

MONOGRAFÍAS DE PREHISTORIA Y ARQUEOLOGÍA UNED

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DOI: <http://dx.doi.org/10.5944/monografias.prehistoria.arqueologia.2020>



UNIVERSIDAD NACIONAL DE EDUCACIÓN A DISTANCIA
Madrid, 2020

MONOGRAFÍAS DE PREHISTORIA Y ARQUEOLOGÍA UNED N.º 1, 2020

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ISBN 978-84-09-23602-2

Monografías de Prehistoria y Arqueología UNED es una colección sometida a un proceso de evaluación triple ciega.

URL MONOGRAFÍAS DE PREHISTORIA Y ARQUEOLOGÍA UNED·

<http://e-spacio.uned.es/fez/community/bibliuned:MonografiasPreyArqUNED>

DISEÑO Y COMPOSICIÓN

Carmen Chíncoa Gallardo

<http://www.laurisilva.net/cch>

Motivo de la cubierta: Detalle de cantería tradicional en el paraje de Atalaya de la Sorda (El Escorial, Madrid).

Fotografía: Virginia García-Entero

Esta edición se ha realizado con la colaboración de:

Red de investigación: «*El ciclo productivo del marmor en la península Ibérica desde la Antigüedad: extracción, elaboración, comercialización, usos, reutilización, reelaboración y amortización*» (RED2018-102356-T) - Ministerio de Ciencia, Innovación y Universidades.

Proyecto I+D+i «*Arqueología e Historia de un paisaje de la piedra: la explotación del marmor de Espejón (Soria) y las formas de ocupación de su territorio desde la Antigüedad al siglo XX*» (PGC2018-096854-B-I00) - MICIU/AEI/FEDER, UE.

Línea «*Canteras: estrategias, organización y técnicas de explotación*» dentro del proyecto (RYC-2017-22936) - MICIU/AEI/FEDER, UE.

Proyecto I+D+i «*El mensaje del mármol: prestigio, simbolismo y materiales locales en las provincias occidentales del imperio romano entre época antigua y altomedieval a través del caso de Hispania y Aquitania*» (PGC2018-099851-A-I00) - MICIU/AEI/FEDER, UE.

Este trabajo se inscribe en la producción científica del Grupo de Investigación «*Paisajes, arquitecturas y cultura material en la Iberia antigua*» (UNED: G193/454) y en el marco del Equipo «*Arqueometría y Producciones Artísticas – ArPA*» del Grupo 2017 SGR 00970 MIRMED-GIAC del ICAC, con financiación de AGAUR/Generalitat de Catalunya.



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THE IMPERIAL GRANITE QUARRY OF DOMITIANÈ-KAINÉ LATOMIA (UMM BALAD, EGYPT)

LAS CANTERAS IMPERIALES DE GRANITO DE DOMITIANÈ-KAINÉ LATOMIA (UMM BALAD, EGIPTO)

Jean-Pierre Brun¹

Recibido: 15/06/2020 · Aceptado: 30/08/2020

DOI: <https://doi.org/10.5944/monografias.prehistoria.arqueologia.2020.03>

Resumen

Se presentan los resultados de las excavaciones llevadas a cabo en 2002-2003 en las canteras imperiales de granito de Domitianè-Kainé Latomia, en Umm Balad, en el desierto oriental egipcio. Las intervenciones arqueológicas afectaron tanto a los frentes de extracción, como al enclave asociado a ellos conformado por un fuerte y un poblado vinculado con los trabajadores. Estas instalaciones, junto a la información procedente de numerosos *ostraka* documentados, permiten conocer datos sobre la organización y la contabilidad de la cantera.

Palabras clave

Cantera; fuerte; poblado; ostraka; contabilidad.

Abstract

The results of excavations carried out in 2002-2003 at the Imperial granite quarries of Domitianè-Kainé Latomia at Umm Balad, in the eastern Egyptian desert, are presented. The archaeological interventions affected both the extraction fronts and the associated enclave, made up of a fort and a settlement linked to the workers. These facilities, together with information from numerous documented *ostraka*, provide information on the organization and accounting of the quarry.

Keywords

Quarry; Fort; Workers Village; *ostraka*; accounting.

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WE EXCAVATED the quarry of Umm Balad in the Eastern Desert of Egypt in 2002-2003 with H el ene Cuvigny (as director of the mission), Adam B ulow-Jacobsen, Emmanuel Botte, Martine Leguilloux, Michel Redd e and Isabelle Sachet (figs. 1-2).

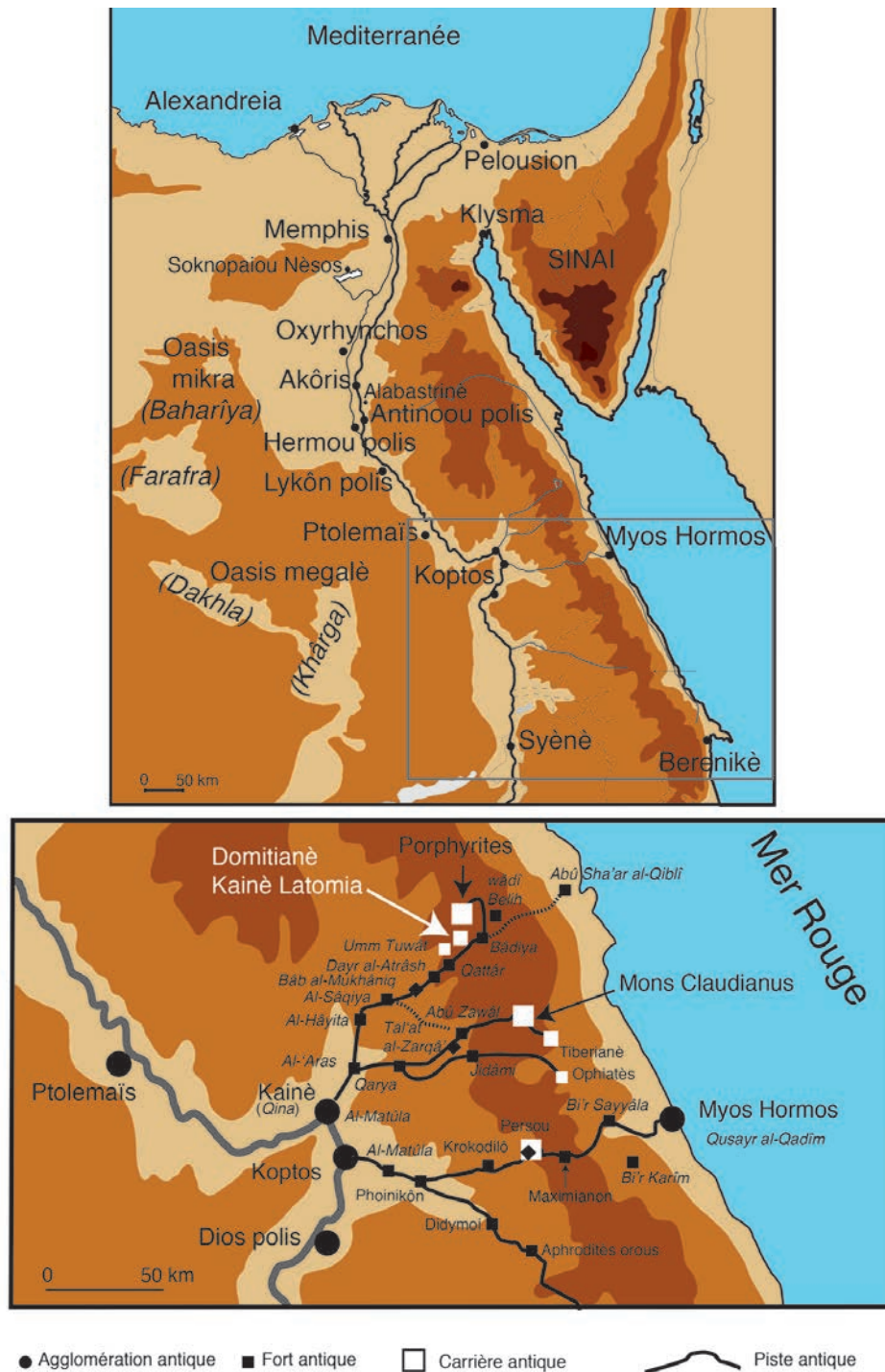


FIGURE 1. MAP OF LOCATION OF DOMITIAN E KAIN E LATOMIA (J.-P. BRUN)

We learned, from the *ostraka* found during these excavations, that this quarry bore the name of Domitianè when it was opened. Then, after the *damnatio memoriae* of this emperor in AD 96, the quarry bore the more politically correct name of Kaine Latomia, thus the New Quarry. This quarry was indeed new, in comparison with the *Porphyrites* quarry which was opened in the same mountains under Tiberius, in AD 18.²

Even if this new quarry was located in the Gebel Dokhan mountains, the stone extracted was not porphyry but granodiorite, similar to the one of *Mons Claudianus*, but somewhat darker (fig. 3). This stone is known in Rome with the name: *granito verde fiorito di Bigio*.

The quarry was discovered by Barron and Hume who published in 1902 a short description in their book on the geology of the Eastern Desert. In 1930 O. Scaife conducted a more detailed survey studying the fort, the quarries and the workers village that he published in 1935. The site was visited several times thereafter. In January 2000, when we were excavating the Roman way fortress of Didymoi, we found that the rubbish dump in front of the fort had been looted. Clandestine excavations unearthed ceramics and *ostraka*. We decided to interrupt our ongoing research on the route from Coptos to Berenike, to organise a *recue* excavations on the site of Umm Balad. The operation necessitated two campaigns in 2002 and 2003.

The site includes a fortress, several buildings all around such as a smithy, stables, a temple, cemetery and, up in the wâdi, two quarries and a worker's village.



FIGURE 2. GENERAL VIEW OF THE FORT OF DOMITIANÈ-KAINÉ LATOMIA AND THE GRANODIORITE MOUNTAINS (J.-P. BRUN)



FIGURE 3. BLOCK ABANDONED IN QUARRY A, SHOWING THE APPEARANCE OF THE GRANODIORITE OF UMM BALAD (J.-P. BRUN)



FIGURE 4. THE FORT OF DOMITIANÈ-KAINÉ LATOMIA FROM ABOVE (J.-P. BRUN)

2. About the names of the quarries in the Eastern Desert of Egypt: see Cuvigny 2018.

THE FORT

The fort is located on a terrace (fig. 4). It was reached by a flattened road, 8 to 14 m wide.

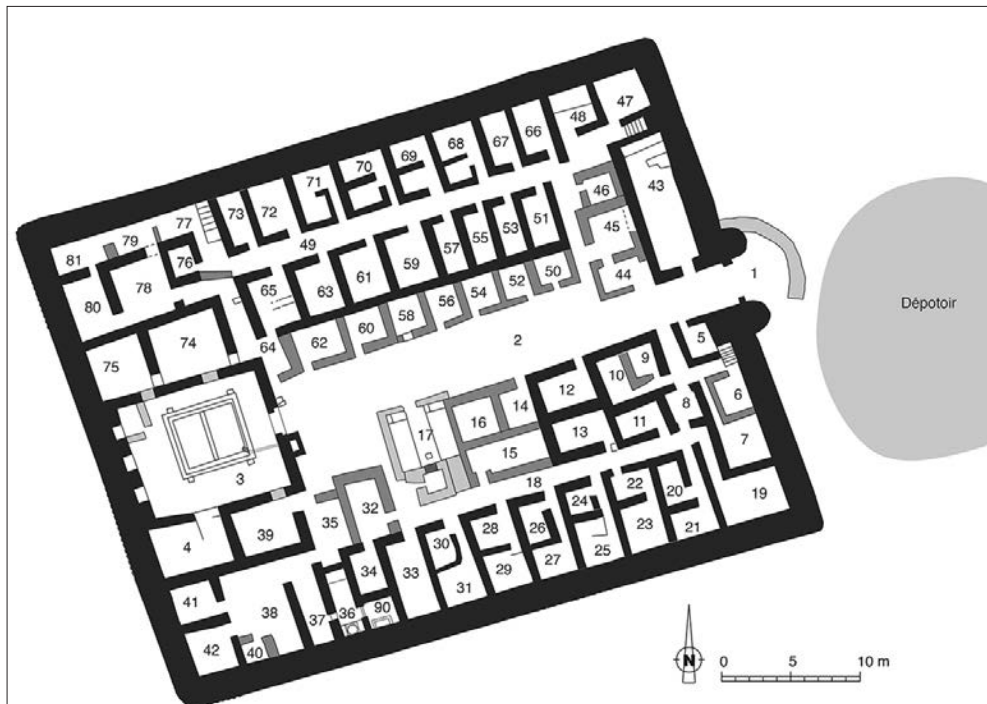


FIGURE 5. PLAN OF THE FORT OF DOMITIANË-KAINÉ LATOMIA (E. BOTTE, J.-P. BRUN, M. REDDÉ)



FIGURE 6. ENTRANCE OF THE FORT OF DOMITIANË-KAINÉ LATOMIA WITH THE LATER ADDED CLAVICULA (J.-P. BRUN)



FIGURE 7. ROOM 3 AND THE CISTERN OF THE FORT OF DOMITIANË-KAINÉ LATOMIA (J.-P. BRUN)

The fort forms a rectangle about 48 x 37 m (fig. 5). As the ones of *Mons Claudianus* and *Mons Ophiates*, the corners have no towers, but the entrance is defended by two towers 2,50 m wide. When we excavated the gate, we discovered several fragments of the dedication engraved on a limestone slab used on both sides. On one side was certainly written the dedication of the time of Domitian, on the other, the text was revised after the *damnatio memoriae* of the emperor. An outer *clavicula*

protected the entrance (fig. 6). We cannot be sure that it was built with the fort; the example of *Mons Claudianus* where the *clavicula* was built later, suggests a later construction, probably towards the middle of the second century.

Inside the fort, an alley, 5,10 m wide on average, leads to a large room located at its end, against the wall. Two blocks of rooms line the alley. Other blocks are arranged along the curtain wall; they are served by narrow lanes.

The entire western part of the fort that I call block A is occupied by a set of rooms, located against the western wall. The block includes living quarters for the staff and a large tank occupying the central room 3 (fig. 7). This room measures about 12 m x 10,50 m. It has a main entrance in the centre of the alley and side openings which were blocked later on.

The back wall, to the west, is occupied by three rectangular niches coated with clay covered with a layer of lime and paintings. The central niche revealed the presence of an incense burner and of a male head statue made of painted clay. The presence of the three niches, their decoration, and the discovery of a fragment of a statue indicate that this was the location of the sanctuary when the fort was first built. The central part of Room 3 is occupied by a large cistern which could contain about 220000 litres. The cistern is fed by a pipe connected to a tank built near the entrance. The water was brought from outside by water-skins which were emptied into the tank. These water skins were brought by camels from a well located in a nearby wâdi.

Room 3 gave access to rooms 74 and 75 (fig. 8). Room 74 is the only one that is paved. It links to room 74, the floor of which contained several *ostraka* addressed to the centurion *Caninius Dionysios*. The discovery of these letters and the link with the sanctuary in room 3 indicates that rooms 74 and 75 were part of the *praetorium*, thus the accommodation of the commander of the fort.

In the south western part of the fort, a corridor leads to a small bath complex, which was part of the original design as the bathtub drain pipe was clearly planned when the rampart was built (fig. 9). Room 36 contained a boiler formed by a hearth which was heating a metal pot surrounded by a cylindrical wall of clay. A door



FIGURE 8. PRAETORIUM LOCATED IN ROOMS 74 AND 75 (J.-P. BRUN)



FIGURE 9. SMALL BATH COMPLEX IN ROOMS 36 AND 90 (J.-P. BRUN)



FIGURE 10. ROOM 17, PROBABLY A SHRINE (M. REDDÉ)



FIGURE 11. THE RUBBISH DUMP OUTSIDE THE FORT (J.-P. BRUN)



FIGURE 12. BUILDING N.6 OUTSIDE THE FORT: STABLES (J.-P. BRUN)



FIGURE 13. BUILDINGS OUTSIDE THE FORT: INTERIOR OF THE SMITHY (J.-P. BRUN)

gave access to room 90. Its floor and the inside walls are covered with lime plaster and red painting and a bathtub occupies the entire north side of the room.

The size of the rooms of block B and their internal division indicates that these were barracks, *contubernia* type *arma / papilio* which were occupied by the soldiers. Block E has an irregular appearance. It was built in three stages marked by additions of rooms whose walls are based on previous constructions. Belonging to the first phase, room 7 was the largest of the fort. Given its position near the guard post, this room may correspond to a granary.

The final stage of Block E is marked by the addition of the room 17 which has a flagstone floor forming a corridor between two benches built against the walls of the room (fig. 10). This plan has parallels in the shrines of the Eastern Desert such as Didymoi or Qusur al Banat.

The ceramic material discovered in the occupation layers is dated from the early third century.

The dump extends over 230 m² southeast of the door and has a volume of about 80 m³ (fig. 11). The stratigraphy is simple because the waste was spread horizontally and the sharp decline in volume of organic matter led to a simplification of the natural succession of layers. Essentially, the strata consist of gravel mixed with organic matter decomposed. The ash levels are limited to lenses.

The architectural development of the fort and the study of *ostraka* have shown that the site was occupied three times, under Domitian, Nerva and Trajan, under Antoninus Pius and under the Severi, but abandonment phases are not marked in the stratigraphy because no sediment is brought by the wind in this rocky environment. The barracks of the fort were found as they were abandoned, except for the stones that fell from the walls, and the surface of the dump was just as the Roman army left it.

Around the fort, there are scattered several buildings. I only mention the most significant for our purposes.

A building located 100 m southeast of the fort consists of two rooms (fig. 12). One is a stable because its south and northwest sides have high benches 0,90 m wide, which can be interpreted as feeders for packed animals.

A hundred meters north of the fort, a rocky hill is crowned by a small square building to be interpreted as a *skopelos*, a watching post (fig. 13).

Under the *skopelos*, there was a smithy essential for forging tools used in the quarry. In a first phase, the blacksmith worked outdoors generating a mass of ash and iron slags about ten centimetres thick. In a second phase, a square building was built. Leaning against the rock wall, it included a bench used as a bed, a forge and a tank with a capacity of twelve litres, used for quenching the forged tools. The rarity and the banality of ceramics found in the smithy meant that we cannot date the two phases. I'm tempted to date the first phase from Domitian, and the second from Antoninus, but only tentatively.

THE SHRINE

At a distance of 280 m northwest of the fort, a shrine was built halfway up the mountain, at an altitude of 605 m, thus 60 metres above the fort (fig. 14). Two paths gave access to the shrine, both being built with steps. The two paths converged on a natural terrace where an altar was erected.



FIGURE 14. BUILDINGS OUTSIDE THE FORT: SHRINE ON TOP OF A HILL ABOVE THE FORT (J.-P. BRUN)

The sanctuary measuring 6,10 m by 5,50 m includes a main *cella* opening to the south and designed with a central niche to house the statue of the god. A second *cella* was added later on the east face. In the initial phase, the façade included two massive pylons clearly influenced by the entrance of the Egyptian temples.

This shrine is in a very bad state, due to erosion and the destructions carried out by treasure hunters who smashed the floor of the *cella* and the main niche. I could not get any information on the nature of worship, any statue, inscription or *ex-voto* having been removed by looters.

THE CEMETERY

The cemetery lies 240 m southeast of the fort. I counted fifteen graves covered with piles of stones. All were looted when we arrived. The excavation of some of them showed the presence of adults and a toddler. The buried people are mostly men, robust, too poor to have their corpse transported and buried in the valley.

WORKERS VILLAGE

From the fort, the road leads to a village of quarrymen built at the foot of the eastern side of the mountain (fig. 15). The village is formed of 18 cells, some with stone benches. H. Cuvigny's paper on the toponymy of the Eastern Desert suggests that this village was called Arabarchès getting his toponym from a personal name known at Thebae (Cuvigny 2018). We know that because an amphora of wine was sent to Sôkratès who was architect at Arabarchès.

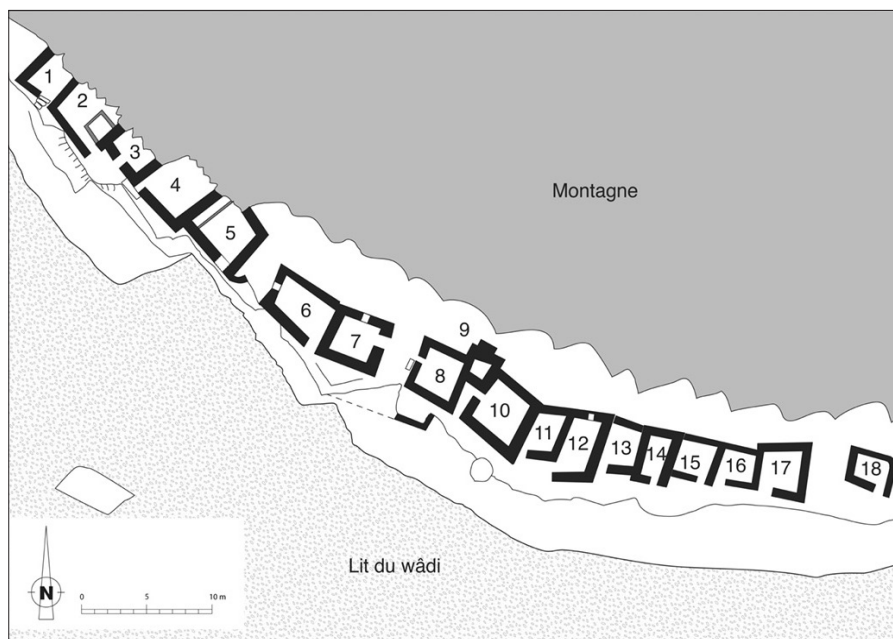


FIGURE 15. PLAN OF THE WORKERS VILLAGE AT THE FOOT OF THE QUARRIES (J.-P. BRUN WITH E. BOTTE AND M. LEGUILLOUX)

THE GRANITE QUARRIES

From the workers village, two paths lead to the granite quarries. Two quarries were opened successively on the western side of the mountain opposite the village (fig. 16). I called quarry A the oldest quarry at an altitude of 700 m. The second quarry at the altitude of 830 m has been called B.

The paths leading to quarry A reached an artificial platform bordered to the east by a high retaining wall (fig. 17). In the space between the working faces and

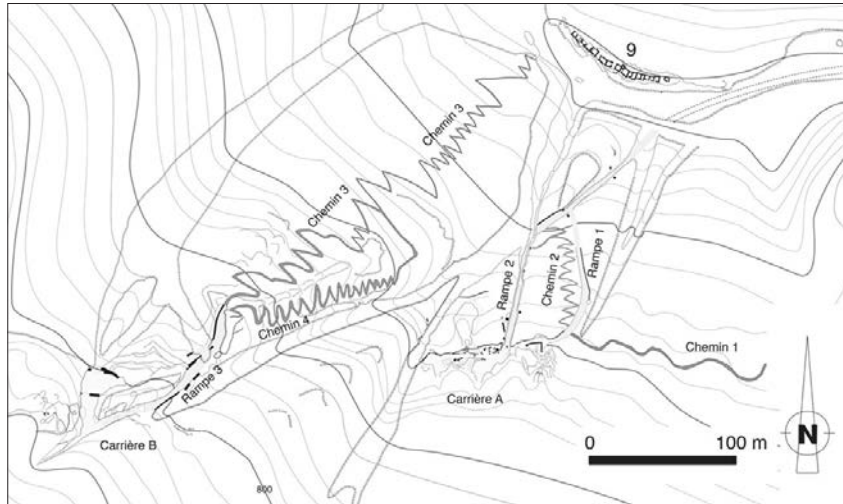


FIGURE 16. PLAN OF THE QUARRIES (J.-P. BRUN WITH E. BOTTE AND M. LEGUILLOUX)

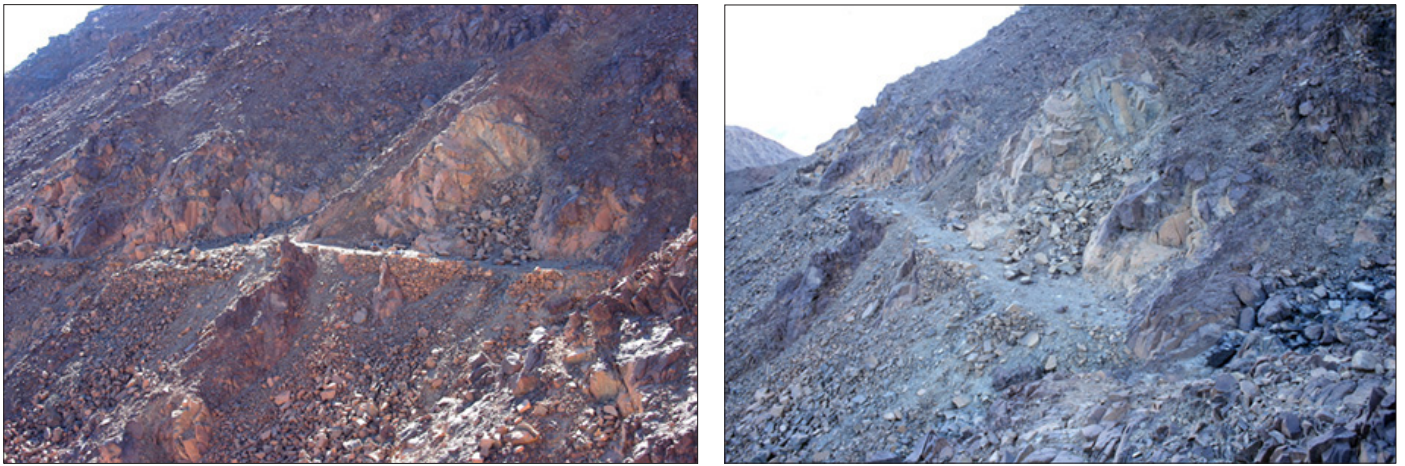


FIGURE 17. QUARRY A (J.-P. BRUN)

the retaining wall, stands a building, the floor of which is covered with a layer of charcoal and iron slags showing that it was a blacksmith's workshop. The association of quarries and blacksmiths is common in the *Mons Claudianus* quarries. The working faces are dotted with lines of wedge holes used to extract the blocks. The wedge holes are of the same type at the *Mons Claudianus* and the *Porphyrites* showing an identical technique of rock extraction by iron wedges hammered between two feathers, which were small sheets of iron called *parasphènia* and mentioned in the *ostraka*. The working faces show that rectangular blocks of medium size were extracted.

Several semi-finished blocks ready to be transported down the slipway are lying at the top of the slipway. A block found in the wâdi bears the inscription *RPP: R(ecensitum) P(atrimoni) P(orphyritou)*, indicating that the administration considered that Kainé Latomia was part of the *Metallon Porphyritou*, which is logical since this quarry is located in the same mountain of *Mons Porphyrites* whose importance and anteriority were obvious (Bülow-Jacobsen 2018).



FIGURE 18. QUARRY B (J.-P. BRUN)



FIGURE 19. THE UNFINISHED SLIPWAY OF QUARRY B (J.-P. BRUN)

The blocks extracted from the quarry were carried down through two slipways (fig. 16). The North slipway is lined, as the ones at *Mons Claudianus* and at *Porphyrates* quarries, by cylindrical structures with an average diameter of 2 m, built with waste stones. They were probably used for fastening the ropes used to slow the descent of the blocks, rather than being piles of stones held in reserve for the construction of the slipways according to D. Peacock.

Quarry B is located north of quarry A, halfway up the mountain (fig. 18). Two paths joined it. The quarry is designed as a roughly triangular working area divided into two terraces. The lower terrace, north, is bordered by a high retaining wall up to ten meters high. The west face of the quarry is prepared for the extraction of granite blocks. The upper terrace is bordered by a long retaining wall. Its surface shows several blocks with wedge holes. Toward the southeast, a passage, 5 m wide, links quarry B to a slipway. This corridor, was designed to allow the evacuation of blocks but it was never completed: a rock pan lies in the middle and was not removed. Above the west face of the upper terrace, at an altitude 835 m, there is an extraction area. The working faces are lined with wedge holes. Ten meters above, two are located two watch shelters.

The original plan was to build a slipway from the quarry to the road leading to the village in order to offload the blocks (fig. 19). The upstream segment of this slipway was completed but the downstream segment, to the village, has not been finished; the unfinished slipway ends abruptly on a rock head.

CHRONOLOGY AND INTERPRETATION

Summarizing all the data provided by the *ostraka* and the results of the archaeological study of the buildings and the ceramic assemblages, we can determine five phases in the history of this site. We know from the corpus of *ostraka* that such quarries were exploited during short periods when works notably at Rome needed specific stones. From a methodological point of view, we must keep in mind that, if we had only the ceramics to date these phases, we would find it normal to extend

them from the end of the first century to the middle of the second century, filling the gap of what we know to be an abandonment between AD 100 to 146. Instead of short periods of very intense activity, we would imagine a long period of medium intensity.

The first phase: building of the fort and other structures

This phase consists of the construction of the fort between AD 89 and 91. The blocks A, B, C1, D1, E1 and F1 were built (fig. 20). The block A was occupied by the staff of the fort. Room 3, vital because of the cistern, also served as a sanctuary where three deities were worshiped. We know nothing of these gods but in the other quarries, Zeus Helios Megalos Serapis occupied the central place with other gods sharing the same temple. On either side of the *sacellum*, rooms are linked to it;

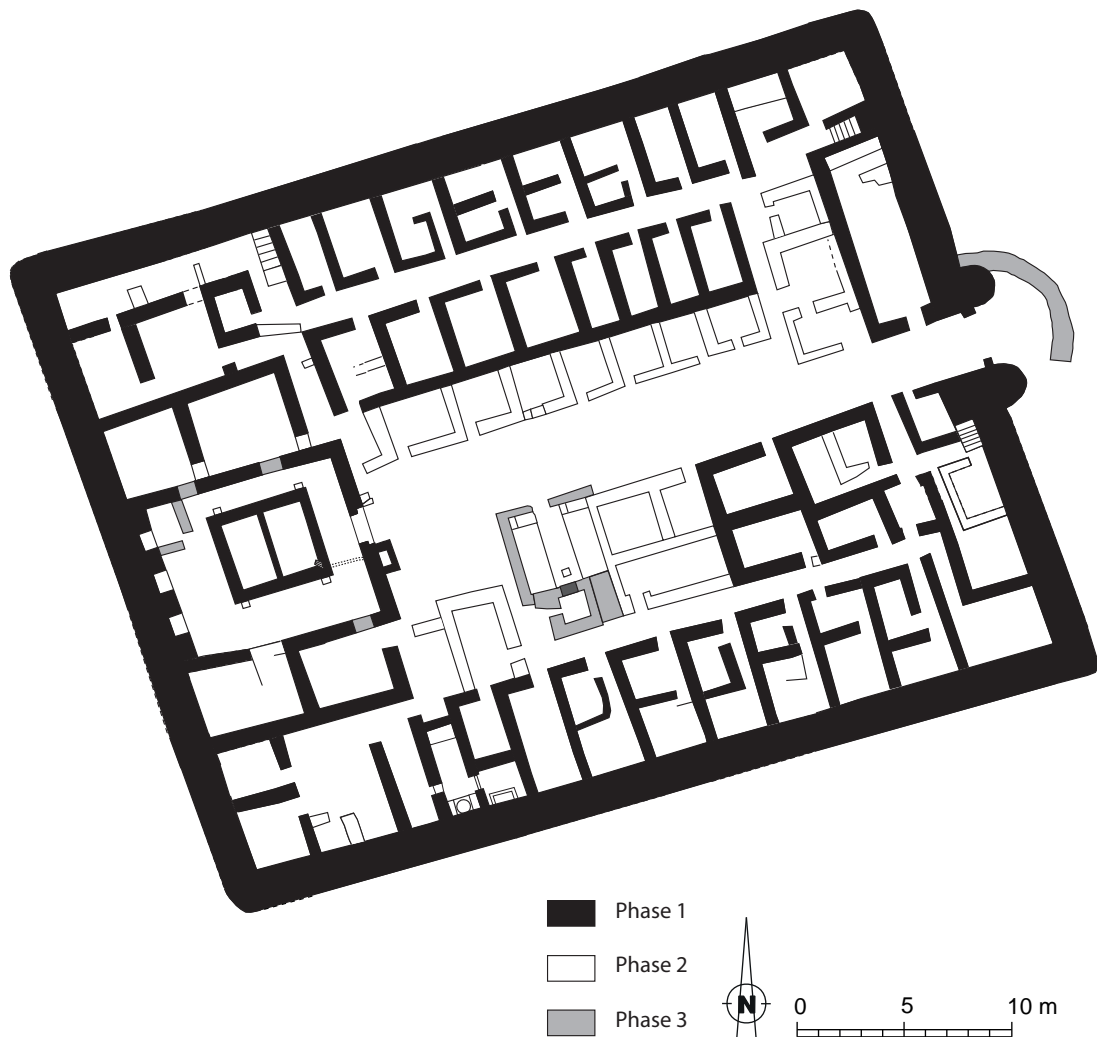


FIGURE 20. PLAN SHOWING THE PHASES OF THE FORT OF DOMITIANÈ-KAINÉ LATOMIA (J.-P. BRUN)

we can identify them as the commander's living quarter, the *praetorium*. Rooms 74 and 75 were probably used as an office and meeting room whose floors were paved.

From that time certainly dates the beginning of extraction in quarry A, the construction of the main slipway and the building of the workers' village, at least some of the cells. Given the date, it is certain that the granite slabs were extracted for the decoration of the *Domus Flavia* on the Palatine, especially for the *opus sectile* of the *triclinium* along with black porphyry, *marmor tibereum* from Bârùd and *marmor Ophiates* from the Wadi Umm Samna-Wikala quarries (Gnoli 1972: 112).

Phase 2: abandonment between AD 100 and 146

The activity of the imperial quarry was intermittent but it generated many documents found on *ostraka*. The organization of the quarry works needed a huge bureaucracy: for example, scribes had to establish lists of workers sent to the quarries in order to distribute the water or other goods. Thus the lack of *ostraka* dated between the years 100 and 146 indicates almost certainly a period of abandonment, called Phase 2.

Phase 3: extracting phase AD 146-151

Phase 3 is characterized by an increase in the number of rooms inside the fort. New cells were built wherever it was possible: C2, D2, E2 and F2, and some passages were removed in order to build new rooms (fig. 20). This clearly marks an increase in activity, which took place towards the middle of the second century when the *ostraka* show intense activity from 146 and up to 151.

I think we can relate the construction of new stables in building 6 and the preparatory work undertaken in quarry B to this intense phase. As we have seen, the works were not completed and quarry B was never exploited: the blocks that were extracted were used to build the retaining walls and the slipway remained unfinished, nor indeed was the access corridor to the quarry completed.

I propose the following hypothesis: when very significant works were undertaken by Antoninus Pius, the imperial administration put maximum effort into the operations at the quarries of the Eastern desert where we witness renewed extractions at *Mons Ophiates*, at Tibérianè, at *Mons Claudianus* and at *Porphyrites*.

At Kainé Latomia, this effort ended in failure: the new quarry, B, may have not given the expected results, probably because the bed rock was cracked and because it was impossible to extract large blocks, such as big columns as at *Mons Claudianus*. But the bad quality of the rock was already known from previous works.

An alternative explication is thus possible: this dark granite was probably extracted only for cutting decorative slabs for flooring. When, after the mid-second century, major works in Rome came to an end, the administration decided to stop work at the Desert quarries and focused on only two large ones, those of *Mons Claudianus* and *Porphyrites*. We know that, during the second half of the second

century, the exploitation decreased even at *Mons Claudianus* and at *Porphyrites* and that *Mons Ophiates* quarry was abandoned in the second half of the second century.

Phase 4: abandonment soon after AD 151

The abandonment seems to have lasted at least half a century.

Phase 5: short reoccupation

This phase is characterized by a re-occupation of the fort for a short period of time, perhaps no more than a couple of months. During this phase, the fort was already partially ruined and it was reoccupied only in part. The old sanctuary was abandoned and a kitchen was installed against its northern niche of room 3. Rooms 74 and 75 were cleaned. It is in these rooms that the centurion *Caninius Dionysios* took up residence as shown by the letters we found there.

A new sanctuary was built then in room 17 which included a central corridor bordered by two benches accessible by stairs. Sanctuaries built in the fort of the eastern desert during the early third century, such as those of Qusur al-Banat and Didymoi, present similar plans: so in the absence of any epigraphic evidence, we can only suggest that this sanctuary was devoted to the main god of the army: Zeus Helios Megalos Serapis.³ The ceramic and glass objects found in the layers of this phase are dated to the late second-early third century.

How can we explain this reoccupation? I could not identify any levels of waste on the external dump and there were only a few sherds thrown on the surface and the ceramics found in the fort are rare. Our interpretation of the reoccupation of the Severian period is as an inspection tour for informing the administration on whether or not to reopen the quarry. It is significant that a centurion resides locally. We know that it is a centurion, *C. Cominius Leugas*, who was sent to the desert under *Tiberius* to discover porphyry and to open the quarries at the *Porphyrites*. Other centurions *Annius Rufus*, *Valvennius Priscus* and *Avitus*⁴ were commanding at *Mons Claudianus* at the time of the great extraction works necessitated by the construction of the Forum of Trajan between AD 110 and 118. Under Antoninus, at a peak of activity, the centurion Plotinus was in charge (O. Claud. 868). A centurion is also attested in *Mons Ophiates* in AD 150⁵ during a phase of intense activity. So the administration could have sent a centurion to inspect the quarry in order to decide about its reopening.

3. About the question of worshipping in the forts of the Eastern Desert, see Reddé 2015a, 2015b and 2018.

4. *Annius Rufus* (CIL III 25 = I.Pan. 39 between AD 114 and 117), *Valvennius Priscus* (between AD 113 and 117: SEG XV 867 = I.Pan 4); *Avitus* (AD 118).

5. AE 1952: 249; I.Pan 53.

On which occasion? For this period, we think of course of the construction of Septizonium by Septimius Severus, or the decoration of the flooring of the Baths of Caracalla, whose structural work began in 211-212 and that were completed in 216.

The report of the centurion was probably negative and the quarry was not reopened. It was the second failure and the scarcity of granite Kainé Latomia in Rome is a reflection of these failures albeit the massive investments in labour force and capital to pay salaries and equipment. This failure was due to bad choices by the imperial administration, blinded by its desire for prestige to the point of wasting huge resources on a poorly planned project. But this type of failure is not the prerogative of the governments of the past as we learn every day.

CONCLUSION

Examining the two small quarries A and B of Kainé Latomia provides several lessons for the organization of the extraction work. Given the difficulty of the environment, implementing a new quarry necessitated the setting up of a base camp (the fort), a communication network (roads) to the valley, temples for gaining the protection of the gods and the digging of wells and cisterns. Then it was necessary to build a camp base to prevent workers returning every night to the fort. Then, from these bases, the fort and the village, paths were made to reach the rocky banks and to bring men and tools. These paths are wide enough to allow the passage of donkeys for any transportation. The third step was to build terraces, using raw blocks, in order to work easily, and to build a blacksmith to forge the tools several times a day. The *ostraka* from *Mons Claudianus* published by Adam Bülow-Jacobsen in his book «The quarry texts» issued in 2009 provide a clear insight into the role of the smiths and their aids: the proportion between the ratio of smiths vs quarrymen is 1:15. Only when all these stages were done could the actual extraction begin and slipways were built to get the blocks down to the road.

When the imperial administration decided not to carry on the exploitation, only quarry A was under exploitation: the working faces were prepared, the quarrymen had extracted some blocks which were roughly cut; some had been transported as far as the road, since five of them were abandoned there, but others were brought to Rome.

Quarry B on the contrary was far from being operational: the terraces were built, two major quarry faces were prepared but they were not worked on because the slipway was not completed. Thus no block has ever come from this quarry. Unlike quarry A, there is no cluster of rock chips attesting that blocks were roughed-out and I found very few pottery sherds testifying to a short-term operation.

In sum, it is likely that the Romans spent most of the time planning the operation and preparing the work building the fort, the village, the temple, etc. Because of the poor quality of the stone, the order to stop the work came when the complex was barely operational and even unfinished. The first period, which lasted a decade at the very end of the first century AD would correspond to the start of operations in quarry A. The second period, which lasted about five years towards the middle of the

second century if we follow the dates given by the *ostraka*, focused on the recovery of quarry A and on the opening of quarry B.

The third attempt, in the early third century, was probably limited to an inspection, perhaps some tests but no real work in the quarry.

What was the importance of Domitianè-Kainé Latomia in the complex of the granite and porphyry quarries of the Eastern Desert of Egypt? The opening of quarries in this hostile region was decided towards the end of the reign of Augustus and under Tiberius. On the one hand, old quarries such as the *basanites* quarries of Wâdi al-Hammâmât were reopened, and on the other hand, intense surveys were conducted by military specialists such as *C. Cominius Leugas* who discovered the porphyry deposit in the Gebel Dokhan in AD 18.

The oldest granite quarry complex opened by the Roman administration, is that of *Mons Ophiates* in the Wadi Umm Samna-Wikala sector. A dedication to Pan dated from AD 10-11 gives the quarry name, the date of foundation of the temple and probably of the entire complex and the name of the freedman *Poplius Iuventus Agathopous* who led the works under the authority of the prefect of the desert of Berenike. We can identify the stone quarried from *Mons Ophiates* as the marble called *Augusteum* by Pliny (*Natural History* 36, 55-56). Another inscription found in a Roman site near the gold mine of Wadi Samna 10 km northwest of *Mons Ophiates* quarry bears the name of *Ulpus Himerus* with his title of *procurator metallorum* (Cuvigny 1996). It attests that the quarry was still operating under Antoninus Pius but the survey conducted in the years 1997-2000 by the US team composed of S. Sidebotham, assisted by Hans Barnard and J. Harrell and R. Tomber showed that the *praesidium* which included a well (*hydreuma*) and the settlement for the quarrymen and shrine located 2 km upstream were abandoned soon after this date and never reoccupied (Sidebotham *et alii* 2001).

The second granite quarry was the one opened under Tiberius at Tibèrianè, now Barud, located 10 km south of *Mons Claudianus*. The name is given by the *ostraka* found by the British mission and it seems that the *marmor Tibereum* is a rather black granite used precisely for paving floors in the Palace of Tiberius on the Palatine. The excavations and surveys were rather disappointing because the British team led by V. Maxfield and D. Peacock found only remains from the Antonine period in the fort and the rubbish dump (Maxfield and Peacock 1997: 277-278, and 2001b). But I think that there is a first stage of the fort that escapes us because, as elsewhere, the barracks were periodically cleaned. The first settlement was probably poorly fortified and similar to that of Wadi Umm Wikala, thus without towers at the corners. The towers were added later, during the second century AD. The objects and *ostraka* of the mid-second century would date only the Antonine quarrying phase which was intense everywhere in the desert.

At *Porphyrites*, the first exploitation of the porphyry quarries dates from the Tiberian period. Works were carried out for five centuries but not permanently (Maxfield and Peacock 2001a). Under Tiberius and Claudius, small quarries and villages called Foot and Bradford were active; then under Nero and the Flavian, new villages called NW and SW were built for exploiting nearby quarries. Under Domitian a large fort and a new well were created. At least two temples were built

shortly after: the temple of Isis was dedicated in AD 113, and the temple of Serapis in AD 117-119. From this period dates the exploitation of the *Lepsius* and *Lycabettus* quarries. Towards the middle of the second century, the intense activity in the *Lepsius* and *Lycabettus* quarries necessitated the construction of a fort and stables at Badia, as well as stables and cisterns at Umm Sidri. During the second half of the 2nd century, activity appears much less intense but there was a renewal during the Severian period, marked by the construction of a new workers village near the *Lycabettus* quarries.

The troubles of the last third of the third century probably caused the abandonment of the quarry. Then at the beginning of the fourth century, the fort was reoccupied and new working faces were opened at the *Lepsius* and *Lycabettus* quarries. This intense activity explains the construction of a long slipway regularly flanked by pairs of cairns. This period is dated by inscriptions, coins and pottery which indicate that the site operated until about AD 425. Then the quarries were definitely abandoned.

The history of *Mons Claudianus* is much shorter. The quarry was opened under Claudius and exploited at the beginning around a workers village incorrectly called the Hydreuma. The main phase began under Domitian who ordered the construction of the fort in AD 86 and ordered the extraction of granite for the decoration of the *Domus Flavia*. This fort was necessary because of the growing insecurity in the area, observed also along the routes of Myos Hormos and Berenike. From this base, the quarries were fully exploited for Trajan's Forum, then for the Villa Hadriana, then, under Antoninus for the Temple of Venus and Rome. The Antonine period is marked by several improvements such as the construction of a large granary and of animal lines. After this period of intense activity, the quarry is less used during the second half of the second century. But there is a renewal during the Severian period, in particular for the decoration of Caracalla's bath in Rome. After Severus Alexander, the quarry is definitely abandoned, toward AD 235 (Maxfield and Peacock 2001b).

In this context, we observe that the Kainé Latomia quarry follows the main phases of exploitation of the other imperial quarries. The role of Domitian is fundamental everywhere: at *Mons Claudianus*, at *Porphyrites* and at Kainé Latomia, he ordered the building of large forts and increased the extraction. This activity continued under Trajan. There is another peak under Antoninus, marked by intense activity at *Mons Ophiates*, at Tiberianè, at *Mons Claudianus* and at *Porphyrites* where large stables are built for the animals pulling the stones. It appears that the reign of Antoninus is not only a very important phase of extraction, but also a period of rationalisation of the transport. The last peak occurred under the Severi when *Porphyrites* and *Mons Claudianus* were reactivated and when the administration sent a centurion to evaluate the opportunity to reopen the quarry at Kainé Latomia. We have seen that this was not the case.

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ISBN 978-84-09-23602-2