 127–28.
[165] Waksman, Teslenko, and Zelenko, 'Glazed Wares as Main Cargoes and Personal Belongings in the Novy Swet Shipwreck (13th c. AD, Crimea): A Diversity of Origins Investigated by Chemical Analysis', 852.

painting forms which are used to create design and styles of monochrome to polychrome painting. It includes three main classes: A2.A. Monochrome Painted Decoration, A2.B. Bichrome and Trichrome Painted Decoration (together) and A2.C. Polychrome Painted Decoration.

A2.A. Monochrome Painted Decoration is defined as "a single colour which is used to give a decorative effect on the surface of the vessels." This group comprises four sub-groups: A2.A1. Brown Slip-painted Design, A2.A2. Brown Glaze-painted Design, A2.A3. Spatter Painted Design and lastly A2.A4. Blue Painted Design. On the other hand, A2.B. Bichrome and Trichrome Painted Decoration include "two and three colours in" the glaze painting which comprises A2.B1 Splash Design and A2.B2 Green/Blue and Brown Painted Design together with two stylistic sub-groups for each. Lastly, A2.C Polychrome Painted Decoration includes four classes and two stylistic sub-groups in Class II and also Class III.

In **B. Decorative Technique**, tool-made decoration of Glazed White Ware is divided into two main classes: B1. Carved Decoration and B2. Relief Decoration. Carved Decoration consists of B1.A Cut Design and B1.B Incised Design and two stylistic sub-groups for each. Relief Decoration, on the other hand, encompasses three main classes: B2.A Petal Design, B2.B Moulded Relief Design and B2.C Relief Sculpture Design. All classes have two stylistic sub-groups; however, Moulded Relief Design also includes two variants which are either combined with Carved Decoration or Painted Decoration.

In C. Thematic Classes, motifs are grouped together by themes. Motifs include apotropaic and religious symbols, mostly crosses and amuletic symbols. There is a group of figural depictions which may be related to the Imperial court. The horse riders in moulded relief may be related to the equestrian games, such as chariot racing, possibly hunting or even tzykanion.

Animals may also be related to the entertainment places at the capital, such as game parks and animal parks where those animals were kept and hunted.

The fantastic animals are also associated with the Imperial Court, especially with a connection to banquets. A single Polychrome Ware bears a Hippogriff which is a hybrid animal combining an eagle and horse. This plate can also be included in the ceramics of feasting cycles of the Byzantine silverware, after sirens and sphinxes. Relatedly, the chafing dish with a relief sculpted design from the Corinth excavations is a fine example of the secular feasting context. The scene on the vessel is an acrobatic performance which may have taken place at an imperial banquet. What this theatrical composition depicts is a lively story of the cultural landscape of Byzantium.

There are some depictions which are also symbolically associated with the imperial court. An unpublished vessel from Iznik Museum bears a sculpted relief head of an imperial figure that I suggest to be Alexius I Comnenus (1081-1118) who sits on horseback flanked by ceremonial insignia. This scene on the dish more likely commemorates the triumph of Alexius I Komnenos at the Siege of Nicaea in 1097. Other than this example, some heraldic animals depicted on artefacts are believed to be used as emblems of status. The use of griffins with other animals, such as lions and eagles, on elaborate textiles is thought to symbolise “social and political achievement” of the court members who could wear these garments. While eagles are the heraldic animals which are associated with the imperial families, Feng Huang is another type of bird which is believed to be a sign of high social status.

The last group is called Others which consists of a small group including individual examples. This group has a specific value because it includes three examples of a classicising scene. It seems that they are differently imitated versions of a single depiction: a nude man in the act of fishing. This scene depicts a Greco-Roman theme which rarely appears in other middle Byzantine art objects. Therefore, it adds more value to Glazed White Ware pottery.

The decorative classification in Part one is integrated with the historical sequences in Part three: D. Historical Classes. In the early-Glazed White Ware Decoration (7^{th} -9^{th} century), the story of decoration begins with the emergence of Carved Decoration on a group of Glazed White Ware dishes of the late 7^{th} or maybe the early 8^{th} century. The Plain-incised Design which consists of shallow incised forms and plainly depicted motifs including apotropaic and religious symbols, such as crosses, birds and fish and inscribed verses from the New Testament and also scrolls. The earliest form, Plain-incised Design, is usually encountered in the class called GWW I which has an off-white fabric and a dark coloured Plain-glaze.

Another carved technique in this period is Cut Design which creates several decorative patterns, such as dogtooth, fretwork and perforations which decorate the inside or outside surfaces of vessels. Examples are rare but the both designs are also used together, especially on chafing dishes, fruit stands and goblets, towards the 9^{th} century when an increase appears in use of plain yellow and green glaze. After the mid-9^{th} century, Cut Design seems to have faded out and was likely replaced by a new and time saving decorative technique which is moulded relief. The Relief Decoration emerged in the later period of the early-Glazed White Ware Decoration. Two of its classes which are Petal Design and Moulded Relief Design show the earliest instances of these two techniques. For Plain-glaze painting, the later period is when it reaches its decorative appearance with mottled and streaky glaze techniques.

In the middle-Glazed White Ware Decoration (9^{th} – 11^{th} century), Incised Design is used to highlight the lines around the motifs in all groups in the Plain-glazed and Painted Decoration, excluding Polychrome Painted Ware. Roughly in the middle of this period, mid-tenth century, new variations in the glaze painting emerge: Brown-slip Painted Decoration and Polychrome Painted Decoration. The former was surely imitating Petal Design and later it was combined with relief and incised designs. Polychrome Painted Decoration, on the other hand, was not manufactured in large quantities and circulated for a long time. However, it stylistically shows the most widened decorative class which was being manufactured for about two centuries. This period saw the Incised Decoration take its new Elaborated-incised form which was used along with two types of Relief Decoration: Moulded Relief and Sculpting Relief and both were used together until the end of the 11^{th} or maybe 12^{th} century. At the end of the middle-Glazed White Ware Decoration, a new variant of polychrome decoration (Polychrome variant) emerged. This type does not show the same delicacy as Polychrome Painted Decoration. It is the B series in Stevenson's (B 4b-c) and GWW III in Hayes's classification.

In the late-Glazed White Ware Decoration (11^{th} -13^{th} century), Splash Design occurs at the Great Palace Stage Va and in the eleventh century context at Saraçhane, Hayes's latest GWW II. Also, the above-mentioned polychrome treatment continued to occur in the early phase of this historical sequence. The colour palette is defined as yellow-green to blue-green with brown or red specks and the glaze tends to decay. It is dated to the middle of the eleventh and early twelfth century. This new glaze painting also has a monochrome variant which corresponds to Brown-glazed Painted Design, Spatter Painted Design (also notice polychrome variant) and Blue Painted Design. However, its polychrome variant is included in the Green/Blue and Brown Painted Decoration which also covers Stevens's B 4a and Hayes's GWW IV. This is the last group, Green and Brown Painted White Ware, which is dated from the twelfth to the late thirteenth century and corresponds to most of the Bichrome and Trichrome Painted Decoration.

CHAPTER FIVE: DISCUSSION

Chapter five brings together the results of the archaeological and the art historical evaluations which are discussed in Chapter three and four, respectively. It begins with the archaeological approach which includes archaeometric results of the fabric and glaze analysis of Glazed White Ware pottery from the Parion Excavations and two clay sources (Şile and Ömerli) in Istanbul under the title **5.1 Material and Technique**. Next, **5.2 Ornamental Attribution** includes the discussion of the art historical approach by interpreting the implications of the results that emerged from the suggested classes (decorative, thematic and historical) in the Chapter four.

5.1 Material and Technique

5.1.1 Fabric

The quantitative (XRF) and semi-quantitative (SEM-EDS) analysis of the selected archaeological samples (**PAR** batch) of White Wares revealed a non-calcareous fabric. It contains a high content of Silica (63-70 wt%) and Aluminium (26-30 wt%) and low Iron (2-5 wt%). With the exception of PAR 2, 4, 5, 20 and 25 (see Table 3), a low Calcium content (0.67-7.17 w%) is another feature of the ceramic body. These findings correspond to the previous archaeometric analysis made upon Glazed White Wares and tiles from Constantinople and Corinth by Vogt and Bouquillon,[1] Mason and Mango,[2] Armstrong et al.,[3]

[1] Christine Vogt and Anne Bouqillan, 'Technologie Des Plaques Murales Décorées de Preslav et de Constantinople (IXé -XIé Siecles)'', *Cahiers Archéologiques* 44 (1996): 105–16.

Lauffenburger et al.,[4] Megaw and Jones,[5] Waksman et al.,[6] White,[7] and Palamara et al.[8] Among them, the compositional analysis of samples from Istanbul, in the batch called "Byzance" by Waksman *et al*., allocate more data for comparison regarding the major and minor and also the trace elements shown in Table 6. The major and minor elements (Si, Al, Fe, Na, Mg, Mn, Ca, Ti, K, P in w %) look similar, however, a dissimilarity in figures occurs in the trace elements (V, Cr, Ni, Cu, Zn, Rb, Sr, Zr, Ba, La, Ce, Pb in w ppm).[9] In addition to that, the Iron level of the samples in the Byzance batch is higher in the than Parion samples (except PAR 5, 20, 25), between 4.42 and 6.99 wt% for the former, 2.51 and 4.64 wt% for the latter (Table 6). Nevertheless, the result proves that all analysed White Wares are made of the same highly siliceous kaolinitic clay.

In the petrological studies of White Wares, the common physical properties in the ceramic body are defined as quartz and iron-oxide grains,[10] and, later, altered feldspar,[11] mica and

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[2] R.B. Mason and M. Mundell Mango, 'Glazed "Tiles of Nicomedia" Bithynia, Constantinople and Elsewhere', in *Constantinople and Its Hinterland, Papers from the Twenty-Seventh Symposium of Byzantine Studies (Oxford 1993*) eds. Cyril Mango and Gilbert Dagron, Routledge 1995, 329, Table 1.
[3] Pamela Armstrong, Helen Hatcher, and Michael S Tite, 'Changes in Byzantine Glazing Technology from the Ninth to Thirteenth Centuries', *La Céramique Médiévale En Méditerranée, Actes Du 6e Congrès de l'AICEM2. Aix-En-Provence*, 1997, 228, Table 2.
[4] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 81–82.
[5] Megaw and Jones, 'Byzantine and Allied Pottery: A Contribution by Chemical Analysis to Problems of Origin and Distribution', 242–43, 247, Table 2-3.
[6] Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', 131, Table 1.
[7] White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries', 94–98 Vol. 11, 94-98, 140-144; Vol. 2 Fig. 8.2.1-4; Tables 3.2.1, 8.3.5, 8.4.1.
[8] E Palamara et al., 'Technology Issues of Byzantine Glazed Pottery from Corinth, Greece', *Microchemical Journal* 129 (2016): 141, Table 4.
[9] That is probably because of the different spectrometry used with the scanning electron microscope, while the "Byzance" batch were analysed by wavelength dispersive X-ray (SEM-WDS), Parion samples were examined by energy dispersive X-ray (SEM-EDS).
[10] Jannic Durand and Christine Vogt, 'Plaques de Céramique Décorative Byzantine d'époque Macédonienne', *La Revue Du Louvre et Des Musées de France*, no. 4 (1992): 38–44; Etienne Coche de la Ferté, 'Décors En Céramique Byzantine Au Musée Du Louvre', *Cahiers Archéologiques* 9 (1957): 188–92.
[11] Mason and Mango, 'Glazed "Tiles of Nicomedia" Bithynia, Constantinople and Elsewhere', 326.

chert[12] are added to this list. Except for feldspar and chert, these inclusions are visible to the eye, or a better view for considering size and shape can be achieved by a hand lens and more so in Thin Sections. Our microscopic examination of the properties of the ceramic body is compatible with the aforementioned correlative studies. The common monocrystalline quartz, fine sand-sized dark red to black iron-oxide concentrations and rare silt-sized red and white mica are the characteristic properties of the fabric.

However, the analytical method (XRD) that we used to cross check the data showed that only quartz mineral is present in the crystalline phase (Fig.4 and 5). To verify this fact, the XRD data was used to experiment with other minerals, mentioned above, such as K-Feldspar, Muscovite-Mica, Maghemite/Hematite and also Tridymite for an estimation of the firing degree. The result shows that all of these minerals show different diffractograms which are not overlapping with the peaks of the representative sample (PAR 1) (see Appendix 2). The ratio of Silica oxide increase shown in the graphic is, perhaps, due to the formation of amorphous silica in the crystalline phase. The X-ray diffraction analysis (XRD) shows that the silica mineral in pottery sherds is quartz which is known stable at about 860-870°C. Also, the thermal behaviour of analysed samples indicates that maximal firing temperature did not exceed 900°C, which is in good agreement with XRD results. Therefore, it can be proposed that our White Ware samples might have been fired up to 860-870°C.

The quantitative analysis carried out by XRF for both possible raw clay sources, (Şile and Ömerli) which are located on the Asian sides of Istanbul, reveals that major and minor and also the trace elements match with the chemical compositions of the pottery sherds. A high Silica (43-50 wt%) and Aluminium content (26-27 wt%), followed by a low Iron content (2.5

[12] White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries', 94–98.

wt%) in the powder samples of Şile and Ömerli clays are quite close to the ratio of those in the ceramic bodies. However, the ratio of the dominant mineral quartz, proved by XRD, is higher in pottery sherds (63-70 wt%) than in Şile and Ömerli clays. This either may indicate another clay source in which Silica is higher than our sources or a deliberate addition of quartz mineral to the clay by potters.

Our analytical study on the fabric groups corresponds with the correlative data of the petrographic analysis which demonstrates distinct petrofabric groups for White Wares. Considering the textural differences in the archaeological samples, the Ashmolean ware and tile fragments revealed two different fabric groups.[13] Similarly, two different fabrics are also mentioned in the examined tiles of the Louvre and Sevres museums,[14] but the samples from Corinth excavations are more varied in fabric types. For instance, H. White defines White Wares as "Altered Feldspar Class" which has a grey to white grey micromass with predominantly quartz and altered feldspar inclusions. The further division of this class is made by the textural differences in fabrics, dividing into three groups which are called the Altered Feldspar Group A, B and C. There is also a subdivision in Group A (A1 and A2) due to the amount of the non-plastic inclusions and textural differences in this group. Having in common the white-grey micromass and quartz, altered feldspar and iron-rich concretions in the fabric suggests a strong relation among the groups and, relatedly, to the similar clays which are highly possibly originate from the same region. The differentiation in each group, according to White's description, reflects the distinctness in technological practices, particularly, occurring in the preparation of the raw material and the firing process.[15]

[13] Mason and Mango, 'Glazed "Tiles of Nicomedia" Bithynia, Constantinople and Elsewhere', 326.
[14] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 82.
[15] White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries', 94–98.

On the other hand, Palamara et al., divide White Wares of Corinth excavations into three: Coarse, Fine and Pink according to the difference in fabric colours, inclusions and voids in the texture. Additionally, the SEM-EDS analysis of the bulk composition of the samples allows the making of chemically established groups for the fabric categorisation. According to that categorisation, most of the fine and pink fabrics are in Group I which is non-calcareous with a high alumina content and relatively high titanium and iron. Group II, on the other hand, is represented by the coarse fabric which shows a very high silica and low alumina content which is, supposedly, an indicator of a stonepaste.[16]

Our fabric categorisation is based on both microscopic examination which is fortified by SEM imagining and the chemical compositions of the samples revealed by XRF and SEM-EDS. The White Wares which were unearthed at Parion excavation are divided into three: Fabric A (fine), Fabric B (medium) and Fabric C (coarse) by taking into consideration the textural differences in the fabrics. Besides this, the chemical categorisation determined by the different chemical compositions in the ceramic body shows two variations. The majority of the samples (PAR 3,6, 11, 12, 15, 17, 18, 19, 22, 26) fall into the first group, PAR Group I, which is composed of only the major components, Aluminium (Al), Silica (Si) and Iron (Fe). The second group, PAR Group II, is the Ca-rich fabric group which is defined by a high content of Calcium (Ca) in addition to the major elements, with or without Magnesium (Mg), (PAR 2, 4, 5, 20 and 25). The Ca content in the Ca-rich fabric group does not look like a diffusion of the element from the glaze to the fabric since Ca level in the glazes are smaller than in the fabrics (Table 5). Regarding the result of the quantitative analysis, XRF, which showed a low Ca content in the ceramic body and the raw clay sources (<1.00 wt%), (Table 2 and 4), the high Ca content in Ca-rich group cannot be related to a different source of clay

[16] Palamara et al., 'Technology Issues of Byzantine Glazed Pottery from Corinth, Greece', 140–41.

which is naturally rich in calcium. Rather, it suggests a deliberate addition of calcium rich minerals to the fabric. In the glaze, Calcium is used as a flux which contributes to hardening and durability in low temperature glazes together with other fluxes, such as lead, zinc and sodium.[17]

These two chemically established fabric groups can be compared with those that are similarly categorised at Corinth, by Palamara et al. The first group at Corinth (Group I) comprises both the chemical variations of Parion (PAR Group I and II), and it is a non-calcareous fabric with high aluminium, and low iron and titanium. The high calcium content (5 wt%) which is represented by three samples in Corinth Group I is attributed to outer layers by the authors, the existence of the slip in this case. However, in PAR Group II, the majority of the samples (PAR 2, 4, 20 and 25) do not bear a slip, and only a single Polychrome sample (PAR 5) shows a layer between the fabric and the glaze.

The second group at Corinth (Group II) contains very high Silica levels (80 wt%) and low Alumina (8.9 wt%) and, therefore, it is categorised as a stonepaste fabric by Palamara et. al.[18] The stonepaste is a particular ceramic body producing technique which first occurred in Fatimid Egypt in early 11th century and spread over the other lands of the Islamic world in the late 11th - 12th centuries.[19] The recipe for a stonepaste body, which was allocated by Abu'l Qasim (14th century), contains ten parts quartz, one part white clay and one part glass frit.[20] By taking this ratio as a reference for the difference between Silica and Alumina contents and also by the help of the SEM images of the fabrics, Palamara et al. categorised two blue glazed samples as stonepaste. However, the difference between silica and alumina of Parion

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[17] Daniel Rhodes, *Clay and Glazes for the Potter* (New York: Greenberg, 1957), 68.
[18] Palamara et al., 'Technology Issues of Byzantine Glazed Pottery from Corinth, Greece', 141.
[19] Michael S Tite, 'Ceramic Production, Provenance and Use-a Review', *Archaeometry* 50, no. 2 (2008): 222.
[20] James W. Allan, 'Abu'l Qasim's Treatise on Ceramics' (Iran, IX, 1973), 113–14, 119, https://www.jstor.org/stable/4300488?seq=1.

samples is not that particularly high. The ratio which EDS revealed is roughly one-part silica and a half part alumina in the both chemically established groups (see Table 3). Still, Parion fabric Group II falls into the Islamic stonepaste categorisation.

Both quantitative and semi-quantitative analyses show that the fabric contains a high content of Silica (63-70 wt%) and Aluminium (26-30 wt%) and low Iron (2-5 wt%) which suggests a kaolinitic clay. On the other hand, SEM-EDS points to two chemically different groups. While Group I agreed with the above result which is high silica and aluminium levels, and low iron, Group II contains low silica (~4.33-18.54 wt%) and alumina (~2.01-9.88 wt%) contents with a high concentration of Calcium (~7.17-36.93 wt%).

On the other hand, the high contents of Silica and Aluminium (close to 90%) in the fabric of the earliest White Ware type (GWW I)[21] also suggest the same kaolinitic clay. However, this class is known by its darker fabric and relatively darker glaze if it is compared with the following classes. One possible reason for this dark appearance is the high Iron level in the fabric which is demonstrated in the studied samples of Saraçhane, by Waksman. The Iron oxide level is higher in the fabric (4.42-6.99 wt%) than the glaze (2.2-3.7 %) which signifies that the high content of Iron in the fabric could hardly be a diffusion of the element from the glaze. This elevated level of Iron content is close to levels seen in the analysed clay sample of Arnavutköy (Bosporus white clay, Table 7). Therefore, it can be suggested that Bosporus white clay or a similar clay bed with high content of Iron was used to produce the earliest Glazed White Ware pottery. Later, a change in clay source may have happened in the mid or late ninth century which corresponds to the lower Iron level in the fabric of the studied samples (see Table 8). Two chemically different groups examined by Lauffenburger et al.,

[21] Waksman et al., 'Approche Archéométrique Des Premières "Byzantine Glazed White Ware" et de Productions Glaçurées Romaines et Romaines Tardives', 533; Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', 130.

revealed the same conclusion that two different kaolinitic clays were used in manufacturing glazed tiles and also wares in the capital at around 1000 CE, besides Arnavutköy clay.[22]

Considering that the X-ray diffraction peaks correspond to only Quartz as a Silica oxide mineral, 860-870°C is suggested as a firing degree for **PAR** batch. This result corresponds well to the thermal behaviour of analysed samples and indicates that maximal firing temperature did not exceed 900°C. This result can be compared with two other suggestions for White Ware pottery by Armstrong et. al.[23] and Cherneva,[24] 900-1000°C and 980-1050°C, respectively. However, about 800°C is also suggested by Lauffenburger et al.[25]

5.1.2 Glaze

The glaze analysis, carried out by SEM-EDS, revealed two compositional groups in White Ware samples, the lead-alkali and high lead glazes. The lead-alkali glazes compositionally contain 20 to 40% lead oxide and 5 to 12% alkali oxide, and the high lead glazes, on the other hand, contain 45 to 60% lead oxide and alkali oxide which is lower than 2%.[26] Although SEM-EDS analysis did not explicitly reveal alkali oxides (Na and K) for each of the samples, considering the above ratio of PbO by Pace et al., two of our examined samples (PAR 7 and 17) fall into the lead-alkali glaze and the rest is high lead glazes (PAR 4, 5, 12, 17, 18, 19 and 22). The lead-alkali glazes contain about 30 wt% lead, between 7.46 to 20.47 wt% silica and

[22] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 82.
[23] Armstrong, Hatcher, and Tite, 'Changes in Byzantine Glazing Technology from the Ninth to Thirteenth Centuries', 229.
[24] Daniela Cherneva, 'Study on Technological Characteristics of Polychrome Ceramics from Great Preslav 9th-10th Century', in *Средневековният Човек и Неговият Свят. Сборник в Чест На 70-Та Годишнина На Проф. д.и.н. Казимир Попконстантинов \ Medieval Man and His World. Studies in Honor of the 70th Anniversary of Prof. Dr. Dr. Habil. Kazimir Popkonstantinov*, 2014, 662.
[25] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 74.
[26] Marco Pace et al., 'The Technology of Production of Sasanian Glazed Pottery from Veh Ardasir (Central Iraq)', *Archaeometry* 50, no. 4 (2008): 592.

between 1.79 to 8.21 wt% alumina. This group occurs in Polychrome Class II and Brown-slip Painted pottery sherds. The high lead group contains between 42.5 to 73.95 wt% lead, 8.72 to 20.47 wt% silica and 3.74 to 7.3 wt% alumina. This group occurs on pottery covered with brown, yellow, orange, orange-brown glazes and Polychrome Class II. Considering two chemical groups, lead-alkali and high lead, in glaze used on the Constantinopolitan origin white clayed pottery, our result matches with sherds from Corinth[27] and the tiles kept in the Walters Art Museum, the Musées du Louvre, and Sevres.[28]

SEM-EDS could not detect lead content in any of the green and blue-green coloured samples (PAR 2, 3, 20 and 25). A common feature of these samples is to contain a high amount of sulphur (S) and/or tin (Sn) in their glaze bodies, between 3.26 to 17.44 wt% (S) and between 6.30 to 17.86 wt% (Sn). Considering the Byzantine Glazed Pottery, no works associate these two elements occurring together in the glaze body with the green colour of sherds. While tin oxide might have been used as an opacifier as happens with Arsenic (As) (mentioned below), the purpose of the high concentration of sulphur in the glaze remains unclear; however, sulphur and arsenic sulphide are known to be have been used to produce Lustre Ware in the Middle East.[29] Therefore, tin and sulphur might have been used as opacifier as happens with arsenic.

In both ESD multi-point and line scan of the glaze surface, Arsenic (As) content appeared in PAR 17, 18 and 26, on which orange-brown to brown glazes are applied. Whether or not arsenic was an accidental addition to glaze of the Parion samples, its diffractogram which

[27] White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries', 94–98.
[28] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 82.
[29] Pradell et al., 'Composition of the Lustre Pigment Used in the Production Of 13th Century AD Raqqa Lustreware from Syria', 983–85.

appears to be overlapping with lead and silica may indicate that it was used as an opacifier rather than a colourant. The arsenic content in the glaze is not only a new discovery for Glazed White Wares but also for the others in the Byzantine ceramic literature. However, arsenic is known to be used for optimisation of the glaze or as colour enhancer throughout history. It is noted to be used in glass weights in the Late Antiquity,[30] the Venetian *lattimo* glass artifacts from the 16th century and white arsenic on the enamels on metals and glasses, vases and beads are known to be produced in Europe in the second half of the 19th century. Also, the arsenic-optimised blue and cobalt blue European porcelains and enamels on metals (imported to China) led potters to use lead-arsenic in blue glaze and white decoration during Kangxi and Yongzheng reigns.[31] In addition to those various recipes of Jābir ibn Hayyān (the 8th century)[32] and Abu'l Qasim (the 14th century)[33] let us know that arsenic was used in producing the Lustre Ware of Islamic lands (see below, Ornamental Attributions).

According to EDS analysis, the colour used in glazes of Parion samples are as follows: brown colour is achieved predominantly by iron oxide in orange to brown coloured samples, brown hues, stains and lines (PAR 2, 4-6, 11, 17-18, 20, 25-26). In addition to that, iron oxide was detected to be used in black lines of a polychrome sample (PAR 11). This result corresponds to White's analysis at Corinth[34] and supports her claim that iron oxide could be the source of black/brown lines rather than manganese which is believed to be used as colourant of the dark

[30] Nadine Schibille et al., 'Comprehensive Chemical Characterisation of Byzantine Glass Weights', *PLoS One* 11, no. 12 (2016): 12.
[31] Philippe Colomban, 'Colouring Agents for Glass, Glaze and Enamel: Tracing Innovation and Exchange Routes', *Supplementary Information for Raman Spectroscopy in Archaeology and Art History, The Royal Society of Chemistry*, 2019, 8–9.
[32] Ahmad Y Al-Hassan, 'An Eighth Century Arabic Treatise on the Colouring of Glass: Kitāb Al-Durra Al-Maknūna (the Book of the Hidden Pearl) of Jābir Ibn Ḥayyān (C. 721–C. 815)', *Arabic Sciences and Philosophy* 19, no. 1 (2009): 149–54.
[33] Allan, 'Abu'l Qasim's Treatise on Ceramics', 114.
[34] White, 'An Investigation of Production Technologies of Byzantine Glazed Pottery from Corinth, Greece in the Eleventh to Thirteenth Centuries', 137, 144.

coloured lines used to outline motifs in Polychrome Wares.[35] In our analysis, manganese was only detected where the light brown colour is applied in a polychrome sample (PAR 7). On the same sherd, zircon is also spotted where the white colour is applied. While zircon in white colour is a new find, the use of manganese in brown glazes on polychrome tiles found in Constantinople and Preslav was already noted.[36] A peculiar fact about green and blue-green samples (PAR 2-3, 20, 25) is that EDS did not reveal Copper (Cu) which is widely accepted to be the source of green and blue colours.[37] This is perhaps because the copper content is low in quantity, i.e., < 1.00 wt%, which EDS could not measure. The relatively high concentration of copper oxide found in green glazed White Ware samples from Istanbul, Corinth, Lakedamion and also the tiles from museum collections below are described in analytical works which accept that the green colour is achieved by copper oxide. Further, the analyses of tiles from museum collections (Walters, the Louvre and Sévres) list how glaze colours were generally achieved: amber and brown coloured by iron oxide; green by copper oxide; aubergine by manganese oxide; blue by cobalt oxide.[38] Also, a combined addition of iron and manganese may have been used in the slip, in pink to deep red, which is used in faces of figures and in details of the decoration on the polychrome tiles.[39]

[35] White states that G.D. Sanders mentions manganese is the colourant of black/brown outlines in Polychrome Wares. However, Sanders, in both his Ph.D. thesis and the article covering Polychrome Pottery, uses the term 'manganese' to define the colour rather than pointing out the element itself. Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 71–74; Sanders, 'Byzantine Polychrome Pottery', 89–103.
[36] Vogt and Bouqillan, 'Technologie Des Plaques Murales Décorées de Preslav et de Constantinople (IXé -XIé Siecles)'', 105–6; C Vogt et al., 'Glazed Wall Tiles of Constantinople: Physical and Chemical Characterization, Manufacturing, and Decorative Processes', 1997, 51–65.
[37] Rhodes, *Clay and Glazes for the Potter*, 130; Colomban, 'Colouring Agents for Glass, Glaze and Enamel: Tracing Innovation and Exchange Routes', 14.
[38] Lauffenburger, Vogt, and Bouquillon, 'Technical Insights into the Working Practices of the Byzantine Tile Maker', 73.
[39] Ibid.

5.1.3 The Raw Clay

Considering the provenance of the raw material of White Wares, an analysis made by Megaw and Jones includes “white clay” and “clay mix” samples which were taken from Arnavutköy/Bosphorus. Of the white clay, although Silica content is not included, the given values show that the major and minor elements (Al, Ca, Mg, Mn, Ti, Na, Cr, Ni) are slightly lower than Şile and Ömerli (Table 7). But, 5.5% Iron (Fe) content in Arnavutköy/Bosphorus clay is not only high for Parion samples, but also the others found in Istanbul, Corinth, Lakedaimon and also other analysed sherds kept in museum collections (Table 2-3, 8). However, the higher value of Iron concentration in Arnavutköy clay matches the earliest glazed White Wares (GWW I) analysed by Waksman et al. (see Table 6). By comparing the Iron level of the earliest glazed White Wares (GWW I) with the other samples mentioned above, it is possible to deduce a change in the clay source might have happened which corresponds with the beginning of the Middle Byzantine period (see Chapter four, Part three). Also, this high level of Iron in the clay source may explain the differentiation in fabric colour of the earliest White Wares (GWW I) which is darker than in those following.

Regarding the well-suit chemical compositions in pottery sherds, Arnavutköy, Şile and Ömerli clays are considered clay sources for CGWW, and two other possible sources for tiles mentioned by Lauffenburger et al.[40] have yet to be discovered. Considering the major components (silica and aluminium) in both the archaeological ceramics and the raw clays, our material analysis of the raw materials revealed that the kaolinitic clays on both sides of Istanbul are not particularly different from each other. While a difference in the iron level can be a good indicator, it should also be considered that trace elements are helpful parameters to

[40] Ibid., 82.

provenance the clay sources. Consequently, further discussion will benefit from an analysis the major and minor and also the trace elements of other clay sources on both sides of Bosphorus, such as Boğazköy, Ayazağa Çömlekçi Bayırı, Hacı Osman Bayırı, Uskumru Köy, Akpınar, Terkos-Tayakadın, Çatalca Dağyenice, Kartal-Yakacık, Dudullu and Beykoz.[41]

Considering Glazed White Wares, so far only the Glazed White Ware I and II (GWW I-II) were examined. These samples were unearthed in a waster including mostly the later chronological ceramics, such as Zeuxippus and Sgraffito Wares, have been related to a kiln discovered at Sirkeci, Istanbul, in 2007.[42] Also, a new publication of S. Y. Waksman confirms that some of the groups of White Wares, Glazed White Ware II and Polychrome White Ware, are chemically associated with the bars found in a structure at Vezneciler which is possibly a kiln.[43] This result does not allow us to conclude that Byzantine White Ware pottery was manufactured in the above-mentioned kiln, rather, it indicates that the bars and Glazed White Ware are made of the same or similar clay which is located in Constantinople. Considering this lack of proof for workshops and kilns for White Ware, it is best that we alter our perspective and focus on what kaolinitic clay beds of Constantinople can disclose about the pottery.

[41] The findspots are supplied by a geological report which was written by Dr. Ekrem Göksu on behalf of MTA (General Directorate of Mineral Research and Exploration) in 1949; *İstanbul civarında, Seramik Sanayi Hammaddelerinden Kaolin, Kil, Feldspat ve Kuvarts Yatakları Hakkında Jeolojik Rapor, Rapor Tarihi 11.02.1949*. https://eticaret.mta.gov.tr/index.php?route=product/product&product_id=1962.
[42] S Yona Waksman and Çiğdem Girgin, 'Les Vestiges de Production de Céramiques Des Fouilles de Sirkeci (Istanbul). Premiers Éléments de Caractérisation', *Anatolia Antiqua* 16, no. 1 (2008): 458, Fig. 25, 30.
[43] Waksman, 'Byzantine Pottery Production in Constantinople/Istanbul: Recent Excavations and New Issues Regarding the Diffusion of Models and Techniques', 72.

5.2 Ornamental Attributions

5.2.1 Decorative Painting

As Sanders states nicely, CGWW decoration relies dominantly on glaze painting and its tonal variations.[44] In the Glazed Painted Decoration, especially, Polychrome Ware surely represents the most elegant artisanal works with a highly artistic expression which reflects its uniqueness in Byzantine Pottery. Scholars often praise this peculiarity, but the credit given to both its delicacy and meaning could not be defined better than by Zalesskaya's words:

"…a relatively rare but artistically most elaborate species…this pottery as a clear culturo-historical phenomenon."[45]

I shall save my opinion about the second half of the above statement for later and, now, begin with its main challenge: rareness. On one hand, this rarity bestows its artistic value, and on the other, it hardly contributes to its chronology at archaeological sites. Despite the being one of the products of the capital, its presence or absence has not been considered "a good chronological criterion," as Stevenson indicates,[46] at the excavations in Istanbul. Though an absolute chronology highly depends on new discoveries, the contribution to the classification and the chronology of Polychrome Ware that Sanders made at Corinth is praiseworthy. His unorthodox assessment that Polychrome pottery was a product of the 11th and 12th centuries contradicts with the traditional, as follows below.

The traditional attitude is to date Polychrome Ware to the 10th century according to the similar/identical decoration which was shared by the polychrome ware and the tiles. Talbot-

[44] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 250.
[45] Zalesskaya, 'Byzantine White-Clay Painted Bowls and Cylix-Type Cups', 215.
[46] Stevenson, 'Chapter II, The Pottery 1936-37', 44.

Rice is the first scholar who used this approach to date Polychrome Ware to the 10th century by the help of the analogy that he made with the tiles of Patleina, Bulgaria. The reference date that he uses was suggested by A. Grabar who dated the plaques of the Simeon Church to 907 CE based on the associated coin evidence. Therefore, Talbot-Rice has no dispute with using the ninth century dating for Polychrome Ware at Constantinople, yet, he was not convinced that the Bulgarian counterpart was the source of those produced at the capital.[47] Later, he revised this date since he thought this pottery type reflects the characteristics of the patronage of the court and suggested to date Polychrome Ware between 843 and 1204 CE.[48]

Nevertheless, Sanders reasoned against Grabar's problematic dating and refuted it by re-examining the related coins. He discovered that most of the coins that Grabar used to date the church are actually from the first half of the 11th century.[49] In his Ph.D. Thesis, Sanders divides the Polychrome Ware into four classes, Groups 1-4.[50] Later, in the article, he revised this classification and produced three types, Types 1-3,[51] based on decoration and form, and also three fabric groups that have already been discussed in Chapter one and two. As mentioned earlier, Sanders thinks that Polychrome Ware is a phenomenon of the eleventh and twelfth centuries; therefore, his propositions for the earliest date of the Types fall in the mid-eleventh century. Sanders's well-established chronology is supported by coin evidence and the analogy made with findings of other sites. Though his suggested dating for Type 2, the middle to third quarter of the eleventh century, may well define the sherds found at Corinth, it highly contradicts with the following assessments.

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[47] Talbot-Rice, *Byzantine Glazed Pottery*, 17–18 p.17 footnote 1.
[48] David Talbot-Rice, 'Byzantine Polychrome Pottery, A Survey of Recent Discoveries', *Cahiers Archéologiques* VII (1954): 77.
[49] Sanders, 'Byzantine Polychrome Pottery', 98.
[50] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 71–74.
[51] Sanders, 'Byzantine Polychrome Pottery', 91–98.

The artistic and also typological comparison suggest a date centring on the ninth and the tenth centuries, which is also suggested by myself for the earliest class (Class I), of the Polychrome Decoration, Chapter four, part one (pl.16). V. Zalesskaya suggests the ninth century date for the cups which are accentuated by a brown painted cross which is depicted on the floor. A barrel-shaped body with a conical neck, ring handles and also the cross motifs on the floor are characteristic features of this type which was widespread in Byzantium during the eight and the ninth centuries.[52] Zalesskaya mentions that these cross-bearing cups were brought to the Byzantine Empire by the artistic influence of Barbarians (Avars). In the seventh and eight centuries of Eurasian steppes, these cups were used as cult objects by which a mixed substance, milk and honey, was offered to "newly-baptised Barbarian nobles after Eucharist and Anointing."[53] She adds that not only does the function of the cups pertain well to the church rituals, but also the so-called Iconoclastic cross, cross recrossed type, of the eighth and ninth centuries, depicted inside the cups suits the restricted decorative repertoire of the period.[54] The ninth century proposition of Zalesskaya seems to correspond to other close chronological suggestions from the sites in Constantinople, Greece, Bulgaria, Russia and the Crimea. However, the suggested dates cover a period of two or three centuries. The cups from Cherson, Sarkel and Mesembria are dated to the ninth and tenth centuries; the Great Palace, Novgood and Preslav are dated to the tenth century; Corinth,[55] Thessaloniki, Kerch and Taman are dated from the second half of the ninth century to the early eleventh centuries; Dinogetia and Athens are dated to the tenth and eleventh centuries.[56]

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[52] Zalesskaya, *Masterpieces of Byzantine Applied Art. Byzantine Ceramics of the 9th – 15th Centuries, Catalogue of the Collection*, 28.
[53] Ibid.; Zalesskaya, 'Byzantine White-Clay Painted Bowls and Cylix-Type Cups', 222.
[54] Zalesskaya, 'Byzantine White-Clay Painted Bowls and Cylix-Type Cups', 220.
[55] This date is suggested by C. Morgan. Later, Sanders redated the similar cups in his Type 2 in the middle to the third quarter of the 11th century.
[56] Zalesskaya, 'Byzantine White-Clay Painted Bowls and Cylix-Type Cups', 216.

The tenth century date which is proposed for Class I in Chapter four is not only based on the analogy of the cups mentioned above, but also the similarity in the use of the same brown colour in so-called Red Brown Painted Ware, (see Brown-slip Painted Decoration). The earliest examples of this group can be found at the Great Palace Stage IV. These sherds were found together with Polychrome Ware at these strata which can be dated to the early ninth and the late tenth centuries by the associated coins.[57]

A few other colours in Class I demonstrate its relationship with following classes, specifically Class IIa and IIIa-b, of Polychrome Painted Decoration. For instance, a warm yellow or amber is the commonest colour in Class IIa and the second most common is the blue-green. Though turquoise, which is a product of an alkaline-rich glaze,[58] is only represented by a single cup in Class I (pl.16.11), it illustrates the relation of the class with Class IIb. What is really interesting about this piece is not the colour but the suggested date for it. This cup is a recent discovery from the cathedral of the city called Xanthos, in Lycia and studied by P. Armstrong.[59] With the help of the archaeological evidence, Armstrong suggests a date from the late seventh to the early eight centuries. This proposition not only moves the date about 100 years before the traditional one, but it also is 300 years removed from Sanders's suggestion. On the other hand, based on the similarity in the fabric and also the decoration, M. Mango suggests that polychrome tiles and polychrome wares were decorated in the same workshop.[60] One rare and the earliest secure date for polychrome tiles is the tenth century date of Lips Church.[61] But, Mango thinks that the chronology of Polychrome Ware can restructure Polychrome Tiles. Yet, Mango only overviews some of the above-mentioned suggestions and

57 Stevenson, 'Chapter II, The Pottery 1936-37', 43–44.
58 Armstrong, 'From Constantinople to Chersonesos and Lycia: Polychrome White Ware Cups', 10.
59 Pamela Armstrong, 'Byzantine Polychrome Ware: A Class Apart', 2018, 20.
60 Mundell Mango, 'Polychrome Tiles Found at Istanbul: Typology, Chronology, and Function', 29.
61 Ibid.

can neither propose a specific date nor adopt Sanders's proposition for the tiles,[62] which is late concerning the tile production assigned to the capital.

My chronological suggestion, on the other hand, stands in between and centres on the middle tenth to the late eleventh or early twelfth century for Class I-IV (Chapter four, Part one). I mostly rely on Hayes's[63] and also Sanders's[64] coin associated evidence. However, the focus given to the mid-tenth and the late eleventh century is also based on a decorative analogue with a group of Medieval Islamic Ceramics, namely Buff Ware or Nishapur Polychrome Ware and Samanid Epigraphic/Inscribed Ware, from Iran (see below). While the chronology for Byzantine Polychrome Decoration remains disputed, Y. Waksman's statement below on a technological point is worth considering to identify the kiln type and possible location of the workshop for Polychrome Ware.

"If we follow Sanders's chronology, the Polychrome White Ware and the kilns with bars would have appeared in Byzantium at the same time. At any rate, it is probably not by chance that these two "Islamic" features in pottery techniques would have coincided, at least partly."[65]

According to Waksman, the kiln with bars at Vezneciler is a structure which is possibly a kiln, dated to the eleventh and the twelfth centuries. The reference samples, from this workshop, which are the kiln bars, show that they are chemically alike to Glazed White Ware II and also some examined Polychrome Ware. Nevertheless, Waksman states that this fact

[62] Ibid., 32.
[63] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 35.
[64] Sanders, 'Byzantine Polychrome Pottery', 98.
[65] Waksman, 'Byzantine Pottery Production in Constantinople/Istanbul: Recent Excavations and New Issues Regarding the Diffusion of Models and Techniques', 76.

does not prove the manufacturing of Glazed White Ware in the kiln at Vezneciler, but it does suggest these bars and White Wares are made of the same kaolinitic clay which is located Istanbul.[66] Waksman follows:

"As the most elaborate category of Byzantine White Wares, Polychrome White Wares were the subject of several archaeometric studies, carried out by Anne Bouquillon, Julie Lauffenberger, and others concerning mostly architectural ceramics kept in museums in France and in the USA (Louvre and Sevres Museums, Walters Art Gallery, and Dumbarton Oaks Collections) Some of them are spectacular by their motifs, such as iconographic representations, and by the richness of their decoration, sometimes enhanced by gilding. These archaeometric studies showed that they present a remarkable variety in the pigments and glaze recipes, unknown in the other Byzantine glazed wares investigated so far. Their glazes are not only of the high-lead, but also of the lead-alkali and alkali types, sometimes combined on the same objects. These glazes give access to a wider range of colors, such as turquoise green, a hue otherwise absent from the Byzantine repertory but very common in the Islamic world. In addition to stylistic connections, turquoise colors and glaze recipes including alkali fluxes, and cobalt pigments, are some of the features which lead us to consider Polychrome White Wares as a technological link between the Byzantine and Islamic worlds."[67]

Waksman sees Glazed White Ware as a notable hiatus with Late Roman ceramic repertoire by correlating it with the emergence of the medieval advancement of glazes in Byzantium.[68] Regarding the above assessment on the glaze technology, not only the variety of glazes (high-lead, the lead-alkali and alkali types), but also the content of the glaze recipes (alkali fluxes, cobalt pigments and also the presence the turquoise colour) in Polychrome Ware are the technological link between Byzantine and Islamic Ceramics, besides the stylistic commonality. The fact of these similarities will surely be enlightened by further analytical

[66] Ibid., 72–73.
[67] Ibid., 75.
[68] Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', 129.

works; however, two treatises mentioned in ancient sources seem to be helpful to gain an idea of the preparation, application and also the firing stages of the White Ware pottery.

De Coloribus et Atribus Romanorum written by Eraclius (or Heraclius) in the tenth and the twelfth centuries, and in Theophilus's *De Deversis Artibus* (the eleventh century) give clues of producing and colouring glazes on pottery. Eraclius includes a recipe to make a base of glaze, which is similar to the second route mentioned by Tite et al.,[69] by adding flux to the ground glass and suspending it in water.

"If any one wish to paint vases with glass, [let him grind Roman glass well on marble, and when it is like dust, let him paint earthen vases with it, with the clear fatness of gum, mixed with spring water; and when dry, send them to the furnace. Let the earth (clay) be good, so as to stand the fire; and at length he will take out of the furnace shining vases good enough for kings.] Let him choose for himself two stones of red marble, between which let him grind the Roman glass, and when it is pulverized as fine as the dust of the earth, let him make it liquid with the clear fatness of gum. After this let him paint the vessels, which the workman has finely moulded in clay, when they are dry, let him put them into the furnace. And let him take care to put them into [vessels of] good clay, that they may thus be able to check the heat, and make them shining with perfect beauty."[70]

Theophilus's account below describes a way of producing and applying the colours which suits the Polychrome decoration of CGWW. Additionally, the way that Theophilus describes

[69] Tite et al., describe three commonest routes to produce transparent high lead glazes. In the first and simplest method, a lead is used by itself in suspension with water. In the second method, a lead compound is used in suspension with silica in form of sand or ground quartz, chert pebbles or salicaceous clay. The third method comprises two steps: the first step is to fire a lead and a silica together to produce frit, and in the second step, the frit is ground to prepare for being used in the suspension. Michael S Tite et al., 'Lead Glazes in Antiquity-Methods of Production and Reasons for Use', *Archaeometry* 40, no. 2 (1998): 248.

[70] Mary Philadelphia Merrifield, *Original Treatises: Dating from the XIIth to XVIIIth Centuries on the Arts of Painting, in Oil, Miniature, Mosaic, and on Glass; of Gilding, Dyeing, and the Preparation of Colours and Artificial Gems; Preceded by a General Introduction; with Translations, Prefaces, and Notes*, 2 volumes (John Murray, 1849), 184–86.

the firing stage may also indicate that Polychrome Ware might have been fired in glass furnaces rather than a pottery kiln.

"They likewise make earthenware basins and small vessels and other fictile vases, painting them in this manner. They take all kinds of colours, grinding them singly with water; and mixing with each colour a fifth part glass of the same colour, very finely ground by itself with water, they paint with it circles or arches or squares, and in them beasts, birds, or leaves, or any other thing they may wish. After these vases have been painted in this manner, they place them in the furnace used for window (glass), and applying a fire of dry beech-wood below them until they are surrounded by the flame; and thus, the wood being taken out, they close the furnace. The same vases can also be decorated in places with gold leaf, or with ground gold or silver, if they wish, in the above-mentioned manner."[71]

To suggest that Polychrome Ware was fired in a glass furnace rather than a pottery kiln, one surely needs more physical evidence which must be proved by archaeological data and archaeometric analysis. However, that such rarity is mentioned in the beginning of the discussion implies that Polychrome Ware was treated differently than other abundantly produced table wares. Hence, it separates them by making them close to a special workshop which would also be manufacturing White Ware Tiles, as Mango suggested, according to the alikeness in motifs and designs.[72] Probably, this workshop had an environment with a certain favourable condition and the knowledge of the different glaze recipes; otherwise, we would have classified Polychrome Painted Decoration as a common treatment if other workshops had the same advanced expertise.

[71] Robert Hendrie, 'An Essay upon Various Arts in Three Books, By Theophilus, Called Also Rugerus, Priest and Monk, Forming an Encyclopaedia of Christian Art of the Eleventh Century' (John Murray, 1847), 135–37.
[72] See shared motifs and designs between wares and tiles in Mundell Mango, 'Polychrome Tiles Found at Istanbul: Typology, Chronology, and Function', 29–33.

Therefore, Theophilus's account is valuable as it suggests to follow the clues of the similarities in the description of a specific motif repertoire and designs on vessels and the glass furnace used in manufacturing. While the motifs, circles, arches or squares, may refer to the designs which were executed by the rims or inside the panelled sections, the additional depictions inside these bordures, such as beasts, birds or leaves may point to the proudly standing adornments in vessels' tondo in Class IIa-b, (pl.17-21). Leaving this argument to further works, there is one last point that I feel obliged to make about the glass furnace which is allegedly located in the Tekfur Palace (Tekfur Sarayı), which is known to be the only preserved Byzantine palace, of the Blachernae Palace complex, in Istanbul which was built in the fourteenth century.[73]

The exact location of this furnace at the palace complex is unknown, but according to travellers' accounts, it was use in as late as the early nineteenth century.[74] Considering this contemporary date, the lost glass furnace may not seem an interesting case; however, the older kilns discovered there definitely of interest. Vroom has already suggested Tekfur Palace to be a possible provenance for Glazed White Ware.[75] On the provenance issue, Yenişehirlioğlu states that the archaeometric analysis on whiteware ceramics unearthed at the kilns shows resemblance with the other workshops, especially in Eyüp, and the Ottoman Ceramics also bear similarities with Byzantine White Ware.[76] Nevertheless, the author highlights the fact that none of White Ware pottery was found at the kilns. Therefore, their presence only provides evidences for their consumption at the site.[77]

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[73] Filiz Yenişehirlioğlu, 'Les Fours et La Production Des Céramiques Du Palais de Tekfur à Istanbul', in *Actas Del VIII Congreso Internacional de Cerámica Medieval*, vol. 27 (Ciudad Real-Almagro, 2009), 618.
[74] Ibid., 619.
[75] Vroom, 'Ceramics'.
[76] Yenişehirlioğlu, 'Les Fours et La Production Des Céramiques Du Palais de Tekfur à Istanbul', 630.
[77] T. Karaöz, 'Tekfur Sarayi Çini Firinlari Kazilari ve Müzeleştirme Çalişmalari - Filiz Çalışlar Yenişehirlioğlu', n.d. https://www.youtube.com/watch?v=DSHanWjxaPk (1:08:08).

The excavations in the courtyard, which is the oldest part of the complex, revealed ceramics from the tenth to eleventh century and also an unidentified group which is dated to the fourteenth century.[78] Sadly, these ceramics have never been a subject of any studies. Archaeometric analysis of these Glazed White Ware (probably Hayes's II and IV) and those which are dated to the fourteenth century which could potentially help in solving the provenance issue. Armed with this analysis, we could better discuss if Eyüp could be the provenance of the kiln with bars at Vezneciler and also the chemically associated Glazed White Ware II and Polychrome Ware.

Returning to the discussion on the decorative influence of Islamic Ceramics on Glazed White Ware, I earlier suggested a decorative analogue to date Class II-IV by centring on the middle tenth to the late eleventh or early twelfth century. Before taking this discussion further ahead, I would like to add my opinion on the emergence of Polychrome Decoration in White Ware pottery. As a reminder, my classification includes a class which I prefer to call "the earliest Polychrome Ware," Class I. This class includes rare instances which barely have a second or the third colour. As pointed out in the Methodology, I would include this class with B. Bichrome and Trichrome Painted Decoration, but it is included in Polychrome Decoration to conform with the previous studies.

Though vessels are usually fragmented, I recognise the difference between Class I and Class II whose colour palette helps in setting a line between these two classes. That does not necessarily mean Class I and II are different; in fact, their designs are almost identical. But, if one pays attention to Class I, the brown lines on cups are doubled to fill, as in Class IIb. Therefore, it is possible that Class I includes unfinished examples of Class II. However,

[78] Yenişehirlioğlu, 'Les Fours et La Production Des Céramiques Du Palais de Tekfur à Istanbul', 618–19.

considering the remnants of the second colour in some examples (pl.16.5, 9-10, 12b), I am inclined towards to think that Class I represents a product of transition, from Brown-slip Painted to Polychrome Painted Decoration. Hence, I suggest a date centring on the mid-tenth and the late tenth century (Stevenson's Stage IV, where they both were found together). This is based on a similarity in forms and the decorative similarity between Brown-slip Painted and Polychrome Class I. My suggestion serves to explain how iron and copper oxide were added to the colour scheme of Polychrome Decoration. Green and brown colours were already used in slip form in Brown-slip Painted Ware. Therefore, Class I can be seen as a "trial" of the polychromatic glaze technique in which green and brown were transferred from coating (slip) to the colourant (glaze).

Regarding Islamic influence in CGWW, one of the questions is the source. Copying an original vessel seems impossible and, as mentioned by François, the instances of Islamic Ware found at Constantinople are rare and also late for Polychrome Painted Decoration, which is dated to the twelfth and the thirteenth centuries.[79] As stressed earlier in Chapter one, François agrees with Grabar that the source of the decorative elements in Polychrome Painted Ware is clearly Sasanian, and is in fact, a revival of the Late Antique Sasanian influence on the Macedonian Dynasty. The silk textile and metal work were counted as the source of the motifs. As a source of nobility, the heraldic animals, hunting scenes and even vegetal motifs can be assigned to Sasanian origin; however, it is not convincing to associate the components of the decoration which are defined by designs and styles.

For instance, I suspect for any media we can relate the red dotted background detail in Class IIIa-b to Sasanian Art. However, a contemporaneous group of pottery was the so-called Buff

[79] François, 'La vaisselle de table à Byzance', 6.

Ware (or Nishapur polychrome ware) from Nishapur, Iran, this curious stylistic feature can be linked (Pl.35.2). Buff Ware media is immensely wide, contrary to Polychrome Ware, and one can satisfyingly find more commonest features than here in this thesis which presents a brief introduction to a more corresponding source to the foreign influence in "Byzantine Glazed White Ware" pottery.

Firstly, Buff Ware uses a similar colour palette to that of Polychrome White Ware which is yellow, green and brown/black. Bordures, motifs and figures are outlined by brown/black and infilled with green and orange-red on a yellow background which is similar to Class IIa. The decoration of Buff Ware similarly falls into two categories: animated forms with animal and human figures, and inanimate designs with vegetal and geometric motifs and some intricate patterns.[80]

Secondly, an attractive shared feature between Constantinopolitan White Ware and Buff Ware from Nishapur is themes in the decoration. Pancaroğlu argues that the imagery on the plates helps to identify the iconography on the Nishapur polychrome ware which is related to a feasting context. Themes are broad but they are mainly related to Iranian traditional feasting. Inside the animated designs, a horse carrying a cheetah (pl.35.5) is a particularly important image that we can see a parallel example on Polychrome Painted Decoration (pl.35.6). These images recall the courtly hunting with trained animals in Sasanian imperial tradition, says Pancaroğlu.[81] The human figures, animals and birds in Nishapur polychrome ware are not unique and are also common in the contemporaneous Lustre Ware (see below) in Iraq and

[80] Charles Kyrle Wilkinson, *Nishapur: Pottery of the Early Islamic Period* (Metropolitan Museum of Art, 1973), 4.
[81] Oya Pancaroğlu, 'Feasts of Nishapur: Cultural Resonances of Tenth-Century Ceramic Production in Khurasan', *In Harmony: The Norma Jean Calderwood Collection of Islamic Art*, 2013, 9.

Egypt.[82] The typical yellow background, on the other hand, may be seen as an imitation of the gold or silver vessels with gilt decoration of Sasanian Art. The imitation of the metal works shows itself on ceramic surfaces in the copied overglaze technique of lustre painting.[83]

Thirdly, the designs are common. A central medallion bears an animal inside which is encircled by double or triple panelled bordures on which rinceau and floriated-kufic designs are painted in a similar order as in Polychrome Decoration (Appendix 5). As mentioned above, the small red dots on figures and also on the background are shared characteristic features which can be seen in Class III of Polychrome Decoration.

Furthermore, the stylistic alikeness on a small group of vessels shows an oriental effect which is quite intriguing because it is unique in Byzantine Art. It achieves a rare style perhaps referring both to the origin of the animals and the origin of the artistic interpretation and even maybe the artist's own place of origin (Appendix 6). The S-shaped forms on the body parts of the animals and the half palmette ending details show that they are unrealistically but highly decoratively painted common ornamental features. Last but not least, the pseudo-kufic characters (pl.35.3) which are painted on the exteriors of small cups where this decorative element is almost identically depicted.

The revaluation of the Polychrome Decoration revealed two different kinds of pseudo-kufic ornamentation used on vessels. The first kind is "floriated kufic style" which consists of antithetically depicted half-palmettes connected to each other with an angled U-shaped stem. In between, usually a drop and S-shaped or three pointed palmette-like motifs are depicted together with other surrounding complementary forms (in Polychrome Painted Decoration,

[82] Wilkinson, *Nishapur: Pottery of the Early Islamic Period*, 3.
[83] Pancaroğlu, 'Feasts of Nishapur: Cultural Resonances of Tenth-Century Ceramic Production in Khurasan', 9.

Class IIIb, a-b). The combination of vertical, angular and horizontal forms makes it fit nicely in the borders of the polychrome vessels of which the function of the pseudo-kufic characters is purely ornamental. The second kind, on the other hand, is the "cursive kufic style." This style is used as a decorative tool as in the previous kind; however, it is likely mimicking the original Kufic script. Including all other sorts of media in Byzantine Art, there is no doubt that the pseudo-kufic characters in the Polychrome Ware are of Islamic origin. However, the use of pseudo-kufic in Byzantine decorative arts is found to be merely decorative. The cylindrical body on a columnar base and the angular pseudo-kufic script inside the double border on the polychrome cup (pl.25.8) is almost identical with a bowl, Lustre Ware, which was possibly produced in Syria in the late 11th and early 12th centuries.[84]

The imitation of Lustre Ware in a group of locally produced eleventh century ceramics in Athens and Corinth has already been noted by François.[85] A similar, but less apparent, treatment exists in Constantinopolitan Glazed White Ware as well. However, the alikeness is not necessarily demonstrated by an artistic imitation of the motif repertoire; rather it may simply lie in the colour which seems to be the target. The golden-metallic shiny brown imitation of Lustre Ware in Glazed White Ware is not known. An orange brown is defined darker; therefore, scholarship tends to call it brown. However, the lusterware imitation seems to exist in a form that is briefly discussed in Chapter three. PAR 26 (Vol. II, Table 1) is just a representative of a group of pottery (see Chapter three) which I do not intend to discuss here materially. However, this sample supports my argument on the technological influence of Islamic Ceramics existing in Glazed White Ware. The PAR batch, which contains Sulphur (S)

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[84] Inv. No. 13584 ع, Earthenware, Fatimid: Origin: Syria, possibly Raqqa or Tel Minis. Mona al-Moadin "Bowl" in *Discover Islamic Art,* Museum With No Frontiers, 2021.
Source: [http://islamicart.museumwnf.org/database_item.php?id=object;isl;sy;mus01;19;en&cp]
[85] François, 'La vaisselle de table à Byzance', 9.

and Arsenic (As) and Tin (Sn), corresponds to sulphur and arsenic sulphide which is similarly used to produce Lustre Ware in the Middle East.[86]

The PAR 26 sherd falls in Stevenson's B 4b-c and Hayes's GWW III which is dated to the mid-eleventh and early twelfth centuries.[87] The odd nature of GWW III emerging after well-defined GWW II gives the reason why this short-term produced Glazed White Ware type has never been understood clearly. But a particular feature that Hayes immediately suspected is an alkaline element in the glaze and its unusual application which is reminiscent of Islamic Ceramics.[88] Since GWW III is "a riddle wrapped up in an enigma," no one can explain the inconsistency in its odd presence and unheralded vanishing from the Byzantine Ceramics. From my point of view, its unluckiness is to be contemporaneous with Polychrome Ware which is the most elegantly executed type of Glazed White Ware pottery. Hence, the "careless" application in the polychromatic glaze of GWW III seemed less worthy. Since Hayes's work pays little attention to it, our knowledge rests on what his book says about this class:

"These would all appear to be the products of a number of smallish pottery-making centres, perhaps not all in the immediate vicinity of the city. Henceforth, the GWW II factories had to compete for their market."[89]

[86] Pradell et al., 'Composition of the Lustre Pigment Used in the Production Of 13th Century AD Raqqa Lustreware from Syria', 983, 985.
[87] See Chapter four, Part three, Late-glazed White Ware Decoration. For classification, see also Part one Monochrome and Bichrome, and Trichrome Painted Decoration, especially, Green/Blue and Brown Painted Decoration.
[88] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 29–30.
[89] Ibid., 30.

Stevenson's account in B Series (4b-c) is slightly descriptive. His effort to treat ceramics with a combined methodology, archaeological and art historical, is helpful to correlate what revealed by PAR 26 about the glaze colour and its relation with Lustre Ware imitation in Glazed White Ware Pottery. However, to correctly interpret monochrome and polychrome GWW III, more sampling has to be done. Nevertheless, the quotation below directs attention to "gold leaf" and "gilding" which are the clues to both the colour and the imitated decorative components.

"A unique sherd is part of the base of a very delicate small bowl which is glazed white (Pl. 19. 14). The inside had a quincunx of squares in gold leaf. The outside of the base-ring was also gilded."[90]

Stevenson's B 4a and Hayes's GWW IV involve the group called Green and Brown Painted Ware in Bichrome and Trichrome Painted Decoration. Hayes states its relationship with previous classes and, therefore, he thinks that it should be considered to be part of the local white ware production. This class is the commonest type at Saraçhane from the mid-12th to the early 13th century. Hayes mentions that the earliest instances which are decorated black and green stripes are similar to those of some earliest red ware examples.[91]

Green and Brown decoration is a common treatment for both white ware and red ware through the twelfth and the middle thirteenth century.[92] The red ware counterpart was called

[90] Stevenson, 'Chapter II, The Pottery 1936-37', 49.
[91] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 30.
[92] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 65.

Early Sgraffito (B1) by Talbot-Rice[93] and Green and Brown Painted Ware by Morgan and[94] Red-bodied B Series (B1) by Stevenson.[95] Morgan divided Green and Brown Painted Red Ware into five groups, I-V, and later Sanders revised it and divided into three styles, I-III, and separated the group called "Spiral Style."[96]

While various similarities can be listed between Green and Brown Painted white ware and red ware, two technical differences can be distinguished. The red ware is first slipped and the green and brown design is combined with incisions. These two steps are lacking in Green and Brown Painted White Ware. The blurred lines in Style I, geometric and single large motifs in Style II, and animal figures, vegetal motifs and geometric patterns in Style III are similar to the motifs in white ware. Finally, the Spiral Style in which large spirals either are depicted alone or in a combination of various geometric forms are similar to those in A2.B2.a, namely Abstract, Geometric and Vegetative Style. However, in one instance Sanders mentions that kufesque motif is uncommon to Green and Brown Painted White Ware.

5.2.2 Decorative Technique

The Incised Design in the Carved Decoration is enlivened in two different styles on Glazed White Ware pottery: Plain-incised and Elaborated-incised Design which are dated to the late 7th to the 9th and the late 11th to the early 12th centuries. Though the suggested dates seem to offer a gap, the incised decoration continued to be applied on the surfaces as a complementary technique without any interruption until the end of the latest GWW II in the 12th century.

[93] Talbot-Rice, *Byzantine Glazed Pottery*, 45–48.
[94] Morgan, *The Byzantine Pottery*, 11:70–72.
[95] Stevenson, 'Chapter II, The Pottery 1936-37', 50–55.
[96] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 65–66.

The earlier design, Plain-incised, involves usually plainly executed shallow lines composing vegetative motifs, geometric forms and also animal figures which are usually isolated and rarely standing in compositions. As a complementary decorative treatment, it is used along with the decorative painting and other decorative techniques, such as moulding and sculpting. In the Plain-incised Design, the lines seem to be cut through the surfaces by a single or doubled wavy or zig-zag lines over and outside of rims and inside in narrow bands and also incised grooves below rims and below lips inside. It is also used to highlight body features on the figures' faces and bodies in Relief Sculpture Design.

The Elaborated-incised design, on the other hand, has a different arrangement than the Plain-incised Decoration. Vertically, horizontally and radially arranged lines create usually a hatched rhombus on the interior walls. One particular difference in its use is to highlight the forms or to create perception of space in the background in Splash Design, which rarely occurs in elsewhere. In a variant which is painted with the Plain-glazed, the brown colour is either used inside the incised forms as an infill on the main motif and also the beads over the rims, or it covers the whole surface. However, the Elaborated-incised design is only more elaborate compared to the earlier incised design. In the eleventh century, the incised design evolved into a better executed form in red fabric which is coated with a white or whitish slip.[97] Sgraffito Ware or with a new alternative name MBP (Middle Byzantine Pottery) includes various groups with different sgraffito designs, such as Fine Sgraffito, Painted Sgraffito, Incised Sgraffito or Aegean, Champlevé, Slip-Painted and Brown Painted Ware which were produced from the mid-twelfth to the mid-thirteenth century.[98]

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[97] Demetra Papanikola-Bakirtzi, 'Byzantine Glazed Ceramics: The Art of Sgraffito', 1999, 18.
[98] Waksman, 'Defining the Main" Middle Byzantine Production"(MBP): Changing Perspectives in Byzantine Pottery Studies', 379, 414.

When they are compared, many similarities and also differences can be listed between the incised design of White Ware and sgraffito of Red Ware. However, I think the main difference is that the former is complementary for painted or moulded figures, but the latter is used to create the forms of the decoration. Therefore, it is understandable why incised design disappeared when Relief Decoration came to end. Later, sgraffito was still used with Green and Brown Painted Red Ware, but the white counterpart was never been used together with incised. This sets a clear difference between the incised and sgraffito designs in the Middle Byzantine Period. While the former is secondary, the latter is a primary design in Carved Decoration.

Judging by the small quantity of so-called Petal Ware, it can be said that Petal Design is the second least frequently used decorative technique in Relief Decoration. The decoration consists of small oblong shaped clay pellets arranged in rows on the exterior of closed shaped vessels, lids and cups. To create a colourful effect on the surfaces, white, pink and red clays are adjoined alternately. Together with the applied glaze, this arrangement results in a fair variation in style, such as one or two bands of dark brown alternating with white/cream bands or orange alternating with yellow. Though these styles represent a common feature, a single example illustrates no alteration at all (see below).

The source of the decoration is problematic. Morgan mentions a similarity in the motif which was found in the eighth century vessels in Sardinian and Roman tombs and he assigns the presence of petal decoration in Byzantine pottery to the ninth century.[99] On the other hand, while Talbot-Rice remarks on the Roman ancestry of the petal technique,[100] Stevenson sees no connection, particularly in glaze, stating that Isaurian glaze is simpler but has more variety

[99] Morgan, *The Byzantine Pottery*, 11:40.
[100] Talbot-Rice, *Byzantine Glazed Pottery*, 20–21.

in colour than Roman glaze.[101] Waksman's study, on the other hand, states that the earliest Glazed White Ware (GWW I) has a high-lead glaze and it is not well integrated with the later groups which contain particularly high aluminium content. Therefore, GWW I share the general features in glaze with some vessels which were manufactured in Late Roman cities in the Balkans.[102] Furthermore, the comparative analysis shows a very good correspondence between GWW I and Italian *vetrina pesante.*[103] Nevertheless, Hayes does not agree on copying or borrowing the decorative technique from a Roman source, especially from Forum Ware, since the petal technique has yet to be attested in the earlier phase of the GWW I.[104]

Talbot-Rice's inclination that the source of the style is Roman may seem reasonable considering the similar petal-like decoration on the surface of the Late Roman pottery called *ceramica a vetrina pesante* (CVP) and later so-called Forum Ware. Similarly, the jugs with petal decoration from Constantinople were compared with the similar jugs of Forum Ware, which were unearthed in the *Lacus luturnae* in the Roman Forum, by Wallis and Bode.[105] A thick, single fired, lead glaze applied on petal-like sherds, such as pots and chafing dishes of CVP, dated to the fourth and fifth centuries, has been unearthed in Northern Italy, and similar glaze technique and decoration on the pottery finds belong to Forum Wares in Rome, the eighth century.[106] However, some stratified deposits from the Santa Cornelia in Etruria and Crypta Balbi at Rome yielded examples of Forum Ware which are dated from the late eighth

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[101] Stevenson, 'Chapter II, The Pottery 1936-37', 58.
[102] Waksman et al., 'The First Byzantine "Glazed White Wares" in the Early Medieval Technological Context', 130,132.
[103] Ibid., 134.
[104] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 15.
[105] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 237.
[106] D'amico, 'Byzantine Finewares in Italy (10th to 14th Centuries AD): Social and Economic Contexts in the Mediterranean World.', 93.

to early tenth centuries[107] which corresponds to the suggested date for Petal Design, mid-eighth to tenth centuries.

Despite this contemporaneity, what is unique to Byzantine Petal Design is the decorative technique and the style of the petals which are different from CVP and Forum Ware. The common feature of the decoration is clay pellets on the outer surface. In Petal Design, these pellets are executed elaborately and positioned in rows in contrast to ones in CVP and Forum Ware that show pellets that are irregular and randomly arranged. This statement is also supported by Sanders's comment on the difference between Constantinopolitan Petal Design and Petal Design in earthenware at Corinth. Sanders mentions that the petal design on the earthenware sherds is comparable with the Italian Forum Ware with "closely packed but widely spaced" petal forms. Also, he underlines the difference of the Constantinopolitan petal decoration by noting that it is "uncommon and applied sparsely."[108]

Also, the style of the pellets or petals appears in different forms. Though the pellets on CVP and Forum Wares are various, the ones in Petal Ware show only two different styles. The first one is the fattish oblong pellets which are arranged either upwards or downwards from top to bottom or vice versa. The pellets produce horizontal bands and over them is the glaze which usually alternates between yellow and brown colours. The second style is to form the pellets in a leaf shape on which the nervures are emphasised by scratches. The latter is rare, and as is stressed earlier, it has been noted only among the findings of the Great Palace and Saraçhane. The prototype of this style is thought to be Roman by Talbot-Rice.[109]

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[107] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 237.
[108] Ibid., 62.
[109] Talbot-Rice mentions an elaborate example of this style from the Roman period which is kept in the Museum of Pompeii; Talbot-Rice, *Byzantine Glazed Pottery*, 10.

Other than the decorative style of Petal Ware, a rare example from Corinth excavations demonstrates that the petal technique was applied in pure white fabric as well (pl.30. 4a). This Constantinopolitan export jug shows a particularly different glaze application with its mottled light green colour with brown tinges on the whole surface without any alternation. However, the design of the pellets is similar to the oblong ones except looking flatter as if they are incised rather than lumped. This flattish petal forms also occur amongst the Great Palace finds, as mentioned in D2. Middle-Glazed White Ware Decoration in Chapter Four, Part three. According to Talbot-Rice,[110] this treatment seems "careless" and lacking the required attention in to save time during this sort of fine craftsmanship.

The Moulded Relief Design or so-called Stamped Ware,[111] Impressed Ware[112] and Relief Ware[113] is a group which is decorated with sculpted forms in low-relief on the interior. The animated motifs of the moulded relief include realistically depicted human and animal figures. Birds, horses, lions or a group of fantastic or heraldic animals, such as griffins and eagles are also usually depicted. The inanimate group includes crosses, flower-like designs, geometric forms as well. Besides that, abstract forms or even a depiction of a church are the subjects of rendered motifs. The motifs are executed in low-relief standing on the centre of the interior of vessels in two different styles: Centric Relief Style and Slotted-Circle Style. Also, two variants exist where Moulded Relief Design is combined with the Brown Slip-Painted Decoration and the Elaborated-Incised Decoration.

As I suggested, Moulded Relief Decoration is usually dated to the late 9th and the early 12th centuries. Sanders suggests a typological change in the design from which the 10th century is

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[110] Ibid., 20.
[111] Waagé, 'The Roman and Byzantine Pottery', 321.
[112] Talbot-Rice, *Byzantine Glazed Pottery*, 25; Morgan, *The Byzantine Pottery*, 11:42; Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 19.
[113] Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 77.

limited to a Centric Relief Style that is shallow with motifs that are often indistinguishable due to blurring and poor stamping. Later, the relief design is extended over the interior surface with the Slotted Circle Style in the second half of the eleventh century.[114] Hayes thought these indistinguishable motifs are "control devices" which are associated with a mass production rather than being decorative features.[115] On the other hand, François thinks that the moulded designs, especially cross and cross-like motifs, birds, peacocks, lions and griffins, are mostly apotropaic. She associates the function of the vessels with motifs which are prophylactic symbols for protection of the food from the evil.[116]

How do "hundreds if not thousands of examples" with blurred and poorly stamped depictions correspond to apotropaic and prophylactic functions if the symbols are not distinguishable? I am inclined towards to Hayes's idea that the stamps became "an internal measurement for an industrial mode of production." The mass production in Impressed Ware is clearly evidenced by a high number of diffused sites (Chapter two, Map 1-2) stressing the market demand in the outside of the capital after the mid-10th century. A high demand in the consumption of the standard tableware, Impressed Ware, may have resulted in manufacturing a second-class ware type which was the cheaper option. The yellow plain-glazed vessels would be the cheaper alternative because it does not require any additives and can be achievable by a colourless glaze in an oxidising atmosphere. Also, the glaze is applied only to the interior. This minimised production and application requirement may have provided the Plain yellow-glazed with moulded relief design to be a widely distributed ware type in the outside of the capital. Towards the eleventh century, the green variant, on the other hand, may be considered

[114] Ibid., 259–60.
[115] Hayes, 'Excavations at Saraçhane in Istanbul II. The Pottery.', 21.
[116] François, ''Υπαγε Σατανά, Des Fonctions Apotropaïque et Prophylactique de La Vaisselle de Table à Byzance', 56–60.

more expensive because of the colour additive, copper oxide, and the glaze application on both the interior and exterior.

However, this economic aspect of the Glazed White Ware consumption hardly answers the function of the stamps on the surfaces. I personally see no pattern which could differentiate one workshop from the others. Rather, it looks like a deterioration which likely resulted from using the same mould successively. Nevertheless, it is agreed by all that the moulding as a technique and also design is a replica of Sasanian prototype which supposedly imitated the gold and silver plates with gilt. Therefore, the animated motifs repertoire, as listed above, should be related to the feasting context in the hunting scenes. However, the cross is likely apotropaic in the earlier depictions as in Early-Glazed White Ware Decoration (7th -9th century). It is possible that it may have evolved to be an “insigne” which seals Glazed White Ware as a product of the Empire’s capital. This could be the “control device” or “internal measurement” that Hayes sought for.

Close parallels exist in red ware at Corinth. Morgan thinks the impressed designs in red ware precisely correspond to the ones in White Wares. An apparent technical difference is white slip covers the red ware. However, Morgan illustrates only four examples in drawing and states that the characteristic of the design and the quality is different. Usually, the impressed geometric forms are imperfect with poor application of the stamp.[117] Only one example shows a close similarity in the chosen motif which is a six-pointed star enlivened by circles and encircled by a medallion which falls into the Centric-roundel Style in Glazed White Ware (Fig. 34d).

[117] Morgan, *The Byzantine Pottery*, 11:50, Fig. 34 a-d.

Models,[118] Plastic Ware[119] or Figural Relief[120] includes the technique which is specifically used to create sculpted forms in the Relief Designs by two different styles: High-relief Style and Mid-relief Style. Examples are few, but human and animal figures are the main subjects which are partially or wholly sculpted and completed with incised technique in detail. Istanbul is not the best context for this group. Talbot-Rice mentions only a few examples of relief figures, such as dogs and horses and calls them children's toys. Stevenson and Hayes do not mention any finds. While Morgan suggests the 10th and 11th centuries,[121] Sanders dates this group in the first half of the 12th century.[122] The well-preserved examples are from the Corinth Excavations. The small figures are usually found attached on the outer surfaces of chafing dishes. A unique vessel which was discovered at Iznik Museum depicts a male figure on a horseback with a crown which is surmounted by a cross on his head. The relief technique is combined with incised design. Only the head of the figure is formed in high-relief and the rest seems to be incised. The plate is likely the commemoration of the triumph of Alexius I Comnenus at the Siege of Nicaea (1097) which is *terminus post quem* for the vessel. Therefore, I suggested a date centring on the late 11th and early 12th century. Close parallels exist in Brown Glazed Wares according to stylistic features which are commonly executed in the faces as Morgan and Sanders mention.[123]

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118 Talbot-Rice, *Byzantine Glazed Pottery*, 28.
119 Morgan, *The Byzantine Pottery*, 11:50–51.
120 Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 75–76.
121 Morgan, *The Byzantine Pottery*, 11:51.
122 Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 258.
123 Morgan, *The Byzantine Pottery*, 11:51; Sanders, 'Byzantine Glazed Pottery at Corinth to c. 1125', 62, Fig. 4 Pl.3a, pl. 3b.

CHAPTER SIX: CONSTANTINOPOLITAN GLAZED WHITE WARES (CGWW) REVISITED

This study has investigated the Constantinopolitan Glazed White Ware (CGWW), as a local ceramic brand of the Empire's capital both materially and artistically with an interdisciplinary approach. It searches through all implemented classifications of the excavations in Istanbul which interpret the pottery from approaches ranging from stylistic to typo-chronological approaches. However, this thesis argues that focusing on either the decoration or the fabric alone is not effective and highlights the problems occurring in these one-sided methodologies. To asses all the characteristic of Glazed White Ware, this study combines two approaches, the archaeological and art historical, with a new perspective and results in complete and unusual presentation.

Both research methods can be implemented to define one of the characteristics of Glazed White Wares, but the main problem is the inability of either approach to evaluate Glazed White Wares as whole. This thesis argues that to rely on either only focusing on the decoration or on the fabric cannot effectively define all important characteristics of Glazed White Ware. For instance, while an absolute classification for the fabric classes, the glaze types and the colourants can be obtained by archaeometric analysis, only a combined approach which incorporates art historical and archaeological methodologies can help to correlate them with the socio-cultural context which is briefly discussed in the present thesis. Therefore, this thesis benefits from an integrated approach bringing the above methods together to convey the material and decorative features of Constantinopolitan Glazed White Ware Pottery and to underline its uniqueness in Byzantine Art.

6.1. Concluding Remarks

6.1.1 Research Problem and Methodology

This thesis revisits the first efforts at classification of White Ware in order to explain the shifts and evolution in the methodology of the field of Byzantine Ceramics. Scholarship in this field took its first big step forward during the Hippodrome Excavations in 1927, when the first organised classification of Glazed White Ware was introduced to Academia. Talbot-Rice's classification focused on the ornamental attributions which is now the so-called art historical approach. Later, the research method was shifted to a typo-chronological approach, namely archaeological, by Stevenson to relate ceramics to the sequences of the Great Palace Excavations. Contrary to Talbot-Rice, Stevenson's categorisation is based on first the fabric, then the decoration which would later influence Hayes who implements a fabric-based methodology on the ceramics at Saraçhane Excavations and suggests his own categorisation, Glazed White Ware I-V and Polychrome Ware. One of the outcomes of this new categorisation is to clear up the confusion which resulted from the "B Series white-bodied ceramics" in the previous works. Hayes included those wares in GWW I-V; therefore, the vessels were grouped in a plainer and handier categorisation. This classification later became the most preferred, even to this day.

Initially, Talbot-Rice's and Stevenson's classifications were abandoned in favour of Hayes's fabric-based categorisation due to its being easily applicable and inclusive and because it supplies better chronological division for the classes, which it most certainly does. However, the later adjustments to GWW I by Vroom, Böhlendorf-Arslan and Waksman show that Hayes's archaeological categorisation is not entirely clear-cut. From an archaeological perspective, the main problem in Hayes's reference book is the underspecified groups and fabric types. From an art historical perspective, on the other hand, Hayes's classification limits the decoration in classes including plainly defined motifs and glaze colours. The ornamentation of Glazed White Ware does indeed have a materially and decoratively more complex nature than its fabric; therefore, Hayes's fabric-based approach is not affective to group them further. Hayes, himself, responded to the challenge of this problem and had to shift his methodology from archaeological to art historical to add the classes of Polychrome Ware. This instance is clear evidence that the Saraçhane classification is not applicable for the decorative attributions of Glazed White Ware. The other problems in the classification are broadly discussed in Chapter two, Part two; however, paragraphs below outline the main reason why I had to draw a line between Hayes's categorisation and my own categorisation for the fabric types and especially for the decorative classification (Table X).

Firstly, the classes are not defined clearly; hence, a confusion occurs in classifying potsherds at sites (i.e., GWW II/III?). Also, the fabrics overlap. The similarity in the fabrics of GWW III and Polychrome Ware, and the GWW IV and V, which are usually recovered together in other sites, suggest to propose one for each group. One can suspect that Hayes's classification is also based on the differences in the glaze; however, the glazes alike from one group to the other (i.e., GWW V and GWW II). His references among the classes are not descriptive to differentiate the characteristic features of the classes. Though he does not initially use the colour as a main criterion, scholars tend to use his observations in fabric colour as a reference, (i.e., pink colour in GWW II emerged after the eleventh century). However, the colour difference in White Ware fabric is not as clear-cut as the cone firing demonstrated (Appendix 3). Since the clay is kaolinitic, it is more prone to alteration. The initial colour of the raw clay, the atmosphere of the kiln and the diffusion of the chemicals from the glaze should be counted in this matter.

As mentioned above, Hayes's classification does not effectively define the artistic features of Glazed White Ware pottery. A major issue occurs in GWW III. The discovery of a new glaze type in the PAR batch has potential to show a direct Islamic influence in glaze technology which might have been used to imitate Lustre Ware in Glazed White Ware in mid-eleventh and twelfth century. Its discovery urges scholars to pay more attention to Glazed White Ware III which includes a group of pottery that comprises both monochrome and polychrome variants. The latter is decorated similarly to the class called Polychrome Ware. The question we must ask is why did not Hayes bring those two together? The answer is unclear; however, one can suspect the answer is in low quality in glaze painting or the different glaze application. This may not explain why the Saraçhane book does not include any pictures of the polychrome variant in GWW III. It is however true that this class causes a misconception in Byzantine White Ware classifications. "Polychrome" as a term must be used inclusively for all, or at least we must clarify the difference between the polychrome variant of GWW III and Polychrome Ware, if it is applicable. I believe there is no clear difference between the two at all. Regarding the similarity in the surface treatment, we may even include some of GWW III polychrome variants with Polychrome Ware without knowing the difference.

Nevertheless, Hayes's chronological typology is a success and is useful as it is. However, the reader should consider that Hayes's Glazed White Ware classification is designed for the Saraçhane findings and it is not applicable for all sites of White Ware findings. To evaluate all sites, the present thesis is a trial which combines two approaches: an archaeometric analysis for the archaeological assessment and a stylistic analysis for art historical evaluation. The archaeological approach combines the typo-chronological approach with an archaeometric application so-called 'integrated approach' that includes XRF, XRD, SEM (EDS) and TGA to provide more information in the technological features, such as fabric identification, the glaze composition and the clay provenance. The art historical approach, on the other hand, uses a chromatic class system, stratigraphic evidence and analogy in decorative components to offer a new decorative classification of White Wares, to establish the decorative history of GWW and to determine the source of decorative attributions and themes. Beginning with one of the tools in this interdisciplinary work, the archaeological approach points to several aspects, materially.

6.1.2 Material

As one of the groups of Medieval Ceramics, Constantinopolitan Glazed White Ware Pottery is naturally utilitarian as the more than twenty-thousand sherds found in Saraçhane can attest. However, there still a lack of proof which could relate this high amount of production to a workshop or a kiln at the capital. Therefore, the provable tie between Glazed White Ware and the capital is thought to be the clay itself which was used in manufacturing. After the discovery of matching clay from Arnavutköy, by Megaw and Jones, this thesis analysed two more clay sources (Şile and Ömerli) located in the Asian side of the Bosporus which correspond to archaeological material. This again supports the fact that Glazed White Ware was a local ware type which was produced in the vicinity of Constantinople. The high Silica and Aluminium and low Iron in the new sources correspond well to Glazed White Wares which are usually dated after the late ninth century.

The typology of forms discussed in the previous works indicates this local ware type includes a variety of wheel-shaped open and closed forms, which predominantly are low and high base dishes and pedestal dishes, plates, deep and small bowls, cups with handles, jugs and jars and chafing dishes. These wares are usually covered by green, yellow or brown glaze with a variety of shades in which the glaze was used either functionally or decoratively before having been singly fired up to 860-870C, suggested here for “Parion” samples. Two chemically different fabric types were revealed in **PAR batch** which may correspond to the output of different Constantinopolitan workshops. The majority of samples fall into Group I (high Si and Al and low Fe) which suggests that the raw clay was used plainly without any addition. However, the ratio of the minerals and the Calcium-rich additive in Group II (PAR 2, 4-5, 20, 25) suggests a stonepaste fabric which is known to be a feature of Islamic ceramics.

Regardless of the functional and decorative use, from monochrome to polychrome, the lead glaze and lead-alkali glaze are commonly used glaze types that the laboratory analyses have been demonstrating. The intriguing fact is the glaze of Group II fabric samples contains Tin, Arsenic and Sulphur which were highly possibly used as opacifiers to reach the splashy appearance and shiny brown colour. The use of the above-mentioned elements is unknown to Byzantine Ceramics. However, the ancient recipes by Jābir ibn Hayyān (the 8th century) and Abu’l Qasim (the 14th century) include tin opacified and sulphur and arsenic sulphide for producing the shiny-gold colour in Lustre Ware. According to the data, the PAR batch samples may represent an imitation of Lustre Ware painting and, therefore, this instance is possibly the first direct evidence of Islamic influence in Byzantine Ceramics.

6.1.3 Decoration

The plainly described decorative attributes and the issue of the vagueness of the source of decoration are compelling reasons to abandon Talbot-Rice's and Morgan's art historical classifications. This also applies to the archaeological categorisations which describe the decoration in groups which strict in a fabric-based categorisation, such as that of John Hayes. To explore decoration further, I implemented a more functional art historical approach which suggests, here in this thesis, three different categorisations considering the ornamentation. The handy use of the Decorative Classes, Thematic Classes and Historical Classes, can easily be adapted in further research which will hopefully generate more additions that I may have missed. Nevertheless, taking advantage of the accumulated information over a hundred years, the new Art Historical classification that I propose will hopefully provide a convincing review of our knowledge about this Early Medieval Ceramic group. The three classes, as mentioned above, approach the surface treatment by investigating the decorative techniques and designs in the Decorative Classes, the meaning of motifs and themes in the Thematic Classes and the advancement in art application both materially and decoratively in the Historical Classes.

In the A-B. Decorative Classes, the re-evaluation of the surface treatments of White Ware pottery makes it possible to follow the ornamental evolution of the pottery and the art production of the capital. It appears that the potters or artists used various methods combining glaze paintings with tool-made decorative techniques to decorate the surfaces of these fine wares from the late seventh to the late thirteenth century. The first initial step of categorisation is to separate the decorative painting from the decorative technique to prevent overlapping the definition of the ornamental attributions.

In Chapter four Part one, **A. Decorative Painting** focuses on treatments of the glaze painting from monochrome to polychrome, and **B. Decorative Technique** covers tool-made decorations including carved and relief designs. Further divisions are made, first according to the different designs and secondly according to the style. In A. Decorative Painting, the new art historical approach revealed a chromatic pattern for ceramics which shows that vessels can be divided into three: Monochrome, Bichrome and Trichrome (together) and Polychrome Painted Decoration. This categorisation helped uncover various different decorative treatments. However, Splash Design is of high importance. Therefore, I suggested to separate it from the earlier categorisations which describe it vaguely. Separating Splash Design brings forth the implication that splash as a decorative technique was already in use in the Byzantine capital in the late 11th and the early 12th centuries. This decorative type that I suggest to call Blended/Stripped-splash White Ware in order to differentiate it from its earthenware counterpart has a weak presence both in the number of findings and also the number of diffused sites. However, the design appears in a certain group including fantastic beasts, classicised scenes, holy figures and even an emperor which likely depicts the Alexios I Komnennos which was executed in sculpted relief (pl. 29.1, 33.6). C. Thematic Classes explores the motifs further in the social context by searching for their meanings and the themes behind them. Motifs can be evaluated in three groups: apotropaic and religious, imperial and others. D. Historical Classes reconstructs the new decorative classification which was built in Part one within a chronological order. It uses mainly the findings of the Great Palace and the Saraçhane Excavations to follow the development of the surface treatments. As a result, Glazed White Ware is evaluated in three chronological sequences: Early-Glazed White Ware Decoration (7th-9th CE), Middle-Glazed White Ware Decoration (9th-11th CE) and Late-Glazed White Ware Decoration (11th-13th CE). The interpretation below is a combination of the above-mentioned three classes which summarises the History of the Glazed White Ware Decoration.

In the beginning, vessels are undecorated and plainly glazed in dark green, yellow and brown colours with limited tones showing mostly a utilitarian character. The artistic presence is still vague in simple incisions over the surfaces, but in time they create the incised designs in the carved decoration which appear to be the first art technique that emerges in the early period of the Early-Glazed White Ware Decoration (7th-9th centuries). These incisions appear in a shallow sgraffito technique which is Plain-incised Design and limited to the interior surfaces of dishes. The repertoire includes limited inanimate designs composing vegetative forms, such as rinceau. A group of vessels feature incised crosses, cross-like designs and non-monogram crosses bearing a Biblical verse are similar to the repertoire of the Early Christian Art. They are depicted over or close to the rims with or without inscriptions or crosses in the centre which appear to be apotropaic and prophylactic devices. Rarely, linear incisions depict animated figures such as birds and fish, with the symbolic meanings which tend to cover the whole surfaces. Additionally, a cut-out technique is used to shape small triangular cut-out forms which are arranged in rows decorating rims of dishes in the early phase of the Early-Glazed White Ware Decoration.

Towards the ninth century in Early-Glazed White Ware Decoration, an increase occurs in variation of yellow and green glaze. During this period, Cut Design is specifically accentuated on a group of table ware, such as chafing dishes, fruit stands and goblets creating various decorative patterns, such as dogtooth, fretwork and perforations. Cut Design begins to disappear when Relief Decoration emerges in the form of Petal Design and Moulded Relief Design. At the end of the period Cut Design in Carved Decoration fades out, and, only incisions remain as a complementary technique. The motif repertoire is limited to crosses and less often animals moulded on the interior. While the earlier examples are covered by a plain glaze, in later examples the glaze is used more decoratively with its mottled and streaky appearance.

In the Middle-Glazed White Ware Decoration (9^{th} – 11^{th} century), new types of glaze painting emerged: Brown-slip Painted Design and Polychrome Painted Decoration (Class I-IV). In the mid-tenth century, the Brown-slip Painted Design appears to be combined with Moulded Relief which depicts animal figures on the interior floor of large bowls, dishes and chafing dishes. The incisions also enliven the rims and the walls of the dishes both inside and outside in a Plain-incised form. The Moulded Relief Design, on the other hand, becomes more complex with the Slotted-circle Style appearing to be moulded on plates and pedestal dishes. Excluding Polychrome Painted Decoration, the incised technique is also used in the Moulded Relief Design as a complementary tool.

In the late-Glazed White Ware Decoration (11^{th} -13^{th} century), the incised technique re-emerges in a group of vessels in an elaborate form. Examples are few but, the Elaborated-incised Design is used strictly with Moulded Relief and Sculpted Relief designs, in which the latter is a new emergence, until the end of the eleventh century or the beginning of the twelfth century. Splash Design is the product of this period. It is a short-lived decoration; however, it shows two styles: Blended Splash and Stripped Splash. A new type of polychrome decoration also emerges in this period. It uses a similar colour palette with Polychrome Decoration, but it has a different application method of the glaze. The same colours are used in monochrome variants with blue and brown with a linear, patchy or spatter application on the surfaces. Finally, the last group of the Byzantine Glazed White Ware is the so-called Green and Brown Painted Ware. There are also variants with blue and purple. It composes all sorts of animate and inanimate designs.

The motif repertoire seems to be enlarged by new themes in Moulded Relief Design and Polychrome Painted Decoration both of which include imagery of related themes of games and sports. The horse riders in moulded relief are likely to be related to the equestrian games, such as chariot racing, possibly hunting or even tzykanion. The animals which are depicted in Polychrome Painting may also be related to the entertainment places at the capital, such as game parks and animal parks where those animals were kept and hunted. On the other hand, the apotropaic and religious imagery is rare in the Middle-Glazed White Ware Decoration. This may suggest that it was produced by choice, meaning the choice of the buyers. The majority of religious imagery come from a church context. But, the predominance of the iconic images is exemplified by two vessels, Virgin Hodegetria and the Three Holies, pointing to demand from buyers for religious art. These vessels were either used by the church for commemoration or ceremonies, or perhaps by individuals who would have used them for private venerations.

With the evolution of the theme from “religious” to “secular,” it can be deduced that the earlier apotropaic and religious motifs, such as crosses, cross-like forms and animals may have been adopted for new functions and art themes. Cross and cross-like forms in Relief Decoration may have been used as Imperial insignia branding vessels as the capital’s own production. Animal figures, on the other hand, may have evolved from the religious, apotropaic or prophylactic devices to the symbols of courtly entertainments, such as animal related games and sports. Hence, it may suggest that these motifs lost their initial meaning and became a part of the new art content: hunting related feasting context of the Imperial court. Such an example is the Hippogriff illustrating a ceramic version of the concept of the connection of fantastic animals with the imperial banquets and the feasting cycles which are depicted on Byzantine silverware.

In the artistic imagery, the rendered motifs and figures are commonly related to the imperial court. The variety in the imperial imagery, on the other hand, is a reference for identifying the targeted buyers. The imperial control over the art content sadly remains a mystery. However, the themes which are portrayed by motifs supply information about the daily life of the "royal and quasi-royal" persons. The depicted motifs consist of animals which carry symbolic meanings referring to the status, social life and banquets of elites. Considering findspots of Glazed White Ware in Sigtuna, Sweden and Gnezdova, Russia both of which belong to noble associated contexts, we see that this is an overseas phenomenon. Furthermore, two stratigraphically well-established excavations, Iznik and Parion, are particularly intriguing. Glazed White Ware pottery were found at theatres which may suggest that the hunting related banquets of elites at the capital copied by the provinces. This is also valuable information about the function of theatre buildings in the Byzantine Period that we barely know anything about.

The motifs are also the pictorial evidence of a part of the socio-cultural life in Byzantium that we often come across in the historical accounts. Glazed White Wares seem to be the only media bearing the animals of three themes: game parks, menageries and animal parks. During the Middle Byzantine Period, these places kept animals for entertainment, such as hunting, animal combat at the Hippodrome, and simply enjoying their beauty. Animated decoration depicting movement of figures reveals the physiognomic genius and artistic expression in White Ware pottery. The expression in the acrobat's bended body, the motion of the back of the horse, the raised front leg of quadrupeds or two legs in hares as if walking or leaping characterise the animated style in figures. To mimic the motion is not the only technique in which the animation takes a form in White Ware pottery. Apparently, potters also used the glaze with an extravagant style to acquire the effect of the movement on the figures.

Examples are many in the Bichrome Painted Decoration; however, a fine depiction on a plate showing a dog walking into the blowing leaves may demonstrate that the use of the blurred glaze be much more than a mere technical failure, as previously suggested. This instance shows that style stresses not only the body features of the naturalistically depicted animals, but also the surrounding nature. This empathic technique is used for enhancing the storytelling of the same theme which was included in Byzantine Ceramic Art by the Polychrome pottery: the above-mentioned parks where the prey and predator were kept for entertainment. The particular stylistic difference between Polychrome and Green and Brown Painted Decorations is that the former was more static than the latter which aimed to capture the transition in the moment.

Beautifully depicted motifs in Relief Decoration and Polychrome Painted Decoration were likely inspired by the East and adapted to artists' own catalogues in a sharing of cultural art topic in the tenth century. While the direct influence is still disputed, this thesis brings a new suggestion for the source of the ornamentation. The source of the motifs is usually believed to be of Sasanian origin. However, the Middle Byzantine Glazed White Ware ornamentation repertoire is thought to be a revival of the Sasanian adoption in the Late Antiquity. I partially oppose this idea. First of all, I agree that the source of the motifs is Sasanian; however, there is clear evidence that the colours, designs and the themes may have been taken from a certain localisation: Nishapur, Iran. As stressed in Discussion, a group of contemporaneous Medieval Islamic Ceramics which is called Buff Ware or Nishapur polychrome ware show resemblance and it seems to be the possible source for the Byzantine Polychrome Decoration. The motifs and the iconography of those Islamic ceramics are believed to be originated from the Sasanian textile and metal work as well. This suggests that both Byzantine polychrome and Nishapur polychrome wares share the same source. However, the similarity in the colours, designs and styles highlights the possibility that the workshops of the capital imitated the Iranian ceramic copies of the Sasanian origin. It is, therefore, reasonable to believe that the decorative components were directly taken from this Islamic Medieval decorative repertoire; but with a clear Byzantine style in the adaptation of the motifs. Nevertheless, on some occasions especially in Polychrome Decoration, the style (oriental effect), seems to be copied rather than adopted. These show nothing else but clearly direct evidence that Constantinopolitan Glazed Ware Decoration is influenced by Islamic Ceramics. Regarding the sulphur and arsenic sulphide detected in PAR batch which implies the imitation of Lustre Ware, the area of the possible sources can be extended to other Islamic lands, such as Syria and Egypt. The imitation of the Islamic Ceramics repertoire took place roughly from the mid-tenth century to the late eleventh or the early twelfth century. Accordingly, the Glazed White Ware classes which may have been produced with Islamic influence are Polychrome Ware, Polychrome Variant (GWW III) and Splash Ware, and even Slotted-circled Style in Relief Design can be included among the classes under the direct influence of the Medieval Islamic Ceramics.

Prior to the conclusion, the following statement is an example to illustrate how Byzantine pottery has been received and interpreted by researchers who are not specialists in the field. In fact, this mindset which unintentionally underestimates the value of Byzantine ceramics is inherited by those worked in the field. For instance, Talbot-Rice worked on the topic for a lifetime but, sadly shares the same idea expressed below. He, perhaps, might have revised his opinion if he saw the catalogue in this study comprising the whole vessels which successfully exemplified the beauty of the studied material and the revealed meaning behind it.

"Byzantine pottery is usually cruder and far less refined than that produced contemporaneously in the Islamic world. Indeed, the most prevalent decorative techniques used in Byzantine ceramics are those found on the more common or provincial types of Islamic pottery. Is this an accident of history? Were the Byzantines more interested in vessels of precious or base metal than those of the cheaper, more fragile earthenware? Or were Byzantine potters simply less adventurous and less capable than their Muslim neighbours?"[124]

This thesis concludes that CGWW pottery should be considered as a part of the artistic achievement of the Byzantine Ceramic Art. Rather than being a mere table ware, this Early Medieval group of pottery had many functions: an exceptional gift of prestige and diplomacy, a talisman, a devoted object for political or religious commemorative rites, a cup for baptism, a royal luxury vessel serving food at a banquet of an elite, and even a gift in his tomb. Over several centuries, these local white-clayed ceramics were potters' small canvases to narrate the capital's very own cultural landscape with a complex choice in motifs inspired by the East and adopted to its own cultural context. What the decorative repertoire diligently portrays is the sociocultural environment of Byzantium conveying a shared cultural history about the lifestyle, custom and tradition between the capital and the East.

The borrowed motifs from Islamic lands do not always mean a passive cultural exchange via circulated goods because they appear late, in the twelfth and thirteenth century, at the excavations in Istanbul. Regarding Polychrome Painted Ware (mid-10th-early 12th c.) the circulated goods theory does not seem possible. Though it is still a mystery how these commonly used oriental motifs, designs, styles and themes reached the capital, scholarship believes it was via other circulated artifacts which bear the same adornments, such as textiles and metal ware. Considering the technological influence proved by the PAR batch, I personally think by itinerant potters who knew the secret recipes of stonepaste and Lustre Ware. For Byzantium, this may indicate a rival or a trend to keep up with. The rivalry may refer to an artisanal war between the workshops of the capital to prove who would be the best

[124] Priscilla Soucek, 'Byzantium and the Islamic East', in *The Glory of Byzantium: Art and Culture of the Middle Byzantine Era, AD 843-1261*, ed. Helen C. Evans and William D. Wixom (Metropolitan Museum of Art, 1997), 416, No. 272.

in producing the most desired items and to be able to dominate the market not in the west, but surely in the north of the Empire. On the other hand, a trend that is quite obvious is the repertoire of the motifs, designs, styles and also themes which were adopted from the East where these components had already been in circulation by Medieval Islamic Ceramics.

6.2 Considerations for Future Research

The results and conclusions in this thesis would benefit from further study in the following areas:

1- The raw clay analysis showed there is no difference in clay properties to assign the source to the European or the Asian side of Istanbul. Therefore, neither Arnavutköy nor Şile and Ömerli provide a clear answer on where the clay bed(s) may have been situated. Rather they represent only two of the many more possible clay sources in Istanbul that I suggest to search for on both sides of the Bosporus. The more clay analysis of clay beds in modern Istanbul, the closer we get to concluding the clay provenance of Glazed White Ware Pottery. Therefore, the clay analyses should include the following locations: Boğazköy, Ayazağa Çömlekçi Bayırı, Hacı Osman Bayırı, Uskumru Köy, Akpınar, Terkos-Tayakadın, Çatalca Dağyenice, Kartal-Yakacık, Dudullu and Beykoz.

2- Considering variable effects on the fabric colour, I suggested using the inclusion as the main criterion to build a fabric classification. Until an analytical fabric categorisation is built, it is more reliable to use a "basic fabric classification," such as the classification I built in Chapter three.

3- PAR batch is an important start to show an Islamic influence in the fabric and the glaze technology which is likely showing the imitation of the stonepaste and Lustre Ware in Glazed White Ware in the mid-eleventh and the twelfth century. Its discovery urges scholars to pay more attention to Glazed White Ware III at Saraçhane and B Series 4b-c at the Great Palace. These classes include a group of pottery which comprises both monochrome and polychrome variants. The latter is similarly decorated with the class called Polychrome Ware. Therefore, further analysis should be carried out for monochrome and polychrome variants of GWW III, Polychrome Class II- IV, Splash Ware, and also mottled and streaky glazed Slotted-circled Style in Relief Decoration.

4- The art historical approach should search further for the artistic similarities between the polychrome variant in GWW III and Polychrome Ware and, also Byzantine Splash Design and Islamic Polychrome Splash Ware.

5- Scholars should keep in mind that Decorative Classes may be re-arranged regardless of compatibility of the previous classifications.

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