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The Use of Egyptian Blue in Funerary Paintings from Roman Egypt

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**THE USE OF EGYPTIAN BLUE IN
FUNERARY PAINTINGS FROM ROMAN EGYPT**

By

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THE USE OF EGYPTIAN BLUE IN FUNERARY PAINTINGS FROM ROMAN EGYPT

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This paper explores the use of the synthesized pigment Egyptian blue in the encaustic and tempera funerary portraits of Graeco-Roman ruled Egypt in the 1st-3rd centuries CE. Recent developments in non-destructive imaging analysis technology have aided research institutions and museums in detecting the presence of this pigment. New questions have arisen based on these findings of Egyptian blue in the depiction of flesh and hair of these subjects, particularly because blue is so rarely used as a standalone pigment in works of this category. These analyses have challenged assumptions that Egyptian blue was a rare and valuable pigment during the Roman era, as well as thoughts that the encaustic funerary portrait had its origins in the Greek tetrachromatic color scheme. In this paper, I will investigate these hypotheses, as well as the possibility that the inclusion of Egyptian blue in flesh and hair of deceased subjects aided them in their journey to the afterlife, citing funerary and mythological beliefs of Greeks and Egyptians alike.

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INTRODUCTION

In recent years, renewed interest in the subject of historical painting techniques combined with great strides in the technology of non-destructive testing have brought together multidisciplinary fields to better understand objects and aspects of them not visible to the naked eye. Scientists, conservationists, and art historians work together now more than ever to piece together these stories. Until recently, it was believed that the Greco-Roman funerary panel portraits found predominantly in the Fayum region of Egypt in the first three or four centuries CE were painted in a traditional Greek four-color color palette, combining Greek portrait tradition with the ritualistic burial practices of ancient Egypt.¹ This novel combination of practices can be attributed to the unique cosmopolitan makeup of Roman Egypt. With the development of new non-invasive spectroscopic imaging techniques came renewed scholarly interest in the Fayum images. These objects have historically gone under-researched, however newly published research conducted by the participating institutions of the APPEAR² (Ancient Panel Painting: Examination, Analysis, and Research) project organized by the J. Paul Getty Museum's Department of Antiquities has shed new light on the physical properties and thereby the production techniques of these portraits. One particularly interesting aspect of these findings has been the presence of the pigment Egyptian blue, widely considered the first synthetically manufactured pigment of the ancient world. Egyptian blue is a calcium copper

¹ As will be discussed throughout this paper, definitive dating of these paintings is disputed. Some historians call for the end of portrait production in the first half of the third century, while others determine works (especially tempera) to have continued into the fourth.

² https://www.getty.edu/museum/research/appear_project/

tetrasilicate compound, made by heating quartz and copper with a calcium compound. The regular presence of this hue brings forth new questions about the famous “four-color” Greek painting style, and what significance Egyptian blue may have had during these ancient times.

The invention Visible Induced Luminescence (VIL) technology in 1999 has introduced greater potential for institutions and collections worldwide to understand the presence and usage of Egyptian blue in ancient works. Like many spectroscopic imaging techniques, VIL can be easily performed with inexpensive equipment and software, and is entirely non-invasive to the object. Evidence shows artists utilized both Egyptian blue and indigo as blue pigments³ in as many as 20 percent of these portraits.⁴ While the presence of Egyptian blue in artifacts from the Mediterranean region during this time is not unusual, it is surprising to find such quantities included in the Fayum panel paintings where the hue is so rarely visible to the naked eye, particularly in the modulation of flesh and hair. Imaging analysis provided by the APPEAR participants has shown a unique range of uses for the pigment in the Fayum portraits, pointing to several new theories about its use.⁵ One such is that it may have been more abundantly available than previously thought. We know that the pigment was traded far and wide, and many historians have considered it to have been a valuable pigment due to the labor that went into its production. Findings of Egyptian blue in underpaintings and rough sketches in place of inexpensive carbon black suggest that by the Roman period, Egyptians may have had abundant supply and that its value was therefore reduced. Other imaging analyses show artists used Egyptian blue in highlights and shadows of flesh, hair and cloth. This is to say, what we

³ Ganio et al., 2015.

⁴ Thiboutot, 2018.

⁵ At the time of this writing, most if not all published research on the use of Egyptian blue in ancient panel painting is conducted through APPEAR participants.

thought were examples of a restricted color palette -- consisting of yellow, red, black and white -- now prove to include the brilliant blue pigment, hypothesized by some as a way to broaden the range of tones available with these four colors, rather than as a stand-alone hue.⁶ This argument is supported in addition by the Greek and Egyptian favoring of shiny lustrous qualities over hue.⁷ We know Egyptian blue had been utilized by Mediterranean artists for generations, however the inclusion of this hue in flesh tones is of particular importance. The hue may have been incorporated simply as a device to heighten the naturalism of skin tones, though beyond its physical properties, Egyptian blue may have been added for its spiritual associations with the gods and the afterlife. Institutional research regarding multi-spectral imaging has been conducted and shared across the APPEAR database in the past few years, though little has been published with direct regards to the findings of Egyptian blue in Fayum portraits, and institutions own the rights to their own images and research. Indeed it was Gabrielle Thiboutot who summarized these three potential uses of Egyptian blue based on these findings at the APPEAR conference in 2018, though these hypotheses were already being formulated by Giovanni Verri's team in 2010 and Ganio and company in 2015. I will attempt here to expound upon recent evidence published by these APPEAR findings to further the argument.⁸

Understanding the purpose and use of pigments like this one can provide important clues to understanding the traditions of people that lived and worked in a culture, in this case aiding to

⁶ There are few examples of Egyptian blue used as a stand-alone hue to depict jewels, which will be noted in subsequent passages.

⁷ 'Greek' should be understood throughout this paper to encompass the lineage of Archaic, Classic, Hellenistic, and thereby their extending influence upon Roman artistic tradition.

⁸ See Thiboutot, 2020 for intifial publishing information of the APPEAR findings of Egyptian blue and these potential intended uses of it in ancient Fayum panel paintings.

trace the cultural shifts from Pharaonic and Greco-Roman traditions to those unique to Roman Egypt.

There are about 1,000 known Graeco-Roman mummy portraits, commonly referred to as Fayum portraits, originally found in Egypt's Fayum region near the Nile river. These portraits have been discovered in sites throughout Egypt beyond the Fayum, such as Saqqara, Antinoöpolis and el-Hibeh, hence we will mostly refer to them as Graeco-Roman mummy portraits. These refer specifically to two-dimensional painted portraits on panels or sometimes shrouds, and are not to be confused with three-dimensional mummy masks created concurrently. Only a handful of these portraits have undergone thorough technical analysis; approximately 285 or one-third of all known mummy portraits are entered in the APPEAR database, of those at least 44 have undergone VIL imaging and detected Egyptian blue, with another three from the Egyptian Museum in Cairo which are not a part of APPEAR.⁹ Though definitive dating is a topic regularly contested amongst scholars, most can agree the majority of these portraits were painted between the late-first and mid-third centuries AD. Klaus Parlasca argued works in the tempera tradition continued to be painted throughout the later half of the third century and into the fourth.¹⁰ This has been supported by a number of other scholars, though Borg, Walker and Bierbrier all suggest mummy portraits were discontinued closer to the first half of the third century.¹¹ Around the year 380, emperor Theodosius made Christianity the official religion of the Roman Empire. By the year 392 Theodosius outlawed mummification in Egypt, a date

⁹ The most recent public data comes from the Getty's publication of research papers from their 2018 conference, so it is likely this number has increased. These numbers were provided by G. Thiboutot, 2018.

¹⁰ Parlasca, 1966; 1980.

¹¹ Walker and Bierbrier, 1997; Borg, 1996.

which most scholars agree signaled the decline of production of these portraits and the practice of pagan rituals.¹²

Fayum mummy portraits were mostly painted on thin panels of wood though have also been found on linen shrouds. Artists of these portraits worked in either encaustic or tempera, though studies thus far show use of Egyptian blue to be more predominant in the corpus of encaustic works. As of 2018, 41 encaustic works in the database have positively identified the presence of Egyptian blue, as opposed to a mere five in tempera. On the whole, encaustic portraits make up around 60% of the known corpus with tempera at about 40%. While the 46 scanned works hardly represent the whole, there does seem to be an early correlation between the use of encaustic binders and Egyptian blue.¹³

The pigment is found employed in each of the major find-spots of the portraits by different artists, and it is likely that artists across Egypt had access to the same working materials, though some were imports from the Mediterranean. In one portrait Egyptian blue may be detected only in the subject's clothing or eyes, while in another the pigment is only employed in the flesh's shadows or in highlights. Still more surprisingly, imaging shows at least several artists to have used Egyptian blue as a material to complete sketches or underdrawings, leading researchers to ponder if by the Graeco-Roman era, the synthesized pigment was as readily available and inexpensive as an earthen pigment such as carbon black.¹⁴ It has also been suggested that the use of Egyptian blue in underlayers such as this may point to an overall disregard for the once-prized pigment. Such findings of Egyptian blue beneath layers of paint in portraits at the Ny Carlsberg Glyptotek and the J. Paul Getty Museum have been

¹² Parlasca, 1966, 195-202.

¹³ Thiboutot, 2020.

¹⁴ See figure 1(#6-21375) from Ganio et al., 2015.

discovered, suggesting its use for preliminary drawings. The assumptions that Fayum artists routinely used preliminary sketches or would have utilized carbon black are only hypotheses. Infrared scans similar to those that will be described for the detection of Egyptian blue can detect carbon black and other earthen materials that could have been used for these drawings. At the time of this writing, only a portion of portraits in the APPEAR database have been analyzed for evidence of sub-layer linework. These recent discoveries are helping historians draw conclusions about the ancient workshops, practices, and techniques transferred among generations and culture in the ancient world.

Egypt's arid climate is favorable for the preservation of these organic materials. The portraits have historically avoided being the subject of much academic research because they are something of an anomaly: they were often considered too late to be of much interest to Egyptologists, and too far removed to be relevant to Classical scholars.¹⁵ Representing Egyptian funerary practices alongside Roman portraiture and painting techniques, they are oddities of a multicultural society. The encaustic portraits are thought to be unique survivors of the Greek painting technique, thanks in part to their arid desert burials. Egypt's dry climate has favored the organic materials used here (wax, wood and linen) in such a way that the paintings often show few signs of age or deterioration, whereas similar paintings created in the humid Mediterranean regions have long been lost to us.

Though portraits of this style have been found throughout much of Egypt, they are commonly called Fayum portraits because the earliest works were discovered centrally in the wealthy Fayum region, located in the Nile river valley of northern Egypt. The first recorded

¹⁵ Corcoran, 1995.

find was in 1616 by the Italian Petro della Valle (1586-1642) in Saqqara, though the greatest documented finds of these mummy portraits were excavated by teams under Sir W. Flinders Petrie in the 19th century. Petrie's teams discovered 81 portraits in their first excavation year in Hawara, and another 70 in their second season. These excavations were begun shortly after hundreds had entered the art market through Viennese art dealer Theodor Graf, who supposedly purchased finds at Er-Rubayat (the burial site for the ancient city of Philadelphia) in 1887.¹⁶ Graf's exhibitions and sales of these works sparked considerable interest in the portraits and fueled European intrigue of Egyptian culture. Since the early 19th century, just under 1,000 Fayum portraits have been discovered and sold to private and public collections around the world, though few remain intact with their original human remains, and about one-third of the portraits in the APPEAR database come from Graf's collection.¹⁷ Scant historical records exist due to the portraits being heavily looted or removed with insufficient archaeological record and sold, often separated from their mummy for convenience of transport and resale value.¹⁸

CHAPTER 1: HISTORIOGRAPHY

While it was Thiboutot who, in 2018, presented such uses for Egyptian blue in mummy portraits as optimizing its shimmering quality, sketching medium, and reference to the gods,

¹⁶ Thompson, 1975.

¹⁷ Scant archaeological evidence was recorded during the early excavations purchased by Theodor Graf at er-Rabayat in 1887, furthermore scholars have since disputed the notion that Graf's entire collection came from er-Rubayat, based on the diversity within the body of works. Archaeologist Flinders Petrie worked at Hawara in 1888 and again in 1911. Petrie is credited with being among the first archaeologists to excavate sites at planned successive levels rather than haphazardly, and to establish practices for the documentation and preservation of artefact finds. He developed the system for dating layers based on found potsherds. His documentation was extraordinary for its time, however does fall short of modern archaeological practice and leaves some questions unanswered.

¹⁸ Notebooks from these archaeologists attest that they cut the portraits away from their casings for easy transport and resale on the European art market, permanently separating them from their original mummies.

Ganio with the J. Paul Getty Trust had been hypothesizing about the glassy nature and optical brightening properties of the hue.¹⁹

It was Castiglione (1961) who famously described the “*dualité du style*” of the Roman-era tombs he studied, describing them as a blending of styles of the Greek and Egyptian worlds and creating a foundation for scholars to build upon. Burials of this time seamlessly combined Pharaonic imagery with Hellenistic naturalism to create a hybrid new visual system for the blended burial practice, appropriate for their new multicultural society. Christina Riggs argues Castiglione’s term “style” is ill-defined, as the concept of *style* as applied to art today would have been foreign to an ancient culture, particularly where creators of these works were craftsmen. Klaus Parlasca soon joined Castiglione in the study of this blended funerary culture, focusing on the corpus of wooden panel paintings discussed here. Begun in 1966, his four-volume publication *Mumienporträts und verwandte Denkmäler* was instrumental in cataloguing the known body of portraits and laid the foundation for dating and provenance studies, along with Grimm’s 1974 *Die römischen Mumienmasken aus Ägypten*, which used Roman art as comparison to better understand chronology. We owe the bulk of scholarly attention to these portraits to the groundwork laid by Castiglione, Parlasca and Grimm. The 1990’s brought a real surge in academic enthusiasm, picking up where the scholars of the 60s and 70s left off. Public interest was sparked by new exhibitions of these artifacts, which viewers related to as fresh, familiar faces though they hailed from antiquity. Doxiadis’ 1995 publication *The mysterious Fayum portraits: faces from ancient Egypt* built upon this intrigue, presenting the eerily modern portraits in beautiful, high quality photographs, and extensively

¹⁹ Ganio, 2015.

covers the cosmopolitan cultural mix that was the Fayum region in the Roman era.

Concurrently, Borg (1996) used similar techniques as Parlasca and Grimm, using Roman sculpture to date mummy portraits, based on their hairstyles, clothing and jewelry. See Borg, Corcoran, Riggs and Svoboda for the majority of research conducted on the Graeco-Roman mummy portraits since the 90s, which delve deeper into the cultural identity, funerary and religious beliefs of the time, and how they can inform our reading of the portraits.

CHAPTER 2: HISTORY OF ROMAN EGYPT

Large numbers of Greeks and Macedonians (mostly soldiers) had begun to settle in Egypt by the 4th century BCE, following the conquest by Alexander the Great in 332. These settlers became fully assimilated in an upper-class role. The Roman period of Egypt began with the conquest of Ptolemaic Egypt in 30 BCE and lasted until the formation of the Diocese in about 381 CE. With the fall at the Battle of Actium, Cleopatra, last heir of the Ptolemies, had taken her own life, thereby marking the end of Ptolemaic rule, and Egypt officially became a province of the Roman Empire. The Empire now financially controlled what was one of the wealthiest Hellenistic kingdoms, and Egypt was a prized Roman province for its economic trade routes and agricultural resources along the fertile Nile, with Alexandria at the center. Under the Romans, life for Egyptians remained largely the same, though the taxation system changed. Earlier Greek settlers now became labeled and taxed as a class of “Egyptians” alongside the native Egyptian population, falling in the social scale beneath new Roman settlers.²⁰ The height of Roman

²⁰ Doxiadis, 1995.

immigration came during the second century CE when the majority of the mummy portraits were manufactured.

Egypt at this moment of historical transition continued to be a polytheistic culture; it was a time in which Egypt saw a true intersection of diverse races and religious beliefs. Not only do we continue to see the veneration of ancient Egyptian gods, but foreign elements of Greek, Roman, Macedonian, Jewish and Persian immigrants brought diverse gods and worshipping practices to the region, and towards the end of the Roman rule Christianity was on the rise. As a result, the Fayum mummy portraits are a reflection of the cosmopolitan society, one in which Romans mixed aesthetics and practice with native Egyptians and Greeks from Macedonian armies of Alexander the Great, and furthermore may represent a desire of the population to be represented as “Greek.” Euphrosyne Doxiadis, an expert of the Fayum portraits, notes that the major mummy portrait finds come from middle-class towns where people identified as descendants of Greeks and spoke Greek, but were stripped of their Greek ethnic status for tax purposes.²¹ Thus, the commissioned mummy portraits represent persons wishing to be portrayed as members of the Hellenistic society, but one newly rooted in ancient Egyptian funerary practice.

²¹ A poll tax (*laographia*) was imposed on every Egyptian male resident between 14 and 62 in each metropolis. This included Greeks and descendants of Hellenized Greeks who had immigrated to Egypt in the Ptolemaic Period. Roman citizens were exempt from this tax and enjoyed a higher social status for it.

CHAPTER 3: DATING

Dating of the portraits is approximated by comparing hairstyle, dress and jewelry with contemporary Roman sculpture.²² Portraiture allowed individuals to display themselves in an idealized manner, identifying with Roman trends through hairstyles, jewelry and clothing while submitting to an ancient Egyptian tradition of mummification. Archaeological evidence suggests that the deceased were not often buried wearing the sorts of jewelry portrayed in their images.²³ With limited access to intact mummies or burial sites, and no literary evidence suggesting workshop practices, conclusions of this sort must be seen as purely speculative.

Though the portraits may portray the individuals as they wished to be seen, the painted faces remain imperfect. Unlike the traditional idealized Egyptian funerary mask, the Fayum artists focused on identifying individual characteristics. There has long been some disagreement amongst scholars whether Fayum mummy portraits were commissioned during the life of the subject, or painted in some period post-mortem. CT scans of mummies where the portrait is still attached show the age of the deceased more or less matches their depicted portrait. More recent research continues to suggest the majority would have been painted from life, due to the particularity of features portrayed. This specificity with which the faces were sometimes rendered has even allowed some researchers to study neurological disorders of the subjects.²⁴ Life expectancy of the average male in Roman Egypt was about 40, lower for that of women, however upper-class citizens certainly could have lived longer.²⁵ While some Fayum

²² Petrie 1889, Parlasca 1966, Borg 1996.

²³ Rönkkö, et al., 42.

²⁴ For more on this research, see Appenzeller, et al. "Neurology in Ancient Faces."

²⁵ Bagnall, Frier and Coale, 1994.

portraits do exist depicting younger children or mature subjects, the majority depict individuals as young adults. Subjects depicted in this age range typically appear vibrant and attractive, rarely showing characteristics of poor health. The Egyptian funerary cult focused heavily on the importance of reproductive maturity for the death and rebirth of a person, so to have a death portrait commissioned during one's sexual prime, regardless of the actual age of death would be appropriate.²⁶ A painted portrait was likely commissioned by the figure portrayed or their loved ones; what we can assume is that the final painted image accurately portrayed the liveliness of the individual, in as far as allowing the bereaved to identify their loved ones, and for the soul to identify its former body.²⁷

CHAPTER 4: FUNERARY PRACTICES OF ROMAN EGYPT

Egyptian burial practice had remained relatively consistent throughout the early pharaonic times until just before the Roman period (ca. 3000-30BCE). For centuries, bodies of the deceased were mummified and placed within sarcophagi bearing painted decoration. The long-held belief that the deceased would be granted immortality in the afterlife gave particular meaning to these religious practices. Highly specialized embalmers removed vital organs such as the lungs, intestines, and liver (leaving the heart in situ) and placed these in vessels called canopic jars, which would be buried along with the mummified body. Preserving the body and furthermore decorating it with human depictions ensured that the body could be accessed in the next realm. Beginning in the Middle Kingdom (2030-1650 BCE) these decorations took the

²⁶ See Riggs, 2005.

²⁷ Doxiadis, 1995, 84.

shape of expressionless, three dimensional human faces, often with heavily outlined eyes, thick brows and generic features. These painted funerary masks would be inserted over the face of the mummified deceased, a fashion which persisted alongside the new style of Fayum panels.

The three-quarter to full-frontal bust portrait of Greek tradition replaced the Egyptian painting conventions, which always portrayed the figure in two-dimensional profile. This stems from a belief that depicting a figure from the front opens the possibility of the opposite: the figure with its back turned, departing. This aesthetic decision is in line with an Egyptian culture focused heavily on the continuity from life to the afterlife. Beliefs of the afterlife for Egyptians stated that each person had a *ka* and a *ba*. These two facets of the soul survive after death, and may move freely while periodically reuniting with the deceased's earthly body remains.²⁸ The *ka* is what most readily translates to our modern-day understanding of a soul. It was the life-force of every living thing - even the gods, and identified as their twin spirit. In hieroglyphic imagery, the *ka* is represented as two outstretched arms, warding off evil spirits. The *ba* is represented in imagery as a human-headed falcon. It was the part of the soul responsible for individual personality; this form could freely leave the tomb and depart on journeys to the afterlife, could visit with the gods, and would ultimately return to the tomb each night with essential food and water to provide nourishment to the *ka*. It was essential for the *ka* and *ba* to identify the body to which they belonged, if they failed to reunite, they would experience a 'second death'. For generations this identification was done with a cartouche, or name plate, however by late mummification of the Roman era, it is likely the realistic bust portraits served this purpose. This would explain why such expertise was required in the

²⁸ The *ka* and *ba* make up just a portion of the whole individual. In most eras, humans were thought to have nine aspects of the soul, though in some eras this may have been five or seven. The *ka* and *ba* were most essential to the person's successful passing into the afterlife.

rendering of individualized features, and the grand expenses required for the decoration of mummified remains.

In addition to the pigments described, Graeco-Roman portrait artists continued to use gold gilding, an ancient Egyptian funerary tradition. As gold was associated with the flesh of the gods, its use on mortal funerary materials ensured divinity and eternity in the afterlife. Inclusion in mummy masks and portraits aided the spirit in the afterlife. In February 2021, archaeologists in west Alexandria unearthed a male mummy from the late Ptolemaic or early Roman period interned in a rock-cut crypt with an artificial tongue made of gold. Scholars suggest this gold tongue may have served to help the individual speak to the gods in the afterlife.²⁹ In more ancient times, gold was used heavily in Egyptian mummification elements, often portraying the dead with gold skin like the gods. Mummy masks and portraits, from ancient times through the Roman era, served to protect the body as well as identify it to the family and to the *ka* and *ba*. However its most important function was to help deify the individual in the afterlife.³⁰ Fayum portraits continued this use of gold to associate the dead with gods, however rather than inclusion in the flesh, gold leaf is most often used in gilded laurel wreaths adorning the figures' heads and their Roman-style jewelry. These laurel wreaths are found in less than 10% of all Fayum portraits, though they are believed to have symbolized the eternal divinity found in death.³¹

As will be evidenced shortly, blue had specific associations with the sun and immortality in the Pharaonic period.³² Perhaps in addition to gold, Graeco-Roman funerary artists included

²⁹ Davis-Marks, "Archaeologists in Egypt Discover Mummy With Gold Tongue."

³⁰ Riggs, 2005.

³¹ Barr, et al. 2019.

³² Thiboutot, 2018.

Egyptian blue (used as an equivalent of the precious stone lapis lazuli) for this very function. By supplying a divine image in burial, the body can enjoy divinity in its afterlife.

The portrait placed over the mummified person's face not only acted as a sort of identification for the afterlife, but also served as a memento for the bereaved family. Not just portraits, but entire mummified bodies may have been kept within the home in special shrines or cupboards³³ for years with the immediate family, until eventually it was shipped to a cemetery to be included in mass burials with other mummies from the region or in family plots.³⁴ This is evidenced in part by Petrie's own notes of his excavation sites, where he described the mass burials as secondary deposits (1887-88 Journal: 39, 70). Bodies here were deposited without grave goods, and in a disorderly fashion, often crammed into spaces upright and broken. At the time of his death in 356 CE, St. Anthony, a Christian of Egypt, requested that his body be buried, specifically not presented to view as was customary.³⁵ By Roman-era Egypt, the care and practice of removing organs and saving them in canopic jars declined. The careful preservation of the body was hastened. This is where we begin to see elaborate diamond-shaped wrappings and detailed encaustic portraits or painted shrouds take the place of molded and painted masks, and coffins and sarcophagi were largely abandoned.³⁶

³³ Marsengill, 2018.

³⁴ In his 1888 excavation, Petrie noted that he found fragments of a framed portrait dating to the 2nd century CE with fittings indicating its previous mounting on a wall - see Walker and Bierbrier, 1997. For more on the keeping of ancestors in the domestic setting, see Borg, B. *The Dead as a Guest at Table? Continuity and Change in the Egyptian Cult of the Dead*. 1997.

³⁵ *Vita Antonii*, 90-91

³⁶ There were three main types of mummy wrappings incorporating encaustic or tempera portraits during the Roman era: rhombic, red-shroud, and stucco (incorporating 3-dimensional elements). See fig. 4.1.

Scholars have suggested this may be in part attributed to the eventual melding of Greek and Egyptian cultures living side by side, extending their shared cultural experiences to the rituals of funerary process.



Fig 4.1

Three types of common wrappings from the Roman Era: Rhombic (left), Red-Shroud (center), and stucco (right).

Image credit: Corcoran and Svoboda, *Herakleides*, 2010.

These Egyptian practices are not unlike those of the ancient Romans, who would create masks of their loved ones' likenesses, sometimes even after death to display in the home, though the bodies of the deceased would certainly never have been brought into the homes of the living. They were instead buried outside the city limits in a *pomerium*. However, by the era of Roman Egypt, cremation had taken hold as the primary practice, before burials came back into fashion by the 2nd-3rd centuries CE, as Christianity was on the rise. We know that Greek and Egyptian

culture had begun to blend as the two cultures lived and worked side by side. Though Graeco-Roman Egypt was a multicultural society, and those mummified with portraits were more than likely of an upper-class Greek or Roman origin, it is clear more of the centuries-old funerary traditions of Egypt were adopted by earlier Greek settlers and later by the Romans who joined.³⁷ While the mummy portraits have received the bulk of scholarly attention from the Roman era, they represent only a portion of Graeco-Roman funerary art. Mummy masks, gilt cartonnage, non-mummified burials, and cremations were practiced concurrently. It is important to stress that while the mummy portraits represent a shift in desire to represent cultural identity, they do not represent all of contemporary society. Only about one percent of remains found in the Fayum region were mummified with these naturalistic portraits.

Greeks shared the Egyptian belief of the soul's continued journey after death, however its afterlife was a grim existence. Deceased souls separated from their bodies at the moment of death and were ushered to the underworld. This realm is far separated from the divine, a meaningless place where greatness could not be achieved; nearness of divinity could only be attained during life. Still-living mortals honored the dead or faced punishment of the gods, and prolonged their existence through recollection over generations. An Egyptian attitude must have seemed a promising alternative for Greeks, for theirs was a culture that celebrated death and promised eternity for their souls, and their realm of the dead was shared with the realm of the gods. Only through death could Egyptians know the divine.

³⁷ Doxiadis, 1995.

CHAPTER 5: EGYPTIAN BLUE

Egyptian blue ($\text{CaCuSi}_4\text{O}_{10}$) is believed to be the world's first manufactured synthetic pigment, filling a need for a stable and easily applicable blue without the hefty price tag of grinding the semi-precious stone lapis lazuli for pigment. Prior to the invention and distribution of Egyptian blue, Mediterranean cultures had experimented with using azurite, a naturally-occurring intensely blue copper mineral that closely resembles lapis lazuli or its pigment form: ultramarine blue. Lapis is a semi-precious stone prized since antiquity for its intense deep blue color flecked with gold-hued pyrite. In the ancient world, this stone hailing from the Badakhshan province of Afghanistan was valued nearly as highly as gold and more costly than silver. We could compare its significance to diamonds of today's culture, and it was associated with the wealth of the gods. As such, grinding the stone to use as a pigment was reserved for the rarest occasions, and though azurite closely resembled this hue, its chemical structure made it difficult to paint with and unstable. As a result, the Egyptians created their own blue, likely the first pigment ever fully manufactured by man. It is made by mixing a calcium and a copper compound with silica/quartz and a flux, heating to a very high temperature (900-1000°C).³⁸

Egyptian blue has been a pigment prized for its intense blue color and scintillating effects for painters throughout the Mediterranean from the Bronze Age to the Roman Empire. In the Graeco-Roman era, the resulting frit would be formed into balls for shipment; artisans ultimately ground the product to use as a powdered pigment.³⁹ It has been suggested that by grinding the frit themselves, artists could maintain control over how the colorant appeared.

³⁸ Chase, 1971; Tite, Bimson and Cowell, 1984.

³⁹ Svoboda, Spaabaek, and Cartwright, 2011.

Egyptian blue can range in saturation and hue from bright turquoise-blue, to nearly blackish blue, and even seeming almost purple depending on the grain size and firing, and typically has a shimmering, glassy appearance. Vitruvius, in his *De Architectura* written in the beginning of the first century BC, describes the ancient production of Egyptian Blue:⁴⁰

“Methods of making blue were first discovered in Alexandria, and afterwards Vertorius set up the making of it at Puzzuoli. The method of obtaining it from the substances of which it has been found to consist, is strange enough. Sand and the flowers of Natron are brayed together so finely that the product is like meal, and the copper is grated by means of coarse files over the mixture, like sawdust, to form a conglomerate. Then it is made into balls by rolling it in the hands and thus bound together for drying. The dry balls are put in an earthen jar, and the jars in an oven. As soon as the copper and the sand grow hot and unite under the intensity of the fire, they mutually receive each other’s sweat, relinquishing their peculiar qualities, and having lost their properties through the intensity of the fire, they are reduced to a blue color.”⁴¹

Though here Vitruvius attests the first Egyptian blue was manufactured in Alexandria, we know from archaeological evidence that the pigment had been used well before Alexandria was founded in 331 BCE. Evidence shows us that Egyptian blue was used as the predominant blue pigment as early as 3250 BCE, with examples of it used in tombs around 2300 BCE.⁴² The earliest documented use of Egyptian blue is on a predynastic-period bowl with markings ‘attributed to the Scorpion King’.⁴³ Production debris in the form of frit balls has been found at presumed factory sites in the Egyptian sites of Memphis and Amarna.

Egyptian blue was used both as pigment and in the decoration of small objects from

⁴⁰ For more on this see Davidovits, 2004.

⁴¹ Vitr. 7.11.1

⁴² Tite and Hatton, “The Production Technology of, and Trade in, Egyptian Blue Pigment in the Roman World.”

⁴³ See Corcoran, 2016. “Although conservators have found evidence from as early as late Dynasty One, Egyptologists have traditionally dated the use of Egyptian blue much later, to Dynasty Four (ca. 2500 BCE). I knew that if the blue pigment on the bowl could be confirmed as Egyptian blue, and be shown to have been applied to the bowl at the time of its manufacture, that this would definitively push back our dating of the use of Egyptian blue to the dawn of pharaonic history.”

Egypt to the Near East and throughout the Roman Empire. Egyptian blue samples dating from the first and second centuries AD have been found in Delos, Pompeii, Malta and Rome in the form of frit and tesserae. The pigment was commonly used in the wall-paintings, mosaics and marbles across the Roman Empire, frequently found at Pompeii, Rome, northern Italy, as well as Greece and Turkey. Though it was originally manufactured in Egypt (Memphis in particular) and transported, archaeological evidence had discovered manufacturing sites across Mesopotamia and Italy (Cumae, Liternum).⁴⁴ Though it has been found in artwork across most of the Greek islands, there is no evidence the pigment was manufactured there, hence it is likely an import.⁴⁵ This may point in part to the cultural practices regarding Egyptian blue in the Mediterranean. While the same materials were available to all, Greeks did not take part in the production of Egyptian blue, nor to our knowledge did they employ it in the same ways as their Roman neighbors. Egyptian blue is believed to have fallen out of use altogether after the fall of the Roman empire and was not thought to have been used widely again until the 19th century, though a recent study detected its overwhelming presence in Raphael's *Triumph of Galatea* completed in 1514.⁴⁶

CHAPTER 6: GREEK PAINTING AND THE FAMED FOUR-COLOR PALETTE

The Fayum portraits serve as some of the only remaining examples of painting on wood or linen that we know would have been common throughout the ancient world, and are key in

⁴⁴ Skovmøller, Brøns, and Sargent, 2016.

⁴⁵ Benson, 2000.

⁴⁶ "Raphael Used Egyptian Blue in Galatea - English - ANSA.It."

understanding the Greek painting tradition. Some paintings on stone, glass or walls give us an idea of the Greek portrait style, while those on organic substrates have almost all been lost to us. There are some notable exceptions, including the Pitsa panels, wooden tablets dating to around 540-530 BC and three wooden shields from Dura-Europos, likely dating to just before 256 CE when the city was abandoned after its conquest. Analysis of these Hellenistic-style shields depicting scenes of the Trojan War from the Iliad shows the presence of organic binder, possibly egg, for the substrate layer and also decayed beeswax on upper layers. This may imply a combination of tempera and encaustic techniques were used, and provides a valuable parallel for Fayum portrait researchers to study. One imperial panel has survived as well, dating to around 200 CE. This panel is the Severan Tondo portraying the Emperor Septimius Severus and his family, and is painted with egg-based tempera (fig. 6.1)

The materials and visual style relate to tempera Fayum portraits made contemporaneously. Examples such as this are rare, and we gain a better understanding of Greek portrait painting traditions from marble portraiture and extensive literary sources.

Thus far, no evidence can support a theory that Greeks would have used blue to render flesh tones. We do have surviving evidence of Egyptian blue in the polychromy flesh of marbles and in wall paintings from the Italic lands of the Roman Empire, as well as works from Egypt, but literary and physical sources do not show this to be the case in Greece. The Ny Carlsberg Glyptotek has detected Egyptian blue in an Amazon marble from the Roman Imperial period, marbles from the 3rd c. CE, the Cuirass bust of Caligula from the 1st c. CE. There are also several Roman wall paintings in their collection which show the use of Egyptian blue to render the flesh of two figures, one of them a satyr. Additionally, the British Museum has



Fig. 6.1
The Severan Tondo
 2nd century AD
 30.5 cm (12 in) diameter
 Antikensammlung, Altes Museum, Berlin

studied the rich traces of polychromy on the Treu Head c. 140 CE and detected Egyptian blue.⁴⁷ Though Egyptian blue has been found to have been used by artists at this time in Greece, we have yet to detect its use in the modulation of flesh tones. This conclusion is subject to change, as the investigative methods used to detect Egyptian blue are still new, and many ancient artifacts have yet to undergo chromatic research.

Scholars have suggested a few possible reasons why artists of the mummy portraits may have included Egyptian blue in ways that are not visible to the naked eye. The most prevalent of these theories are that the ancients favored Egyptian blue more for its properties as an “optical brightener” or pigment modifier and for its shimmering qualities than strictly for its blue hue, and that it was far more plentiful than previously thought.⁴⁸ We are now faced with

⁴⁷ Skovmøller, Brøns, and Sargent. 2016.

⁴⁸ Ganio, et al. 2015.

challenging the assumption that Greeks imported not only their naturalistic way of painting, but their so-called four-color approach to rendering.⁴⁹

Greek tetrachromy is the use of a limited palette, relying on only four earth-tones to complete masterful works. We know of this method of working from literary sources, most notably Pliny:

It was with four colours only, that Apelles, Echion, Melanthius, and Nicomachus, those most illustrious painters, executed their immortal works; melinum for the white, Attic sil for the yellow, Pontic sinopis for the red, and atramentum for the black; and yet a single picture of theirs has sold before now for the treasures of whole cities. But at the present day, when purple is employed for colouring walls even, and when India sends to us the slime of her rivers, and the corrupt blood of her dragons and her elephants, there is no such thing as a picture of high quality produced. Everything, in fact, was superior at a time when the resources of art were so much fewer than they now are. Yes, so it is; and the reason is, as we have already stated, that it is the material, and not the efforts of genius, that is now the object of research (Pliny NH 35.32)

Cicero, too, asserts that Polygnotos, Zeuxis and Timanthes created their greatest works with no more than these four colors. So with the use of only white, black, red and yellow, the most masterful Greek works were said to have been created. Vincent J. Bruno, whose text has long been the standard for Greek painting, suggests that while Greeks did in fact use blue, they did not consider it a color but as a darkener to modify the other four pigments. This would make sense in reading the portraits of the Fayum, which appear to stay within the realm of the warm earth tones, but whose pigments have been modified with the use of blue.

Recent scholars such as J.L Benson and Jennifer M.S. Stager write about the importance of accepting that our modern understanding of color is shaped by Sir Isaac Newton's color

⁴⁹ For more on this subject, see especially Bruno 1977, Brecolaki 2006, Rouveret 1989 and Scheibler 1994.

theory, which only came about in 1665 with the new understanding that light is made of a spectrum of colors. This theory defines color as a property of light, which would have been fundamentally different to how the ancient cultures understood the role of color. This, in part, is why studying the original polychromy of ancient artworks is as important as the works as we see them today, for the pigmentation applied by artisans was very much a part of the visual language used in the ancient world.

Benson describes the traditional Greek four-color theory as potentially relating to a quadripartite conception of the natural world.⁵⁰ This would mean the Greeks mentally associated red, yellow, black and white with the four elements (earth, air, fire and water), the four seasons (winter, spring, summer and autumn) and to the four bodily humors (blood, yellow bile, black bile, and phlegm). Although literary evidence describing this Greek color theory is limited, we may surmise that it was such common knowledge that it did not warrant description.

Neither Egyptians, Greeks nor Romans had a linguistic term used strictly for the color blue. The Egyptian term most commonly associated with the use of Egyptian blue and lapis lazuli is *ḥsbḏ*. This in itself is a foreign loan-word deriving from the term for the stone lapis lazuli. It seems there is a pattern in Egyptian language where the names for colors are derived from the material with which they can be found, suggesting colors related to the material world and not to the depictions of it. Many authors agree, color in the ancient world was directly tied with the material world.

The Greeks had κύανος (*kyanos* or *kuanos*) a descriptor for a blue-black hue which lends itself to some of our modern terms deriving from the color: cyan, and from that cyanosis: the

⁵⁰ Benson, 2000, 15-48.

changing of skin's hue to blue as oxygen leaves the blood in death. This term, like the Egyptian *ḥsbḏ* probably also derived from the word for lapis lazuli, though was used more often to describe bright, shimmering qualities than specifically blue.



Fig. 6.2
Zeus and Ganymede
 C. 480-470 BC
 Archaeological Museum of Olympia

A lesser-discussed possibility for the inclusion of Egyptian blue in the flesh tones of Fayum portraits may derive from the pigment's divine associations. In her essay Jennifer Stager delves into the literary descriptions of *kuanos*, noting the term has been used for descriptive aspects of the “divine and heroic body” since the 3rd millennium BCE in Greek, Egyptian and Near Eastern examples.⁵¹ Stager exemplifies this idea of pigment serving as material and imparting divine associations when describing the creation of the *Bluebeards* of the Athenian

⁵¹ Stager, 2012.

Acropolis, as well as a polychrome terracotta sculpture of Zeus and Ganymede from the sanctuary of Zeus at Olympia (fig. 6.2).



Fig. 6.3
The Bluebeard pediment
Hekatompedon (Acropolis Museum, Athens)
C. 560 BC
Polychromed limestone

When describing the original polychromy of the statue, Zeus' beard, full hair, eyes, eyelashes, and eyebrows are all painted with the rich blue-black pigment that is most likely Egyptian blue, while those of Ganymede are reddish-brown. Stager argues that without the symbolic emphasis of *kuanos*, the imagery of the sculpture would not work.

Kuanos allows the audience to understand Zeus' divinity and emphasizes his immortality in direct contrast to Ganymede's mortality. Stager similarly dissects the trio of figures from the Hekatompedon of the Archaic Acropolis (fig. 6.3) commonly known as the

Bluebeards (c. 560 BCE). Much of the original polychromy remains, notably the eponymous blue beards and hair. Concerning this, Stager states,

“the surface of the sculpted hair and beards painted with a 3-dimensional layer of Egyptian blue pigment creates the effect of hair sculpted from blue material or lapis lazuli. The shallow volume of the pigment layer is effectively deepened through its contact with sculpted limestone. The pigment itself takes up real space.... The blue color appears as pigment (actual material), lapis lazuli (the material referent), and as the even less tangible *kuanos*. ... pigment plays between its ‘true’ material state (inexpensive components of Egyptian blue), its simulacrum as sculpted lapis lazuli (the high-value and high-status stone), and its representation of blue beards, replete with divine associations.”

Through these examples, Stager is arguing that the pigments chosen by ancient artisans represented more than the physical perception of the natural world - they were seen and used as material itself (in this case Egyptian blue or azurite could serve in place of actual lapis lazuli.) Newton’s theories of the color spectrum, particularly when applied to the ancient world, were challenged by German writer Johann Wolfgang von Goethe. Goethe advocated in his 1810 *Theory of Colors* for a more philosophical approach to the experience of color than Newton’s physical one. In his color wheel, Goethe established colors through human psychology, associating them with the four categories of human condition: rational, intellectual, sensual, and imagination (see fig. 6.4).

The way in which he defined color as an emotional experience did little to advance the scientific understanding of color, though it is through this sort of reading of the color wheel that we must approach the language of color in the ancient world. By many accounts, the expansion of language for colors grew through the relationship with the material world. This is evidenced through literary examples of Mediterranean cultures using words for lapis lazuli to mean either

the stone itself or to refer to a shimmering brilliance or deepness, which are inherent qualities of the color. This is especially true in Greek for the term *kuanos*, which Plato describes as being composed of white (*leukos*), black (*melas*), and shimmer (*to lampron*).⁵² The ancient Greek

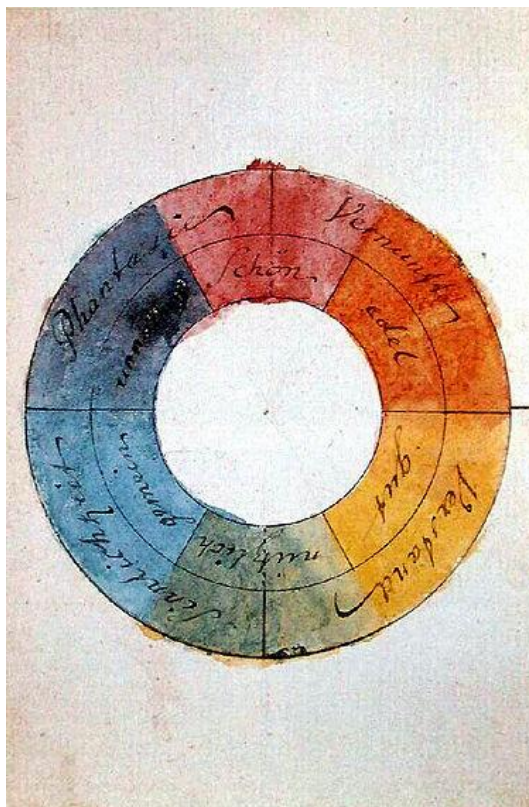


Fig. 6.4
Color wheel as designed by Goethe,
1810.

language seems to have had a wealth of linguistic terms to describe lustre and shimmer while seeming somewhat limited in the description of hues. Plato in *Timaeus* described the formula for *kuanos* = black+white+to *lampron*. For Greeks, black and white were not separate from the color spectrum, but were primary colors to compose it. Homer's texts suggest divine associations for the term *kuanos* - most specifically when he uses *kuanos* in relation to the body. In the *Odyssey*, Homer actually uses two terms that could be used to describe blue: *kuanos* (or

⁵² Plato *Tim.* 68c 5-6

kyanos) which the Greeks used to describe lapis lazuli and could be defined as dark blue or almost black, and *glaukos* which might mean a greyish-blue or perhaps refers to the bright, gleaming quality the Greeks so loved. *Glaukos* is most often used by Homer to describe the eyes of Athena, which are said to be gray, flashing, bright and owl-like. Neither term would be applied to describe the blue of the sky and heavens above. *Glaukos* is just one term he used to describe the ever-changing sea, in this case in rougher conditions and appearing blue-grey or bright, though at times he describes it with *kuanos* to describe it appearing nearly black, or ‘wine-dark’, whitish or purplish, though never distinctly blue. This goes too for his descriptions of the sky, which is never described with the color blue, nor colors at all for that matter. The disparity of color descriptors from modern times and ancient Greek lead some scholars, most notably William Ewart Gladstone who, in the 19th century, speculated that the eye organs of the ancients had not yet fully developed, “hence their strong sensitivity to light rather than hue, and the related inability to clearly distinguish one hue from another.”⁵³ Gladstone’s theory that Homer and other ancient authors were color-blind is largely dismissed today, with the more popular theory that the ancients had a different visual language that cannot be equated with our post-Newtonian color theory.

There are many descriptions of gods of the ancient world that involve the color blue, linking the hue to the powers and awe the gods possessed. Homer describes several instances where the symbolic nature of changing a mortal’s skin or hair to a shimmering *kuanos* aligns them with the gods or the afterlife, and in which the hair of the gods themselves is described as *kuanos*. Athena alters Odysseus, making his hair and skin *kuanos*, before he is reunited with

⁵³ Gladstone, 1858.

Telemachos and his true identity revealed. Telemachos wonders if he is a god and says: “Friend, you’re a new man -- not what I saw before! Your clothes, they’ve changed, even your skin has changed--surely you are some god who rules the vaulting skies! Oh be kind, and we will give you offerings, gifts of hammered gold to warm your heart-spare us, please, I beg you!”⁵⁴ It is unlikely Athena actually turned his skin a brilliant bright blue, but imbued it with the light and life of an immortal. Alternatively, Hector’s hair is described as turning *kuanos* as his lifeless body is dragged behind Achilles’ chariot in the Iliad, his skin covered and protected by Apollo’s golden aegis as Achilles attempts to disfigure his corpse⁵⁵. In describing Thetis’ mourning over her son’s death, she is described as donning a dark blue veil:

ὥς ἄρα φωνήσασα κάλυμμ’ ἔλε δῖα θεάων
κυάνεον, τοῦ δ’ οὐ τι μελάντερον ἔπλετο ἔσθος.
 95βῆ δ’ ἰέναι, πρόσθεν δὲ ποδὴνεμος ὠκέα Ἴρις
 ἤγεῖτ’· ἀμφὶ δ’ ἄρα σφι λιάζετο κύμα θαλάσσης.⁵⁶

Hector and Odysseus were mortals, gifted with *kuanos* by the gods.

Homer, throughout the Iliad and the Odyssey, often describes the hair of the gods as ὑακινθίνῳ ἄνθει ὁμοίως “like the hyacinth,” which has been translated to either curling like the petals of a hyacinth, or, when used to describe color, to mean dark, purplish, or blue. For Greeks, the importance of color was more based on its relative luminosity, from dark to light, than to its local hue. Κυάνεος (“blue”) is more often used in texts to describe darkness in hair and eyes. Though the hair of Greek gods is often described as golden or blond, even Zeus, he markedly had dark blue-black eyebrows and beard; Hera also shared the dark blue eyebrows.

⁵⁴ Hom. *Od.* 15.205-208.

⁵⁵ Hom. *Il.* 22. 400-404.

⁵⁶ Hom. *Il.* 24. 93-96.

Poseidon and Dionysus too, are described as having dark locks - κυανοχαίτης - which was used by Hesiod as well as Homer to describe dark blue-black hair.⁵⁷ Then there is the apotropaic function of lapis lazuli as described in Homeric texts as inlaid in the shields of Achilles and Agamemnon. The breastplate of Agamemnon, gifted to him by the divine Cinyras, son of Apollo, is described in vivid detail as being constructed of bands of dark blue lapis lazuli with gold, silver, bronze and tin, with blue serpents writhing as a warning to men.⁵⁸

Lapis lazuli was associated with the gods throughout the Mediterranean and Mesopotamia. Bricks of the famed Ishtar Gate,⁵⁹ now reconstructed within the Pergamon Museum in Berlin, were painted with rich blue glazes meant to replicate lapis lazuli.⁶⁰ As the name implies, the gate is dedicated to Ishtar, a Mesopotamian goddess of love, fertility, war and sex, originally known in Sumer under the name “Inanna.” Lions - her primary symbol - line the processional gate. Inanna/Ishtar’s most famous myth is the story of her descent into the underworld *Kur*. Her story is told through famed poems in which she carries with her seven items of lapis lazuli, and her own body is described as being composed of lapis lazuli, silver and wood; her body is metaphorically linked to the gate itself by constructing it of the same materials.⁶¹

⁵⁷ Stager, 2012.

⁵⁸ Ten bands of blue enamel (melanos kuanoio) spanned it, spaced by twelve of gold (chrusoio) and twenty of beaten tin (kassiteroio) and dark blue (kuaneou) serpents writhe toward the throat, three each side, shimmering bright as rainbows (irissin) arched on the clouds by Cronus’ son, a sign to mortal men. (Hom. *Il.* 11.17-30)

⁵⁹ The Ishtar Gate was a richly ornamented gate to the inner city of Babylon (modern-day Iraq) constructed during the reign of King Nebuchadnezzar II in about 575 BCE.

⁶⁰ There is some disagreement amongst scholars whether the Ishtar Gate facade is glazed with actual lapis lazuli or with pigments mimicking the stone’s hue. The cost of glazing the entire gate and processional way with lapis would have been expensive, though it certainly was made to appear as such.

⁶¹ In the original inscription to the gate, King Nebuchadnezzar described the gate as being composed of bricks of cut stone (lapis lazuli), with doors of cedar wood adorned with bronze.

Egyptian gods mostly had skin of gold and hair of lapis lazuli, much like the Homeric uses for *kuanos*, likely referring to the blueish color that raven black hair takes on in different lights; this is the darkest of the blues. Many Egyptian deities were, however, depicted with blue skin, particularly those who ruled the sky, air or water: Nun (god of primordial waters), Ha'py (god of the Nile River), Horus and Nut - as they are both sky deities, were all depicted with skin of blue. Blue had special significance in the funerary context of both Pharaonic and Roman-era Egypt. It was the color of the sun, life, and immortality. The major gods of Egyptian religion, particularly as relating to the funerary cult were Ra, Osiris and Isis, and their son Horus. Ra is the god of all life and creation - he is described as having skin of gold, bones of silver, and hair of lapis lazuli - in fact most Egyptian gods are described this way. Humans were said to have been created by his sweat and tears. It is said that all of Egyptian funerary cult is modeled after the life of Osiris, who is often portrayed as a blue or green skinned god. Osiris is the dead god of the afterlife; he is known not for his reign on earth, but rising to great divinity through death.⁶² Osiris was the son of the earth god Geb and Nut, a goddess of the sky. Set (or *Seth*), his jealous brother, murdered him and dismembered his body, depositing the pieces into the Nile where they would be spread throughout the land. Osiris' sister-wife Isis journeyed across Egypt to retrieve his body and assemble him, though a fish consumed a portion of his body when it was severed by Set, so, though Isis had resurrected him, he was no longer whole and could not rule life on earth. He reigned once again in death, and became the god of Duat, the Egyptian underworld. His story is mirrored in the dismembering of the mortal body through the 70-day

⁶² In the Middle Kingdom, Osiris replaced the jackal-headed Anubis, god of the dead, mummification and the underworld prominently worshipped in the Old Kingdom. In the Ptolemaic period, Anubis was closely aligned with the Greek Hermes, as both ushered the dead's souls into the underworld. Anubis is one of the only animal-headed gods welcomed into Greek and Roman mythology.

mummification process, and the reunification of the whole in death. His green or blue skin reflects his continual death and resurrection, as well as his reign over life and fertility. He taught the humans, after their birth from Ra, to be cultured and cultivate the land.

Isis, who helped resurrect Osiris from the dead, is herself associated with the funerary cult. She is said to have sat on the council which judges mortal souls, and aids them in their entrance to the afterlife. She, too, is portrayed with golden skin and lapis hair. Their son, Horus defeated his uncle Set, restoring order to the land. In later generations he became merged with the god Ra, to become Ra-Harakhte, and represented a promise from the gods to take care of the suffering of humanity. He conquered the darkness each day at dawn, likening him to the resurrection of man.

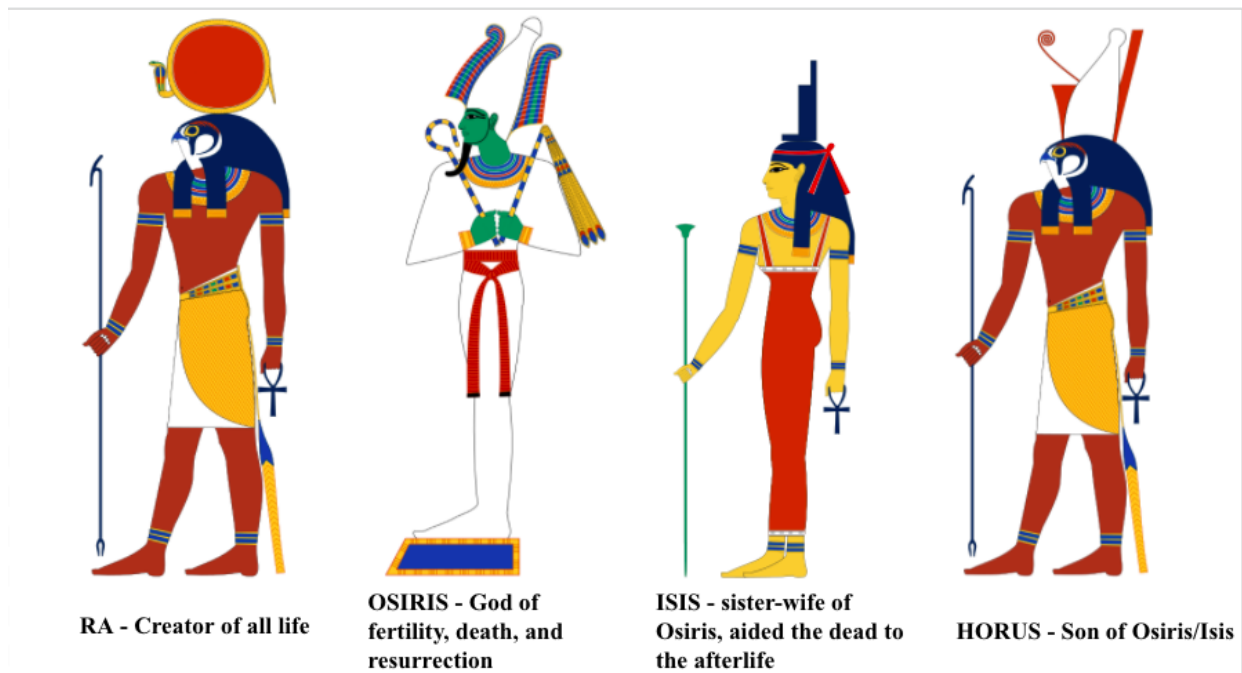


Fig. 6.5
Traditional depictions of four major Egyptian deities

The ancient gods of Egypt continued to be worshipped during Roman rule, though the merging of deities from the Ptolemaic and Hellenistic periods, when Greek populations spread across the Mediterranean, served to unify the mixed population of native Egyptians and Greek colonists. The Ptolemies pushed forward the cult of the god Serapis, who incorporated traits of Osiris with a Greek appearance and traits of their gods Dionysus and Pluto, ruler of the Greek underworld. The Egyptian goddess Isis was worshipped alongside Serapis by Greeks from the Hellenistic period forward, and by the first century BCE, the Isiac cult was absorbed as a major part of Roman religion. Her role as mother and wife in Egyptian myth propelled her to become the inventor of marriage, the protector of women, childbirth, and virginity. She was symbolically aligned with the moon, governing the sea and protecting ships as the feminine counterpart to Serapis/Osiris' alignment with the sun. In the Graeco-Roman religion, she continued to serve a role in death to some degree, as her followers believed worshipping her could help guarantee them a better afterlife and that she had power over fate. Serapis and Isis are often portrayed alongside one another in art, as pictured in fig. 6.6.



Fig. 6.6
Panel including image of Serapis (left) and Isis
(far right).
Tempera on panel
A.D. 100–200

Greeks preferred their gods to reflect human characteristics and generally rejected animal-headed gods, so Serapis appears bearded and mature, much like Zeus or Jupiter. In this tempera triptych panel c. 100-200 CE of Roman Egypt, Serapis wears a modius or grain measure on his head, emphasizing his role as a fertility deity. The Greek god Hades also wore this symbol, linking Serapis with the role of god of the Underworld. Perhaps as religions and depictions of gods changed and merged between cultures, the painted flesh portraying the dead could liken them to these gods they would meet in their afterlife.

Like the Greeks, ancient Egyptians lacked an abstract color term for blue. They, too, used a limited palette of black, white, red and instead of yellow, green. These colors related to their surrounding natural world, black for the spine of a crocodile, white for the brilliant sun, red for flamingos, and green for the papyrus plant. Egyptologists have made similar assumptions about Egyptians preference for lustre, particularly in relation to semi-precious stones, over their hue. The words for faience (*thnt* or *hsbd*) could also mean brilliance or lapis lazuli, respectively. Egyptologist Paul Nicholson asserts this interchangeable use of words for lustre and material helps to confirm that Egyptians saw pigments as direct substitutes for the materials themselves, rather than abstract representations of them. Famous Egyptian blue glazed hippos from Egypt (fig. 6.7) were held in high esteem, their glaze mimicked not only the waters of the Nile but of turquoise and lapis lazuli. Hippos, the dangerous and unpredictable animals that they are, were associated with Seth, the god who killed his brother Osiris. Making their homes in the Nile, capable of staying underwater for long periods of time before re-emerging, they were also associated with life and reincarnation. It was believed that these Egyptian blue figurines, like the shield of Agamemnon, carried apotropaic functions, and could

transfer life and power of reincarnation to their beholders.



Fig. 6.7
Hippopotamus ("William")
 ca. 1961–1878 B.C.
 Middle Kingdom
 Metropolitan Museum of Art, New York

CHAPTER 7: PAINTING TECHNIQUES AND CONSTRUCTION MATERIALS

The tradition of portrait painting on panel would have been imported from the Greeks, particularly in the encaustic methods which they invented. Artisans of Roman Egypt also learned how to portray faces in the naturalistic Greek manner, identifying individual characteristics and modulations in flesh tone which give life to the images we see today. They inherited these techniques from the great painters of Greek past, as described by Pliny. Since so few physical examples of Greek panel paintings survived to this day, we must look to written tradition to understand the artistic heritage.

Sometime around 450-400 BC Athenian painter Apollodorus introduced *skiagraphia*, or literally ‘shadow painting’. He is believed to have been the first painter to seamlessly transition paints from light to shadow, like early chiaroscuro. Apelles, a famed Greek painter from the

fourth century BCE, is said to have mastered a technique by which the subject was brought to full dimensionality through the addition of highlights and lustre.⁶³ He understood that dark tones recede and light ones advance, thus creating the illusion of space when applied correctly. In short, the Greek painting style introduced naturalistic representation in portraiture, rendering the figure through the handling of gradations thus eliminating the need for outline. The imitation of nature or ‘reality’ was of greater importance to the Greeks than the Egyptians; no doubt the true-to-life representational portrayal of the deceased in the Fayum portraits came from Greek artistic tradition.

Some scholars have questioned the cultural significance of these portraits being painted upon imported wood from the northern Mediterranean.⁶⁴ Just as the painting style and accoutrements (hairstyle, jewelry and dress) identify the deceased with a Graeco-Roman ancestry, so may the origins of the wood and pigments themselves. Recent studies suggest that the imported *Tilia* (lime/linden wood)⁶⁵ appears to have been the panel wood of choice for the majority of the Fayum portraits.⁶⁶ Widespread availability of this time throughout Europe made it a readily available import, and their growth pattern allows for a consistently straight grain pattern not subject to undesirable warp.⁶⁷ Native woods available to Egyptians at this time would have included *figus sycomorus* (sycamore fig, unrelated to the European sycamore of today) or palm, woods significantly less durable for this application though were sometimes used. Cartwright notes that sycamore fig in particular is light and prone to insect infestation,

⁶³ No painting of Apelles’ exists today, we must rely on literary evidence accrediting his mastery of technique.

⁶⁴ See Cartwright, 1997 106-11; Walker, 2000.

⁶⁵ Genus *Tilia*, is also known as linden, lime or basswood.

⁶⁶ 73% of the panels analyzed by Caroline Cartwright.

⁶⁷ Svoboda, Spaabaek, and Cartwright, 2011.

though has religious connotations dating to the Middle Kingdom. Artisans, particularly those working in later years of production, cut the wood along the radial longitudinal plane to easily produce very thin panels, and painted the portrait along the vertical grain of the wood.⁶⁸ The portrait is then inserted above the deceased's face, which curves slightly, thus requiring some flexibility in the wood. Linden is superior in these regards for its resistance to splitting from the inevitable convex warp. In their collaborative research on wood identification, Caroline Cartwright, a wood anatomist working with APPEAR noted that 73-75%⁶⁹ of the panels surveyed between the British Museum, the J Paul Getty Museum at the Villa, Los Angeles and the Ny Carlsberg Glyptotek, Copenhagen were constructed on linden⁷⁰ with the indigenous *Ficus sycomorus* following at 13.5%, and 2.5% on imported coniferous *Cedrus libani* (cedar of Lebanon). It is likely that artisans from Greece would have preferred to work on woods they had familiarity with. It is additionally possible that the use of imported materials may have served as yet another method of cultural identification for the wealthy inhabiting a multi-ethnic society.

Many panels have been crudely cut out of their original settings, thus destroying evidence of their preparation. Panels which maintain their original shape fall into three categories of cut shapes, which have been roughly associated with the province of origin since Klaus Parlasca's study and categorization of the majority of found mummy portraits, including their preliminary provenancing.⁷¹ Antinoopolis panels have been identified as 'stepped', or

⁶⁸ Svoboda, Spaabaek, and Cartwright, 2011.

⁶⁹ 86 out of a total of 118 portraits painted on *Tilia* sp.

⁷⁰ Svoboda, Spaabaek, and Cartwright, "Portrait Mummies From Roman Egypt: Ongoing Collaborative Research on Wood Identification."

⁷¹ Parlasca, 1966.

having an overall rectangular shape with 90-degree corners at the shoulders, cutting in to create a narrow rectangular shape from the top of the head to the shoulders. In general, panels rounded at the top tend to come from the Hawara region, and panels with approximately 45 degree angles cut at the upper corners come from er-Rubayat. Approximately 30 mummy portraits are still attached to another sub-category of red-shroud wrappings.

Fayum portraits were created using two material methods: encaustic and tempera. It is assumed that artists working in the later years of mummy portrait production worked largely with the brush and tempera paint. Encaustic (the term coming from the Greek meaning to ‘burn in’) appears to have been the predominant method throughout the Fayum tradition, particularly favored among workshops of highly skilled naturalist painters, as gold leaf and encaustic were more expensive materials. Tempera-based painters may have been employed by less wealthy citizens, though to have participated in mummification and commissioned portraits one would certainly have had means. As research on these portraits advances, we are beginning to realize these two mediums may not be mutually exclusive, and in some instances both paints have been identified on a single portrait.⁷² The tempera technique is thought to have derived more from Pharaonic Egyptian practices rather than the Greek tradition. These portraits can be identified by their even, untextured surface and matte, somewhat chalky finish (fig. 7.1).

These paintings often utilize heavy, dark outlines delineating elements of the portrait such as the facial features or accessories, and do not display the visual depth and naturalism that we see in works characteristic of the encaustic technique. While we have come to know

⁷² For more on this ambiguity, see Sutherland, Sabino and Pozzi, 2018.



Fig. 7.1
Examples of Fayum portraits made with tempera

tempera through the Renaissance technique of mixing pigment with egg, these works are likely made by mixing pigment with a water-soluble medium such as animal glue.

The encaustic method can often be visually identified by characteristic impasto-like texture of the painting surface and naturalistic rendering through highlight and shadow. This medium requires the artist to mix pigment with a wax kept melted over a heated plate; the medium must have remained warm throughout the painting process. Primary large sections of color are first applied with a brush, the marks of which are easily identified in areas such as the background or robes. In areas requiring greater detail, paint medium is applied in a thick, impasto-like fashion and details are worked with a pointed metal tool called a *cestrum* or *cauterium*, which could also be heated to maintain pliability of the medium, resulting in a textured surface. Some have theorized that the thin cut of the encaustic panels suggests artists may have warmed these as well to extend the working time of the wax medium.⁷³ The finished product mimics the depth and glow of later-developed oil paints, enhancing the illusionistic

⁷³ Encaustic works on panel are typically between 1.5-2 mm thick. While some panels could be up to 1.5 cm, these are typically later, tempera works.



Fig. 7.2
Examples of Fayum portraits made with encaustic

qualities of the portrait. Removed from their funerary context, they certainly appeal to us as near relatives of modern oil painting. When Petrie first discovered these portraits he commented on their modern qualities, relating them to the modern oil paintings of Constable or Turner.⁷⁴ Prior to the excavation of the first Fayum portraits, evidence of the encaustic technique was found exclusively in literary sources such as the writings of Pliny the Elder, Seneca, and Dioscorides. Pliny's *Natural History* is by far the most thorough account, though is by no means exhaustive. He devotes book 35 to the Greek-invented encaustic methods, which were mostly used for ship painting, though could also produce panel or mural paintings.

CHAPTER 8: TECHNICAL EXAMINATION OF PAINTINGS

In 2013, the Getty Museum through the direction of conservator Marie Svoboda spearheaded a collaborative research project known as APPEAR. The aim of APPEAR is to

⁷⁴ Picton, Quirke, and Roberts, 2018.

collect data from institutions and private collections holding mummy portraits and relevant ancient panel paintings, in order to compile common technical, scientific and historic information. Data collected includes dating, provenance and archaeological findspots, as well as technical examinations of shape and size, pigment and paint media, wood species, unique inscriptions, brush and stylus markings. Patterns and similarities may provide insight into established workshops. Through use of this aggregated database, museum professionals and researchers can compare and exchange information with the intention to uncover parallels and solve some of the greater mysteries of the Fayum. As of 2019, 41 institutions have provided information on about 285 paintings. The database includes portraits from across the Fayum region and beyond, including Hawara, Tebtunis, Kafr Ammar, Fag el-Gamus, Thebes, El-Hibeh, Tanis and Karanis. Portraits have additionally been stylistically attributed to er-Rubayat, Marina el-Alamein, Saqqara, Antinoöpolis, Akhmim, Abusir el-Melek and Aswan.⁷⁵ Portraits within the database cover roughly one-third of all known mummy portraits.

Part of the resurgence of interest in the study of Fayum portraits can be attributed to the innovations of non-invasive technologies which crucially advance the study of the works. Many larger institutions now have in-house conservation teams conducting high-resolution imaging and spectroscopic investigations to provide information about their antiquities. Techniques such as multispectral imaging (MSI), reflectance transformation imaging (RTI), portable x-ray fluorescence (pXRF) and x-ray radiography allow researchers to analyze the works without taking large samples of pigments or wood, which are too fragile to begin with. Multispectral imaging can identify many facets of the work not visible to the eye, and these

⁷⁵ Barr, 2018.

techniques tend to be relatively inexpensive and readily accessible to most facilities, requiring only a DSLR camera, radiation sources, filters and silicon-based sensors. These procedures employ wavelengths ranging on the spectrum from ultraviolet to the near-infrared, between 350-1100 nanometers. Portable x-ray fluorescence can identify specific elements from the surface of the painting by their metal alloy components. Participating research institutions are also using imaging spectroscopy to determine how artists worked: what materials were used for preparatory sketches and panel construction, what instruments were used to apply paint or encaustic mediums, and how the materials have changed over time.

CHAPTER 9: IDENTIFYING THE PIGMENT

One of the more surprising findings by APPEAR institutions has been the inclusion of Egyptian blue where no obvious use for blue would have been required. Scholars had speculated about the presence of the color prior to modern imaging technology, as Petrie had uncovered six paint pots from what is believed to be a workshop (fig. 9.1) during his excavations at Hawara, one of them the brilliant blue color that has since been positively identified as Egyptian blue. Egyptian blue can be detected easily and inexpensively using Visible Induced Luminescence (VIL), known interchangeably as Near-Infrared (NIR) imaging. Pure Egyptian blue displays remarkable luminescent response in the near-infrared region at around 910 nm, appearing very bright white in imaging;⁷⁶ scans are capable of detecting even

⁷⁶ In this image scan technique, the only pigments capable of registering a 99% reflectance standard luminescence are Egyptian blue, Han blue and Han purple. The latter two pigments have only been found on artifacts from the Han dynasty (208 BC - AD 220). In artifacts from the Mediterranean, this pigment can be assumed to be Egyptian blue.



Fig. 9.1
 Roman pottery bowls containing pigments excavated under Flinders Petrie.
 1st century CE
 Image credit: Trustees of the British Museum

Fig. 9.1
 Roman pottery bowls containing pigments excavated under Flinders Petrie.
 1st century CE
 Image credit: Trustees of the British Museum

the most trace amounts of Egyptian blue, otherwise invisible to the naked eye. The method is described as such:

“Luminescence is the emission of light by a substance, which occurs when an electron returns to the electronic ground state from an excited state and loses its excess energy as a photon. In the specific situation when the excitation is caused by photons, then the phenomenon is known as photo-induced luminescence. NIR luminescence focuses on the response of inorganic and organic compounds when excited in the visible range. These include Egyptian blue, which emits a strong luminescence centered around 910 nm.”⁷⁷

In the case of VIL detecting Egyptian blue, two high-power LED visible light sources are pointed at the object from either side at 21 degree angles. The camera is fitted with a Schott RG830 cut-on filter (50% transmittance at c. 830 nm) with a visible light-blocking filter in

⁷⁷ Dyer and Newman, 2018

front. The painting will reflect both visible light and infrared luminescence, though the filter will block the visible light and the camera can then capture the reflected infrared image, showing the presence of Egyptian blue as bright white on the monochrome gray image (fig. 9.2) In smaller quantities and within mixtures, this white emission is less vibrant. This method of non-destructive testing is especially helpful in small ancient portraits, effectively replacing 19th century practices which required removing samples of paint for examination. Across institutions, scans of Fayum portraits have shown the presence of Egyptian blue in modulations

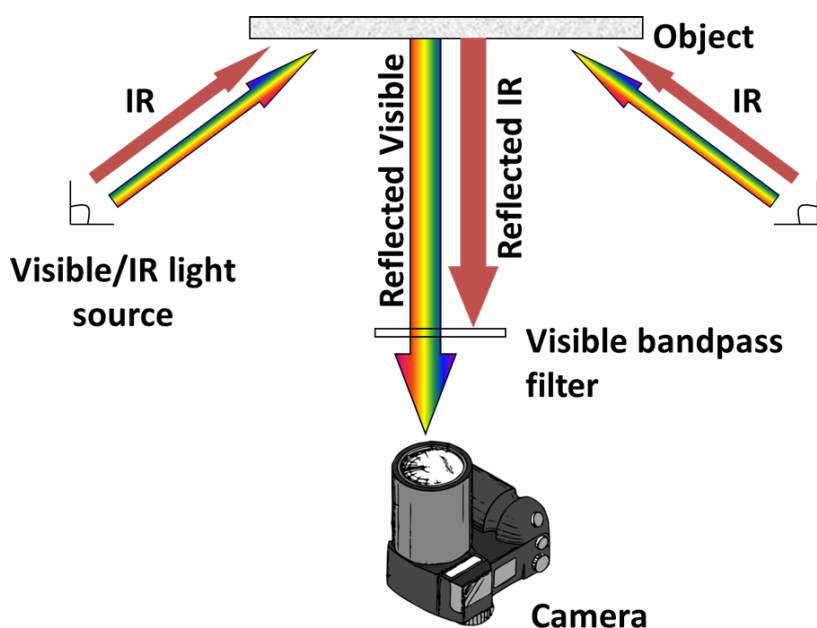


Fig. 9.2
A standard VIL imaging setup

in the greyish backgrounds, white clothing, underdrawings, and in both highlighted and shadowed areas of flesh.

CHAPTER 10: EXAMPLES OF VIL FINDINGS THUS FAR

A number of institutions have published their findings of the inclusion of Egyptian blue. Because some of this research has only been uploaded within the APPEAR shared database, our full understanding of the breadth of this pigment use is still limited. The most recent APPEAR publishings provide the following instances of Egyptian blue as found in mummy portraits, in which we will find an overwhelming use in the shading or highlighting of skin and hair:

Shading of cool flesh tones (31)

Background-gray (27)

White/grayish white garments (13)

White of eyes (10)

Contour of the face (9)

Dark hair highlights (9)

Purple/pink garments (8)

Pink of lips (5)

White pearls (5)

Purple *clavus* (3)

Blue gems (2)

Blue garment (2)

Hazel irises (2)

Green gems (2)

Purple highlight (1)

Pink garland (1)

Gray-white hair (1)

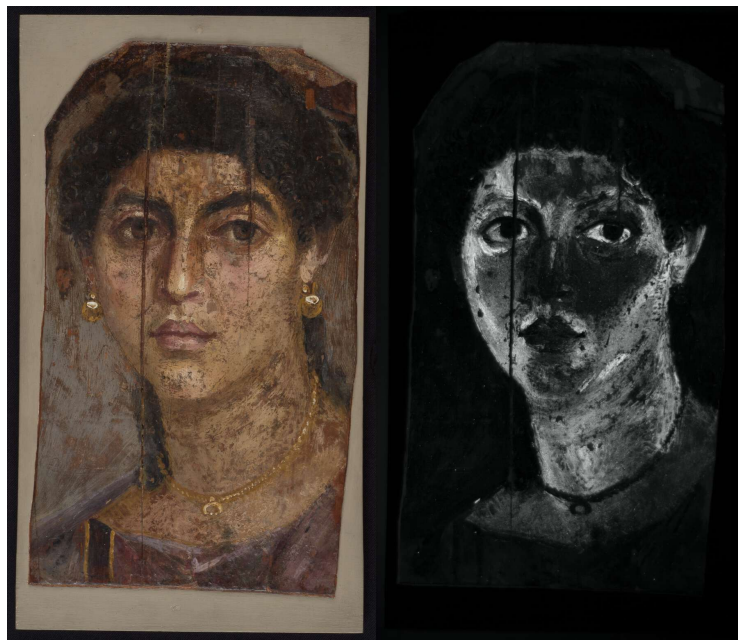


Fig. 10.1

An encaustic portrait of a woman (left) with VIL imaging showing presence of Egyptian blue (right).

In 2018, Rachel Sabino and her team of the Art Institute of Chicago published an article in

which the conservation team outlined findings in two male mummy portraits from their collection (fig. 10.2).⁷⁸ The two portraits look remarkably similar, both depicting men seemingly in their young 20s from the same $\frac{3}{4}$ view, each with gilded gold crowns (of differing designs), gilded background and tunics of the same light beige tone. Seen next to one another, we could reasonably assume they were painted by the same artist or at least the same workshop. However, when the team studied each painting under visible induced luminescence an interesting difference arose between the two. The study describes how in the portrait of the male with a clean-shaven face, Egyptian blue was found in diffused areas of flesh tone only, yet



Fig. 10.2

Two portraits from the collection of the Art Institute of Chicago, shown here in both their natural form and as imaged through VIL. Presence of Egyptian blue can be seen where image is brightest white.

⁷⁸ Sabino et al., 2018.

none was found in the background or in the subject's drapery. The study notes as well that the areas where Egyptian blue were found correlate to areas of highlight, not shadow. Conversely, in the portrait of the male subject with a beard, Egyptian blue appears to have been applied in a very direct manner, with concentration in the background along his jawline, neck and tunic. The only application in the flesh occurs in the male's upper lip or "Cupid's bow" and a small square between his two heavy brows. The artist's application of Egyptian blue differs greatly from the previous portrait, though both artists applied it where blue is not a visible hue.

CONCLUSIONS

Thiboutot does not believe that the use of Egyptian blue in mixtures rather than on its own should be taken as evidence that the artists or commissioners favored the Classical and early Hellenistic tetrachromatic palette of red, yellow, black and white, and rather suggests that this places them firmly within the Roman artistic tradition. I agree that evidence does point to a Roman artistic habit of mixing blue into flesh tones in Italic provinces, and the lack of physical evidence with the literary evidence we do have prevents us from believing Greeks would have done the same. However, there is no doubt that Greeks utilized this pigment to some degree, despite claims of adhering to a strict 4-color framework, as blue may have been seen less as a stand-alone hue, and more as a modifier. The main purpose for using Egyptian blue in these portraits was most likely to achieve a higher sense of naturalism, given its use in the whites of the eyes to achieve a very naturalistic wet look, and in modulation of flesh tones, particularly to add shading and sculpt the face.

That Roman Egypt became an amalgamation of Roman, Greek and Egyptian cultures, beliefs and artistic practices makes it nearly impossible to point to a singular origin for these artworks. Even the corpus of works is divided across tempera and encaustic mediums, combining Egyptian and Greek styles. We cannot ignore the inclusion of gold to serve as an element to align the dead with their divine afterlife, and the importance of blue or *kuanos* in the gods of both Greek and Egyptian religions. The continued use of gold-leaf gilding in Fayum portraits no doubt carried on ancient Egyptian connotations of aiding the deceased in accessing divinity in the afterlife. Gold was the color of the skin of the gods, and so Egyptians also believed that through incorporating it into mortuary symbolism and rituals, mortals could join the realm of the divine after death. In his essay “Symbols and Meanings”, Steven Bianchi asserts that blue faience, ~~thnt~~ in the Egyptian language, and by extension the sun, were both associated with “luminosity and scintillation,” connecting the hue with the resurrection of Osiris, the god of the sun, the afterlife, fertility and vegetation. Osiris’ death, resurrection, and rule of the eternal kingdom of the afterlife is the foundation for Egyptian funerary cult; forever correlating the colors blue/green with the hue of not only his skin, but the skin of the deceased, and ultimately their resurrection as well. This, combined with classical Greek beliefs and Homeric tales of the skin of the gods resembling this luminous, bright blue, suggests it may have served a similar purpose as gold in Graeco-Roman Egyptian burials. Maybe painting this blue, like lapis lazuli itself, into the skin and hair of these deceased was meant as a way to help their souls reach the eternal world. Because Egyptian blue has not only been detected in the flesh tones, but across a wide range of visual elements within these portraits, there cannot yet be a definitive conclusion as to its intended purpose.

Understanding the use of materials and technique may also aid to understand the lineage of art. The Fayum portraits already present a key bridge in the gap from the Classical world to the earliest encaustic Byzantine Christian icons, though there is a puzzling period of time unaccounted for between the end of the funerary portrait tradition in the mid-3rd to 4th centuries and the earliest icons dated to the 6th century.⁷⁹ Stylistically, these works seem nearly identical, though with the burial of mummy portraits, icon artists certainly never would have viewed them. It will be interesting to see if material analysis of the icons could confirm details such as the use of Egyptian blue, edging closer to closing this gap.

Though we may never be able to fully understand the processes and decisions of ancient artists, new and evolving technologies reveal troves of new information about these artworks. Sometimes these studies raise a lot more questions than answers. Many different institutions through APPEAR have been working together to try to tackle some of these issues. On the surface, many of the mummy portraits appear to have been painted with earth pigments alone, possibly in line with their Greek predecessors. Whether the inclusion of Egyptian blue was simply an act of expanding their color range and visual lustre, or whether the hue carried heavier symbolological meanings, we can only begin to hypothesize. The likelihood that the ancients viewed color with associations outside of our modern understanding of the spectrum makes it possible to assume that artisans could make subtle color choices based on cultural knowledge. Though they may not have been directly referencing Homeric tales or Egyptian gods when blending this hue into the flesh of their subjects, artists consciously and subconsciously call upon generations of symbolic references.

⁷⁹ Many of these icons come from the Monastery of St. Catherine at Mount Sinai. For more comparative analysis between the two bodies of work, see Catherine Marsengill and Matthew Thomas.

BIBLIOGRAPHY

- Accorsi, Gianluca, Giovanni Verri, Margherita Bolognesi, Nicola Armaroli, Catia Clementi, Costanza Miliani, and Aldo Romani. 2009. "The Exceptional Near-Infrared Luminescence Properties of Cuprorivaite (Egyptian Blue)." *Chem. Commun.*, no. 23: 3392–94. <https://doi.org/10.1039/B902563D>.
- Adriani, Achille, Klaus Parlasca, Patrizio Pensabene, and Hans G. Frenz. 1961. *Repertorio d'arte Dell'Egitto Greco-Romano*. Palermo: Fondazione "Ignazio Mormino" del Banco di Sicilia.
- Andrews, Carol A. R. 1990. Review of *Review of Mummies and Magic. The Funerary Arts of Ancient Egypt*, by S. D'Auria. *Journal of the American Research Center in Egypt* 27: 224–25. <https://doi.org/10.2307/40000108>.
- Andrews, Carol and British Museum. 1984. *Egyptian Mummies*. London: Published for the Trustees of the British Museum by British Museum Publications.
- Angenot, Valerie, and Francesco Tiradritti. 2016. *Artists and Colour in Ancient Egypt: Proceedings of the Colloquium Held in Montepulciano, August 22nd - 24th, 2008*. Montepulciano: Missioni Archaeologica Italiana a Luxor.
- APPEAR (Project), Marie Svoboda, Caroline Cartwright, and J. Paul Getty Museum, eds. 2020. *Mummy Portraits of Roman Egypt: Emerging Research from the APPEAR Project*. First edition. Los Angeles: J. Paul Getty Museum.
- Appenzeller, O. 2001. "Neurology in Ancient Faces." *Journal of Neurology, Neurosurgery & Psychiatry* 70 (4): 524–29. <https://doi.org/10.1136/jnnp.70.4.524>.
- Backes, Burkhard. 2015. "Funerary Rites and Practices, Greco-Roman." Oxford University Press. <https://doi.org/10.1093/obo/9780195393361-0204>.
- Bagnall, Roger S., Bruce W. Frier, and Ansley J. Coale. 1994. *The Demography of Roman Egypt*. 1st ed. Cambridge University Press. <https://doi.org/10.1017/CBO9780511584053>.
- Baines, John. 1985. "Color Terminology and Color Classification: Ancient Egyptian Color Terminology and Polychromy." *American Anthropologist* 87 (2): 282–97. <https://doi.org/10.1525/aa.1985.87.2.02a00030>.
- Baines, John, and Jaromír Málek. 1996. *Atlas of Ancient Egypt*. New York, N.Y.: Facts on File Publications.
- Barr, Judith, Clara M. ten Berge, Jan M. van Daal, and Branko F. van Oppen de Ruiter. 2019. "The Girl with the Golden Wreath: Four Perspectives on a Mummy Portrait." *Arts* 8 (3): 92. <https://doi.org/10.3390/arts8030092>.
- Benson, J. L. 2000. *Greek Color Theory and the Four Elements: A Cosmological Interpretation*. University of Massachusetts Amherst Libraries. <https://books.google.com/books?id=GkjJwEACAAJ>.
- Bierbrier, M. L., ed. 1997. *Portraits and Masks: Burial Customs in Roman Egypt*. London: Published for the Trustees of the British Museum by British Museum Press.
- Bleeker. 1972. *Ex Orbe Religionum: Studia Geo Widengren Xxiv Mense Aprili Mcmlxxii Quo Die Lustra Tredecim Feliciter Explevit Oblata Ab Collegis, Discipulis, Amicis, Collegae*

- Magistro Amico Congratulantibus. Pars Altera*. BRILL.
<https://doi.org/10.1163/9789004378414>.
- Borg, Barbara. 2014. "Rhetoric and Art in Third-Century Ad Rome." In , 235–55.
<https://doi.org/10.1017/CBO9780511732317.012>.
- Bowman, Alan K., Michael Brady, British Academy, and Royal Society (Great Britain), eds. 2005. *Images and Artefacts of the Ancient World*. British Academy Occasional Paper 4. Oxford ; New York: Oxford University Press.
- Brecoulaki, Harikleia. 2014. "'Precious Colors' in Ancient Greek Polychromy and Painting: Material Aspects and Symbolic Values." *Revue archéologique* 1 (57): 1–35.
- Brier, Bob, and Caroline Wilkinson. 2005. "A Preliminary Study on the Accuracy of Mummy Portraits." *Zeitschrift Für Ägyptische Sprache Und Altertumskunde* 132 (2).
<https://doi.org/10.1524/zaes.2005.132.2.107>.
- Bryan, Betsy M. n.d. "Pharaonic Painting through the New Kingdom." *Lloyd/A Companion to Ancient Egypt*, 990–1007.
- Cannata, Maria. 2012. *Funerary Artists*. Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199571451.013.0037>.
- Caton-Thompson, G. 1928. "Recent Excavations in the Fayum." *Man* 28 (July): 109.
<https://doi.org/10.2307/2790315>.
- Challis, Debbie. 2014. *The Archaeology of Race: The Eugenic Ideas of Francis Galton and Flinders Petrie*. Paperback edition. London ; New York: Bloomsbury.
- Corcoran, Lorelei H. 2016. "The Color Blue as an 'Animator' in Ancient Egyptian Art." In *Essays in Global Color History*, edited by Rachael B. Goldman, 41–64. Georgia Press.
<https://doi.org/10.31826/9781463236632-008>.
- Corcoran, Lorelei H., and Fred C. Albertson. 2015. "GENDERED COLOUR - M.A. Eaverly Tan Men / Pale Women. Color and Gender in Archaic Greece and Egypt. A Comparative Approach. Pp. x + 181, Ills. Ann Arbor: The University of Michigan Press, 2013. Cased, US\$65. ISBN: 978-0-472-11911-0." *The Classical Review* 65 (1): 252–54.
<https://doi.org/10.1017/S0009840X14002996>.
- Corcoran, Lorelei Hilda. 1995. *Portrait Mummies from Roman Egypt (I-IV Centuries A.D.): With a Catalog of Portrait Mummies in Egyptian Museums*. Studies in Ancient Oriental Civilization, no. 56. Chicago: Oriental Institute of the University of Chicago.
- Corcoran, Lorelei Hilda, Marie Svoboda, and Marc Sebastian Walton. 2010. *Herakleides: A Portrait Mummy from Roman Egypt*. Los Angeles: J. Paul Getty Museum.
- D'Auria, Sue, Peter Lacovara, Catharine H. Roehrig, and Museum of Fine Arts, Boston, eds. 1988. *Mummies & Magic: The Funerary Arts of Ancient Egypt*. Boston: Museum of Fine Arts.
- Davies, W. V., ed. 2001. *Colour and Painting in Ancient Egypt*. London: British Museum Press.
- Davis-Marks, Isis. n.d. "Archaeologists in Egypt Discover Mummy With Gold Tongue." *Smithsonian Magazine*. Accessed March 26, 2021.
<https://www.smithsonianmag.com/smart-news/archaeologists-unearth-golden-tongued-mummy-egypt-180976905/>.
- Doxiadis, Euphrosyne. 1995. *The Mysterious Fayum Portraits: Faces from Ancient Egypt*. New York: H. N. Abrams.
- Drerup, H. 1933. *Die Datierung Der Mumienporträts*. F. Schöningh.
<https://books.google.com/books?id=TCYKAAAIAAJ>.

- Dyer, Joanne, and Sophia Sotiropoulou. 2017. "A Technical Step Forward in the Integration of Visible-Induced Luminescence Imaging Methods for the Study of Ancient Polychromy." *Heritage Science* 5 (1): 24. <https://doi.org/10.1186/s40494-017-0137-2>.
- Edgar, C. C. 1905. "On the Dating of the Fayum Portraits." *The Journal of Hellenic Studies* 25 (November): 225–33. <https://doi.org/10.2307/624239>.
- Feller, Robert L., Ashok Roy, Elisabeth West FitzHugh, and Barbara Hepburn Berrie, eds. 1986. *Artists' Pigments: A Handbook of Their History and Characteristics*. Washington: National Gallery of Art.
- Ganio, Monica, Johanna Salvant, Jane Williams, Lynn Lee, Oliver Cossairt, and Marc Walton. 2015. "Investigating the Use of Egyptian Blue in Roman Egyptian Portraits and Panels from Tebtunis, Egypt." *Applied Physics A* 121 (3): 813–21. <https://doi.org/10.1007/s00339-015-9424-5>.
- Geoffroy-Schneiter, Bérénice. 1998. *Fayum Portraits*. London: Thames and Hudson.
- Gladstone, William Ewart. 1858. *Studies on Homer and the Homeric Age, Volume I, I. Prolegomena. II. Achaeis: Or, The Ethnology of the Greek Races*.
- Goldman, Rachael, ed. 2016. *Essays in Global Color History: Interpreting the Ancient Spectrum*. Gorgias Studies in Classical and Late Antiquity 19. Piscataway, NJ: Gorgias Press.
- Gombrich, E. H. 1976. *The Heritage of Apelles: Studies in the Art of the Renaissance*. Ithaca, N.Y: Cornell University Press.
- Grant, Suzanna M. 1978. "Two 'Fayum' Portraits." *Bulletin of the Art Institute of Chicago (1973-1982)* 72 (6): 2. <https://doi.org/10.2307/4104208>.
- Griffith, R. Drew. 2005. "GODS' BLUE HAIR IN HOMER AND IN EIGHTEENTH-DYNASTY EGYPT." *The Classical Quarterly* 55 (2): 329–34. <https://doi.org/10.1093/cq/bmi034>.
- Hagen, Fredrik, and K. S. B. Ryholt. 2016. "The Antiquities Trade in Egypt 1880-1930: The H.O. Lange Papers." *Scientia Danica. Series H, Humanistica* 4, vol. 8. Copenhagen, Denmark: Det Kongelige Danske Videnskabernes Selskab.
- Hunt, L.-A. 1980. "Alexander Badawy, Coptic Art and Archaeology: The Art of the Christian Egyptians from the Late Antique to the Middle Ages (Cambridge, Mass., and London: M.I.T. Press, 1978). Pp. Xiv + 387." *International Journal of Middle East Studies* 12 (2): 228–29. <https://doi.org/10.1017/S002074380000057X>.
- Homer. *The Iliad with an English Translation by A.T. Murray, Ph.D. in two volumes*. Cambridge, MA., Harvard University Press; London, William Heinemann, Ltd. 1924.
- . *The Odyssey with an English Translation by A.T. Murray, Ph.D. in two volumes*. Cambridge, MA., Harvard University Press; London, William Heinemann, Ltd. 1919.
- . *Homeri Opera in five volumes*. Oxford, Oxford University Press. 1920.
- Ikram, Salima. 2003. "Barbering the Beardless: A Possible Explanation for the Tufted Hairstyle Depicted in the 'Fayum' Portrait of a Young Boy (J. P. Getty 78.AP.262)." *The Journal of Egyptian Archaeology* 89 (1): 247–51. <https://doi.org/10.1177/030751330308900116>.
- Jaeschke, Richard L., and Helena F. Jaeschke. 1990. "The Cleaning And Consolidation Of Egyptian Encaustic Mummy Portraits." *Studies in Conservation* 35 (sup1): 16–18. <https://doi.org/10.1179/sic.1990.35.s1.004>.
- Johnson, Janet H., ed. 1992. *Life in a Multi-Cultural Society: Egypt from Cambyeses to Constantine and Beyond*. Studies in Ancient Oriental Civilization, no. 51. Chicago, Ill:

- Oriental Institute of the University of Chicago.
- Jucker, H. 1984. *K. Parlasca: Ritratti Di Mummie*. Beck.
<https://books.google.com/books?id=szULSQAACAAJ>.
- Lembke, Katja, Martina Minas-Nerpel, and Stefan Pfeiffer, eds. 2010. "Tradition And Innovation In The Burial Practices In Roman Egypt." In *Tradition and Transformation. Egypt under Roman Rule*, 343–56. BRILL.
<https://doi.org/10.1163/ej.9789004183353.i-508.77>.
- Lloyd, Alan B., ed. 2010. *A Companion to Ancient Egypt*. Blackwell Companions to the Ancient World. Ancient History. Chichester, West Sussex ; Malden, Mass: Wiley-Blackwell.
- MacDonald, Sally. 2005. "Stolen or Shared: Ancient Egypt at the Petrie Museum." In *Edges of Empire*, edited by Jocelyn Hackforth-Jones and Mary Roberts, 162–80. Oxford, UK: Blackwell Publishing Ltd. <https://doi.org/10.1002/9780470773901.ch7>.
- Marsengill, Katherine. n.d. "Panel Paintings and Early Christian Icons." In *The Routledge Handbook of Early Christian Art*, edited by Robin Margaret Jensen and Mark D. Ellison, 191–206. New York: Routledge.
- Martin, Mervin, and Shelley N. Reisman. 1978. "THE SURFACE AND STRUCTURAL TREATMENT OF A FAYUM PORTRAIT." *Studies in Conservation* 23 (sup1): 191–98.
<https://doi.org/10.1179/sic.1978.s043>.
- Mathews, Thomas F., and Norman E. Muller. 2016. *The Dawn of Christian Art in Panel Paintings and Icons*. English edition. Los Angeles: The J. Paul Getty Museum.
- Merriman, Nick. 2004. *Public Archaeology*. London: Routledge.
<http://site.ebrary.com/id/10099011>.
- Miliani, Costanza, Alessia Daveri, Lin Spaabaek, Aldo Romani, Valentina Manuali, Antonio Sgamellotti, and Brunetto Giovanni Brunetti. 2010. "Bleaching of Red Lake Paints in Encaustic Mummy Portraits." *Applied Physics A* 100 (3): 703–11.
<https://doi.org/10.1007/s00339-010-5748-3>.
- Montserrat, Dominic. 1993. "The Representation of Young Males in 'Fayum Portraits.'" *The Journal of Egyptian Archaeology* 79 (1): 215–26.
<https://doi.org/10.1177/030751339307900114>.
- Mummy Portraits of Roman Egypt: Emerging Research from the APPEAR Project*. n.d. Accessed March 16, 2021. <https://www.getty.edu/publications/mummyportraits/>.
- Parlasca, K., and Deutsches Archäologisches Institut. 1966. *Mumienporträts Und Verwandte Denkmäler*. Steiner. <https://books.google.com/books?id=HntrQgAACAAJ>.
- Picton, Janet, Stephen Quirke, and Paul C. Roberts, eds. 2018. *Living Images: Egyptian Funerary Portraits in the Petrie Museum*. 1st ed. Routledge.
<https://doi.org/10.4324/9781315425252>.
- Price, Campbell, Roger Forshaw, Andrew Chamberlain, Paul T Nicholson, and A. Rosalie David. 2016. *Mummies, Magic, and Medicine in Ancient Egypt: Multidisciplinary Essays for Rosalie David*.
- Quirke, Stephen. 2018. "The Hawara Mummy Portraits and the Periodisation of Burial Customs." In *Living Images*, edited by Janet Picton, Stephen Quirke, and Paul C. Roberts, 1st ed., 73–82. Routledge. <https://doi.org/10.4324/9781315425252-3>.
- Ramer, Brian. 1979. "The Technology, Examination and Conservation of the Fayum Portraits in the Petrie Museum." *Studies in Conservation* 24 (1): 1. <https://doi.org/10.2307/1505918>.

- “Raphael Used Egyptian Blue in Galatea - English - ANSA.It.” n.d. Accessed March 17, 2021.
https://www.ansa.it/english/news/2020/09/01/raphael-used-egyptian-blue-in-galatea_694e67ef-532e-4b05-81e2-98847a7a0a0e.html.
- “REMOVAL OF INORGANIC DEPOSITS FROM EGYPTIAN PAINTED WOODEN OBJECTS: Studies in Conservation: Vol 35, No Supl.” n.d. Accessed March 16, 2021.
<https://www.tandfonline.com/doi/abs/10.1179/sic.1990.35.s1.005>.
- Riggs, Christina. 2002. “Facing the Dead: Recent Research on the Funerary Art of Ptolemaic and Roman Egypt.” *American Journal of Archaeology* 106 (1): 85.
<https://doi.org/10.2307/507190>.
- . 2005. *The Beautiful Burial in Roman Egypt Art, Identity, and Funerary Religion*.
- , ed. 2012. *The Oxford Handbook of Roman Egypt*. 1st ed. Oxford University Press.
<https://doi.org/10.1093/oxfordhdb/9780199571451.001.0001>.
- Riggs, Christina, and Martin Andreas Stadler. 2003. “A Roman Shroud and Its Demotic Inscriptions in the Museum of Fine Arts, Boston.” *Journal of the American Research Center in Egypt* 40: 69. <https://doi.org/10.2307/40000291>.
- Roberts, Paul C. 2018. “An Archaeological Context for British Discoveries of Mummy Portraits in the Fayum.” In *Living Images*, edited by Janet Picton, Stephen Quirke, and Paul C. Roberts, 1st ed., 13–72. Routledge. <https://doi.org/10.4324/9781315425252-2>.
- Rodler, Alexandra S., Gilberto Artioli, Sabine Klein, Rainer Petschick, Peter Fink-Jensen, and Cecilie Brøns. 2017. “Provenancing Ancient Pigments: Lead Isotope Analyses of the Copper Compound of Egyptian Blue Pigments from Ancient Mediterranean Artefacts.” *Journal of Archaeological Science: Reports* 16 (December): 1–18.
<https://doi.org/10.1016/j.jasrep.2017.09.008>.
- Rönkkö, Essi and Mary and Leigh Block Museum of Art. 2019. *Portrait of a Child: Historical and Scientific Studies of a Roman Egyptian Mummy*.
- Sabino, Rachel, Ken Sutherland, Emeline Pouyet, and Federica Pozzi. Marc. “Surprise Encounters with Mummy Portraits at the Art Institute of Chicago.” In *POSTPRINTS*, Thirty One:1–14. Houston, TX: AIC.
- Salvant, J., J. Williams, M. Ganio, F. Casadio, C. Daher, K. Sutherland, L. Monico, et al. 2018. “A Roman Egyptian Painting Workshop: Technical Investigation of the Portraits from Tebtunis, Egypt: A Roman Egyptian Painting Workshop.” *Archaeometry* 60 (4): 815–33.
<https://doi.org/10.1111/arc.12351>.
- “SAOC 56. Portrait Mummies from Roman Egypt (I-IV Centuries A.D.) with a Catalog of Portrait Mummies in Egyptian Museums | The Oriental Institute of the University of Chicago.” n.d. Accessed March 16, 2021.
<https://oi.uchicago.edu/research/publications/saoc/saoc-56-portrait-mummies-roman-egypt-i-iv-centuries-ad-catalog-portrait>.
- Saunders, David, Judith Barr, and Nicole Budrovich. n.d. “The Antiquities Provenance Project at the Getty.” *Los Angeles*, 8.
- Saunders, David and British Museum. 2011. *British Museum Technical Research Bulletin. Volume 5, Volume 5*,. London: Archetype.
- Schwabe, Lorelei Corcoran. 1985. “Hawara Portrait Mummy No. 4.” *The Journal of Egyptian Archaeology* 71: 190. <https://doi.org/10.2307/3821731>.
- Scott, David A., Megan Dennis, Narayan Khandekar, Joy Keeney, David Carson, and Lynn Swartz Dodd. 2003. “An Egyptian Cartonnage of the Graeco-Roman Period:

- Examination and Discoveries.” *Studies in Conservation* 48 (1): 41–56.
- Scott, David A., Sebastian Warmlander, Joy Mazurek, and Stephen Quirke. 2009. “Examination of Some Pigments, Grounds and Media from Egyptian Cartonnage Fragments in the Petrie Museum, University College London.” *Journal of Archaeological Science* 36 (3): 923–32. <https://doi.org/10.1016/j.jas.2008.12.011>.
- Shore, A. F. 1972. *Portrait Painting from Roman Egypt*. Revised ed. London: British Museum.
- Siddall, Ruth. 2018. “Mineral Pigments in Archaeology: Their Analysis and the Range of Available Materials.” *Minerals* 8 (5): 201. <https://doi.org/10.3390/min8050201>.
- Silver, Constance S., and Agneta Freccero. 2003. “Encausto and Ganosis: Beeswax as Paint and Coating during the Roman Era and Its Applicability in Modern Art, Craft and Conservation.” *APT Bulletin* 34 (4): 53. <https://doi.org/10.2307/1504873>.
- Skovmøller, Amalie, Cecilie Brøns, and Maria Louise Sargent. 2016. “Egyptian Blue: Modern Myths, Ancient Realities.” *Journal of Roman Archaeology* 29: 371–87. <https://doi.org/10.1017/S1047759400072184>.
- Stager, Jennifer. 2012. “The Embodiment of Color in Ancient Mediterranean Art.” Dissertation, Berkeley, California: University of California, Berkeley.
- . 2016. “The Materiality of Color in Ancient Mediterranean Art.” In *Essays in Global Color History: Interpreting the Ancient Spectrum*, edited by Rachael B. Goldman, 97–119. Piscataway, NJ: Georgia Press.
- Svoboda, Marie, Lin Rosa Spaabaek, and Caroline Cartwright. 2011. “Portrait Mummies From Roman Egypt: Ongoing Collaborative Research on Wood Identification.” *British Museum Technical Research Bulletin* 5: 49–58.
- Swain, Simon, ed. 2008. *Approaching Late Antiquity: The Transformation from Early to Late Empire*. Reprinted. Oxford: Oxford Univ. Press.
- Thiboutot, Gabrielle. n.d. “Egyptian Blue in Romano-Egyptian Mummy Portraits.” Mummy Portraits of Roman Egypt: Emerging Research from the APPEAR Project. Accessed March 15, 2021. <https://www.getty.edu/publications/mummyportraits/part-one/5/>.
- Thompson, David L. 1975. “Four ‘Fayum Portraits’ in the Getty Museum.” *The J. Paul Getty Museum Journal* 2: 85–92.
- . 1976a. “A Painted Funerary Portrait from Roman Egypt.” *Boston Museum Bulletin* 74 (370): 115–19.
- . 1976b. *The Artists of the Mummy Portraits*. Publication - J. Paul Getty Museum ; No. 7. Malibu, Calif.: J. Paul Getty Museum.
- . 1982. *Mummy Portraits in the J. Paul Getty Museum*. 2nd ed. Malibu, Calif: The Museum.
- Tite, Michael, and Gareth Hatton. 2007. “The Production Technology of, and Trade in, Egyptian Blue Pigment in the Roman World.” In *Communities and Connections*, by Michael Tite and Gareth Hatton. Oxford University Press. <https://doi.org/10.1093/oso/9780199230341.003.0013>.
- Tite, M.S, M. Bimson, and M.R. Cowell. 1984. “Technological Examination of Egyptian Blue.” Edited by Joseph B. Lambert. *Archaeological Chemistry - III*, Advances In Chemistry Series 205, , 215–42.
- Vandorpe, Katelijn, ed. 2019. *A Companion to Greco-Roman and Late Antique Egypt*. Blackwell Companions to the Ancient World. Hoboken, NJ: Wiley Blackwell.
- “VIII. Some Experiments and Observations on the Colours Used in Painting by the Ancients.”

1815. *Philosophical Transactions of the Royal Society of London* 105 (December): 97–124. <https://doi.org/10.1098/rstl.1815.0009>.
- Vitruve, and M. H Morgan. 1960. *Vitruvius: The Ten Books of Architecture*. New York: Dover Publications.
- Walker, Susan, and Metropolitan Museum of Art (New York, N.Y.), eds. 2000. *Ancient Faces: Mummy Portraits from Roman Egypt*. New York: Metropolitan Museum of Art : Routledge.
- “Week 6–Egyptian Blue and Madder | Johns Hopkins Archaeological Museum.” n.d. Accessed March 17, 2021.
<https://archaeologicalmuseum.jhu.edu/the-collection/object-stories/roman-egyptian-mummy-portraits/week-6-egyptian-blue-and-madder/>.
- “What’s in a Tomb? Roman Death Public and Private | Barbara E Borg - Academia.Edu.” n.d. Accessed March 16, 2021.
https://www.academia.edu/1253162/What_s_in_a_Tomb_Roman_death_public_and_private.