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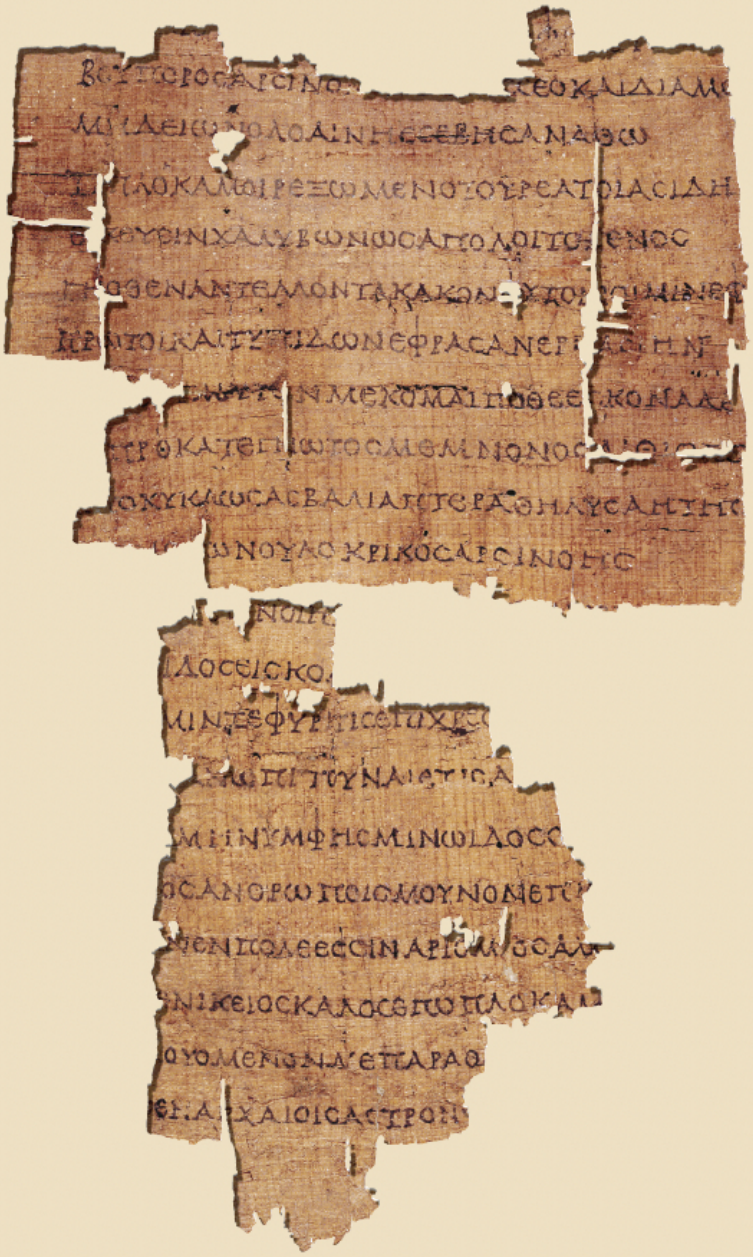

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A FACE FROM THE PAST. THEODOSIA FROM THE DESTROYED FRESCO TO FORENSIC ART

One of the most significant bioarcheological findings in the *kiman* of ancient Antinoupolis is represented by the human remains from the burial chapel investigated by Egyptologist Evaristo Breccia during the 1935-36 excavation campaign[1]. These remains are noteworthy for their good preservation, the circumstance of their discovery, and the potential insights that the whole context can offer.

After being initially reburied at the discovery site, the human remains were exhumed again between February 7 and 19, 2012, during the activities of Istituto Papirologico "G. Vitelli" under the direction of Professor Rosario Pintaudi, allowing a detailed examination of the remains within the framework of the Anthropological Human Bones Identification – An.Hu.B.I. project[2].

The archaeological context (IV-V century A.D.) provides valuable information not only as it was self-contained and isolated once but also because it is indicative of the social status of the deceased, whose name is revealed, Θεδ[ο]σια, according to the writing above her portrait. In fact, along the southern wall of the building made of crude bricks, a fresco depicted a young praying woman, identifiable by the inscription above her, standing surrounded by Saint Colluto and the Virgin Mary[3]. Today, due to the turbulent political events that have characterized the recent history of Egypt, the fresco is severely damaged, and the portrait is lost forever.

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[1] E. Breccia, *Le prime ricerche italiane ad Antinoe (Scavi dell'Istituto papirologico Fiorentino negli anni 1936-1937)*, «Aegyptus» 18 (1938), pp. 285-310.

[2] M. Borrini-P.P. Mariani, *The burial of Teodosia: archaeology and forensic anthropology as tools for identification in the case of a chamber burial from the Sheikh 'Abadah site (Antinoupolis)* in G. Bastianini-F. Maltomini (eds) *Antinoupolis* III, Firenze 2018, pp. 375-413.

[3] E. Breccia, *Le prime ricerche italiane ad Antinoe*, cit.

However, photographic copies are still preserved in the archives of the Papyrological Institute[4].

In light of this loss of the original documentation and following morphometric studies of the skeletal remains, Forensic Anthropology and Forensic Art techniques have been applied to reconstruct the likeness of Teodosia. Undoubtedly, this operation does not restore the lost fresco, but it provides an approximation of the appearance that the deceased must have had in life, thereby, in a different but scientific manner, partially filling a gap caused not by centuries but by the unfortunate events of recent decades.

§ 1. Theodosia's biological profile and morphological traits

Morphometric analyses[5] were conducted on the remains as part of the An.Hu.B.I. Project revealed that the deceased was a young woman aged between 17 and 20, of European ancestry, confirming the hypothesis of Greek origin proposed by Breccia at the time of the discovery. Theodosia had a stature of approximately one meter and fifty centimetres and a relatively slender physique, without any significant evidence of muscular development or physical stress, possibly indicating her belonging to «a prominent Christian family of Antinoue»[6], which is also evident from the burial structure from which she was recovered. No evidence of trauma or pathologies was identified that could suggest a plausible cause of death; although the original discovery of neonatal bones in the same chamber structure (now lost) would lead to the hypothesis of a maternal death.

From a morphological perspective, the skull, the primary focus of the reconstruction, was exceptionally well-preserved, making it suitable for research purposes. It was of moderate size, ovoid-pentagonal shape, with a slight flattening (plagiocephaly) on the right. The glabella is slight, and so is the supraorbital ridge. The zygomatic bones were not prominent (cryptozygia), and the temporal fossae and frontal eminences (*tubera frontalia*) were faint. Conversely, the lateral eminences (*tubera parietalia*) were quite noticeable.

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[4] L. Del Francia Barocas (ed.), *Antinoe cent'anni dopo 1998: Antinoe cent'anni dopo.* Catalogo della mostra, Firenze, Palazzo Medici Riccardi, 10 luglio-1 Novembre 1998, Firenze 1998; L. Del Francia Barocas, *The Image of the Cross in Christian Egypt,* in «RSO» 85 (2012), pp. 165-211.

[5] M. Borrini-P.P. Mariani, *The burial of Teodosia*, cit.

[6] E. Breccia,. *Le prime ricerche italiane ad Antinoe*, cit.

The cranial vault was of moderate height, and the forehead was moderately small, straight, and somewhat vertical, with a non-prominent glabella. The supraorbital sulcus and the upper temporal lines were absent; the zygomatic arch was thin. The root of the zygomatic process of the temporal bone was not prominent. The mastoids were of moderate size, smooth, and rounded, while the supramastoid crests were faint and parallel.

The face appeared proportionate and relatively small, with a fairly narrow nasal root and a noticeable nasal spine. The zygomatics were relatively low, small, and retreated backwards with smooth margins. The incisive fossae were barely discernible, contrary to the deep canine fossae.

The orbits were roundish and moderately spaced, with a slight lean of the thin and sharp upper margin. The left side was slightly lower than the contralateral side.

The skull also exhibited slight maxillary prognathism, while the mandible had limited mental protuberance and gonial eversion development. The mandibular body was moderately slender anteriorly and up to the level of the mental foramina, with a slight thickening near the molars, possibly related to the lack of eruption of the third molar.

It is worth noting that some hair had been preserved in the posterior parietal area on the right side of the skull, suggesting that the hair was somewhat wavy and brown.

§ 2. Forensic Art

Facial reconstruction, more appropriately termed facial approximation, aims to outline the physical features of an unidentified subject's face by examining their cranial remains through Forensic Art. This discipline involves a combination of artistic and anatomical techniques developed to recreate the appearance of an unknown deceased individual to aid their recognition by relatives[7]. It is essential to clarify that facial approximation is not an identification method[8]. In other words, it is not possible to compare the reconstructed face with photographs of one or more missing individuals and directly identify the subject in question. If appropriately

[7] L. Gibson, *Forensic art essentials: a manual for law enforcement artists*, Amsterdam 2008.

[8] ANSI/ASB *Best Practice Recommendation 089, Best Practice Recommendation for Facial Approximation in Forensic Anthropology,* AAFS Standards Board 2020.

disseminated, the result obtained through Forensic Art serves as an investigative aid by helping acquaintances and family members of a missing individual to recognize the features in the reconstruction, directing the investigative effort toward a potential identification candidate. The confirmation of the identity of the remains must then be verified by appropriate scientific means, such as genetic, anthropological or dental comparisons. The facial approximation is, therefore, based on the mechanisms of human feature memorization, much like a composite sketch. However, in this case, the focus is on the victim rather than the perpetrator.

In the specific case of Theodosia, the technique was applied to restore her face due to the loss of the fresco that depicted her in the final earthly resting place. There is unquestionably no possibility of any identification of the young woman, nor would a comparison with the lost fresco be correct considering the artistic bias of the painter due to their skills and the aesthetic canon of the time. Instead, the present scientific and intellectual exercise will recreate a more objective representation of Theodosia likeness, demonstrating the potential of a multidisciplinary approach to the analysis of bioarchaeological. Moreover, it will offer the opportunity to, in some way, compensate historical populations for the damages their artefacts suffered due to modern political and social conflict.

Finally, before proceeding to the description of the technical steps taken and referring to the ancient portrait of Theodosia, it is essential to emphasize that the portrait was only examined by the author after the completion of the anatomical reconstruction. This precaution was necessary to avoid bias and influence when approximating anatomical features. The fresco was presented to the author only during the phases of artistic refinement of the image to delineate the young woman's hairstyle.

The reconstruction presented is a two-dimensional drawing since it was impossible to perform a 3D modelling or a cast of the skeletal remains as part of the An.Hu. B.I. project. The photographic documentation carried out in situ has been used, in addition to assessing muscle insertion areas, which are the points where muscles attach to the bone, to evaluate their degree of development and orientation. This information was integrated with records related to the subject's biological profile[9] and physical build from the anthropometric analysis. The combination of the above data was used to determine the thickness of deep markers, which are thickness indicators of soft tissue development in specific skull landmarks.

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[9] M. Borrini-P.P. Mariani, *The burial of Teodosia,* cit.

The positioning of these markers was drawn from Taylor[10], while for thickness values, the author opted for values published by Helmer (1984) for European females between the ages of 20 and 29 with average body builds.

The cranium and the mandible were articulated according to the instructions provided by Anderson[11]. Photographs were taken in a standard frontal and lateral view, later reproduced in a 1:1 scale using photographic editing software (Photoshop 2020) following the guidelines set by Reis[12]. The frontal pictures were taken at an angle corresponding with the Frankfurt horizontal plane, representing the normal position of a face forward standing subject with their gaze directed at the horizon. The lateral view image was rotated using the raster graphics editor to obtain the same orientation, a plane passing through the porion and the lowest point of the left orbit.

For the projection of the nasal area, following the guidelines proposed by Wilkinson[13], the geometric method of Gerasimov was adopted, which predicts the position of the nasal point based on the projection of the last third of the nasal bones and the continuation of the nasal spine[14].

To better define the contour of the nasal profile, the Lebedinskaya method was applied[15], which involves projecting the lateral edge of the piriform aperture on the tangent to the apex of the nasal bones, parallel to the nasion/prosthion line[16]. The reconstructed nose appears rather thin, as expected from the non-prominent glabella and narrow nasal root observed during the anthropological analysis.

For the approximation of the orbital area, the eyeballs were first drawn within the eye sockets with a diameter of 23.9 mm[17]. They were placed both in lateral and frontal views as per literature[18] Subsequently, the

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[10] K.T. Taylor, *Forensic Art and Illustration*, Boca Raton, Florida 2001.

[11] J.E. Anderson, *Atlas of Grant's Anatomy*, Baltimore 1983.

[12] G. Reis, *Photoshop® CS3 for Forensic Professionals*, Indiana 2007.

[13] C. Wilkinson, *Forensic facial reconstruction*, Cambridge 2004; C. Wilkinson-C. Rinn, *Skull assessment workshop 13th Biennal Scientific Meeting of the International Association for Craniofacial Identification*, 2008.

[14] M.M. Gerasimov, *Face finder*, New York 1971; M.M. Gerasimov, *The Reconstruction of the Face on the Skull,* Moscow 1975.

[15] G.V. Lebedinskaya-T-S. Balueva-E.V. Veselovskaya, *Principles of facial reconstruction*, in M. İşcan-R.P. Helmer (eds) *Forensic analysis of the skull*, Nueva York 1993, pp. 183-198.

[16] M. Prokopec-D.H. Ubelaker, *The Reconstruction of the Face according to the Skull,* «Forensic Science Communications», 4/1 (2002).

[17] E. Wolff-A.J. Bron,-R.C. Tripathi-B. J. Tripathi, *Wolff's Anatomy of the Eye and Orbit,* London 1997.

[18] C.M. Wilkinson-S.A. Mautner, *Measurement of eyeball protrusion and its ap-*

eyelid apertures were drawn. For these, it was considered that the lateral canthus is located approximately two millimetres inside the lacrimal crest, while the contralateral canthus is positioned inside the orbit about three to four millimetres from the malar tubercle[19]. The fold of the upper eyelid was deduced from the overall contour of the orbital margin[20] and the orbital margin of the frontal bone was also used as a reference for delineating the eyebrow shape (ibidem).

The appearance of the labial area was inferred from the morphology of the dentition[21] primarily the central elements (incisors and canines) that were still present, except for the right central incisor that had been lost post-mortem.

The position of the canines allowed for the calculation of the width of the lips, while their thickness was determined based on the dimensions of the crowns of the central incisors[22]. The stomion, which corresponds to the position of the oral fissure, was placed close to the lower third of the central maxillary incisors[23]. Also, the anatomical observations from morphometric analysis allowed to trace the lateral development of the upper lip, which appears to protrude over to the lower lip due to maxillary prognathism[24], while the depth of the canine fossae suggested making the nasolabial fold visible[25].

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plication in facial reconstruction J For Sci 48, 2003, pp. 12-16; T.D. Stewart, *The Points of Attachment of the Palpebral Ligaments: Their Use in Facial Reconstructions on the Skull*, «Journal of Forensic Sciences», 28 (1983), pp. 858-863.

[19] J.L. Angel, *Restoration of head and face for identification,* in *Proceedings of Meetings of American Academy of Forensic Science*, 1978, pp. 125-142.

[20] B.A. Fedosyutkin-J.V. Nainys, *The relationship of skull morphology to facial features*, in M. İşcan-R.P. Helmer (eds), *Forensic analysis of the skull*, Nueva York 1993, pp. 199-213.

[21] W.M. Krogman-M.Y. İşcan, *The human skeleton in Forensic Medicine*, Springfield 1986, Ill; C.M. Wilkinson-M. Motwani-E. Chiang, *The relationship between the soft tissues and the skeletal detail of the mouth*, «Journal of forensic sciences» 48 (2003), pp. 1-5.

[22] C.M. Wilkinson-M. Motwani-E. Chiang, *The relationship between the soft tissues and the skeletal detail of the mouth*, «Journal of forensic sciences» 48 (2003), p. 412.

[23] V.F. Ferrario-C. Sforza-G. Serrao, *A three-dimensional quantitative analysis of lips in normal young adults*, «The Cleft palate-craniofacial journal», 37/1 (2000), pp. 48-54; L.M. Greyling-J.H. Meiring, *Morphological study on the convergence of the facial muscles at the angle of the mouth*, in «ActaAnat» Basel 1992; 143/2, pp. 127-129, doi: 10.1159/000147238. PMID: 1598818.

[24] B.A. Fedosyutkin-J.V. Nainys, *The relationship of skull morphology to facial features*, cit.

[25] Ibidem.

In addition to the general facial profile, which was drawn based on the deep markers and the cranial substructures[26], earlobes[27] and the neck have been added to avoid an unnatural appearance of the face[28]. The neck was modelled based on the position and development of the nuchal lines and mastoids.

Graphic editing software provided a more realistic image rendering once the face was approximated in both frontal and lateral views. The reconstruction was first digitized using Android software (PENUP) and then processed with iOS applications (NewProfilePic and FaceApp), which allowed the addition of a more realistic texture to various parts of the face, even though the result remained a digital drawing. The image was then finalized using Adobe Photoshop 2020.

The use of iOS applications was driven by the widespread use of images generated by such software, to which the general public is accustomed. It is essential to note that these applications were used exclusively to enhance the realistic appearance of the image without altering the somatic features reconstructed following Forensic Art principles. At every step, the coloured and textured image was cross-referenced with the original drawing and the 1:1 scale photographs of the skull by Photoshop.

As part of this final process of rendering the image more realistic, it was decided to recreate Theodosia's hairstyle. In this case, the reconstruction was based on the fresco that depicted her. According to Breccia[29], she appeared with «a very fine, transparent veil that covers her head, descends to her shoulders and behind her back. A long string of pearls shines at several turns on the dark, thick hair that falls to cover her entire forehead and up to her eyebrows and is gathered on the top of her head and around the nape, forming a sort of halo. Heavy earrings, a necklace, and numerous bracelets complete the rich hairstyle.» Based on the information provided, the hair and the jewels have been modelled and added to the face. For the hair colour, observations were made from the remains still adhered to the skull, taking into account that pigmentation could have been altered by taphonomic events affecting the skeleton[30].

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[26] L. Gibson 2008.

[27] M.M. Gerasimov 1975.

[28] G. Civardi, *La Testa Umana. Anatomia, Morfologia, Espressione per l'artista*, Cornaredo MI 2002.

[29] E. Breccia, *Le prime ricerche italiane ad Antinoe*, cit., p. 300.

[30] S.R. Tridico-S. Koch-A.Michaud-G. Thomson-K.P. Kirkbride-M. Bunce, *Interpreting biological degradative processes acting on mammalian hair in the living and the*

Conclusions

The final result of the facial approximation is presented here as the first application of Forensic Art within the An.Hu.B.I. project. It cannot be claimed that this is «the true» face of Theodosia, but it is undoubtedly the scientifically truthful and plausible portrait that can be obtained through modern forensic anthropology techniques applied to ancient remains. If this approach allows us to see the face of one of Antinoupolis' inhabitants for the first time in almost two thousand years, it is perhaps even more important to reflect on how the investigation conducted with forensic techniques, typically aimed at bringing justice to crimes' victims[31] has enabled solve a different offence. In this case, it is not the oblivion of time but rather the deliberate destruction of Theodosia's ancient portrait. Today, through Forensic Art, it has been possible to give her back a face, not the result of artistic talent like the original painting, but certainly a more anatomically and scientifically accurate one.

Liverpool *Matteo Borrini (m.borrini@ljmu.ac.uk)*

Abstract

Forensic Art, or facial approximation, is a specialized subfield of forensic anthropology that aims to recreate the likeness of an unknown individual from their cranial structures. The technique has been applied to the remains of Theodosia (IV-V A.D), found in a painted funerary chapel in Antinoupolis during Evaristo Breccia's archaeological investigation. In the presented case, Forensic Art allowed the unveiling of the face of one of Antinoupolis' inhabitants for the first time in almost two thousand years; moreover, it filled the gap left by the recent destruction of Theodosia's original fresco portrait.

Keywords: Forensic Art, Facial Approximation, Forensic Anthropology, Bioarcheology.

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dead: which ones are taphonomic? in *Proceedings of the Royal Society B: Biological Sciences*, 281(1796), 2014, p. 1755.

[31] M. Borrini-V. Lusa, *La prova Occulta. L'indagine forense sub suolo alla luce della procedura penale*, Milano 2012.

Fig. 1 a-b – Frontal (a) and lateral (b) view of Theodosia's skull.

Fig. 2 a-b – Frontal (a) and lateral (b) view of Theodosia's facial features superimposed on the skeletal remains.

Fig. 3 a-b – The final approximation of Theodosia facial features with the reconstruction of the hairstyle and jewels from the original fresco.

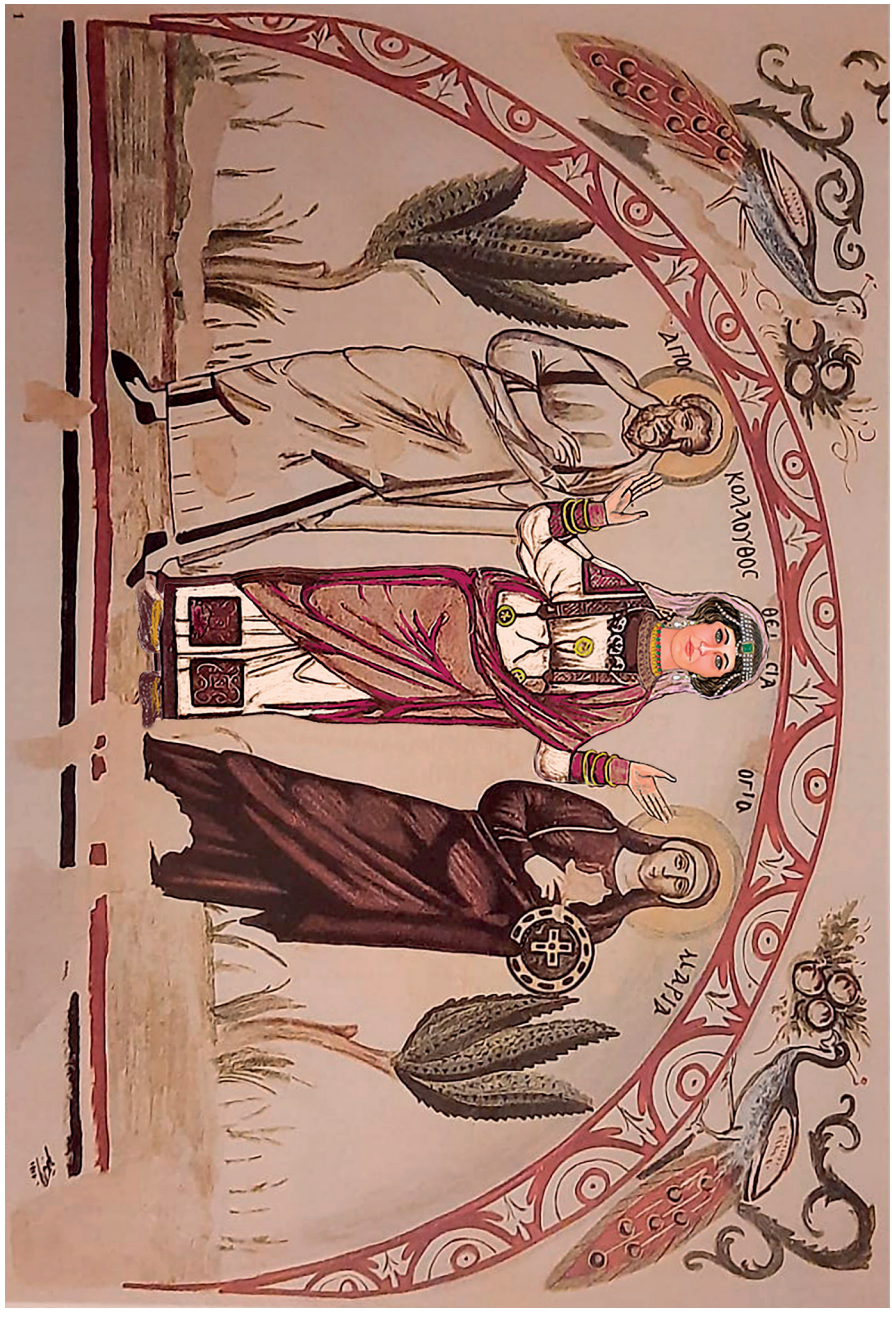
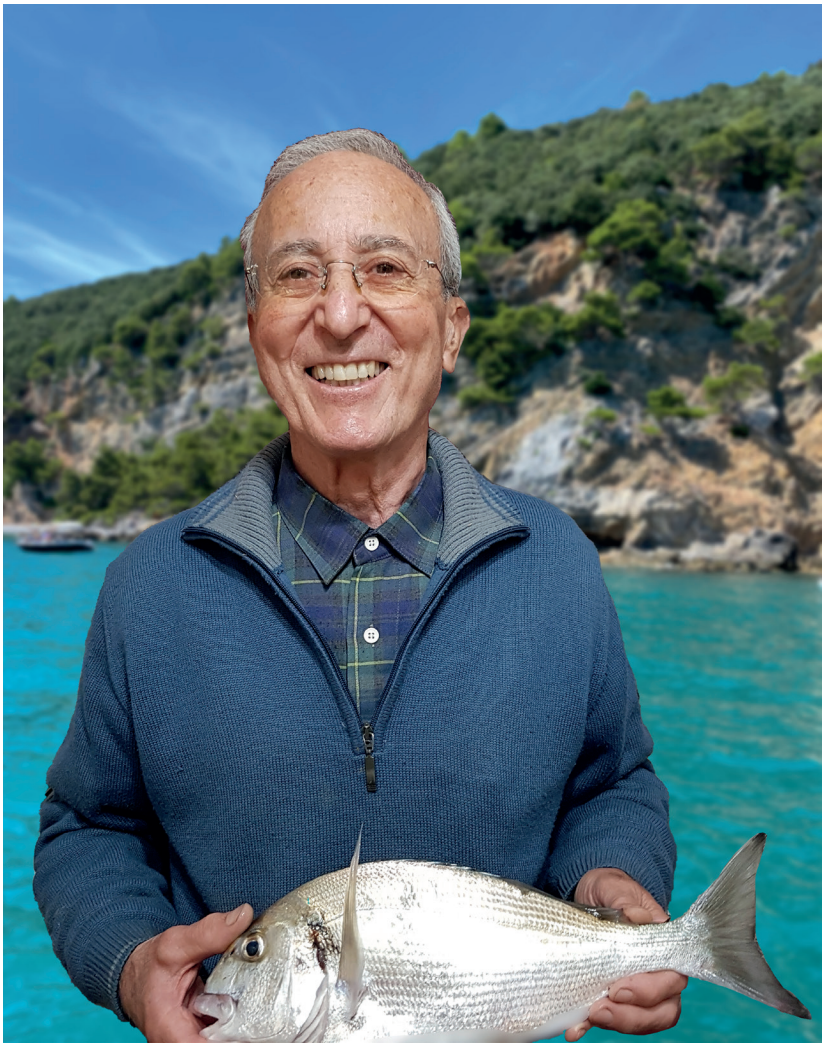


Fig. 4 – An ideal restauration of the fresco, with Theodosia's appearance according to the results of the forensic facial approximation.



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I am deeply grateful to my papa, Fioravante Giancarlo Borrini, for being a wonderful father, a continuous guide, inspiration and friend.

With his gifted golden hands and artistic talent, he supported all my projects until the last moment. The facial approximation of Theodosia stands as an everlasting example.

His lovely memory will last forever.

INDICE GENERALE

DOCUMENTI PER UNA STORIA DELLA PAPIROLOGIA

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