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ΟΡΓΑΝΩΣΗ

ΕΤΑΙΡΕΙΑΣ ΔΙΕΡΕΥΝΗΣΗΣ ΤΗΣ ΑΡΧΑΙΟΕΛΛΗΝΙΚΗΣ ΚΑΙ ΒΥΖΑΝΤΙΝΗΣ ΤΕΧΝΟΛΟΓΙΑΣ

NOESIS
ΚΕΝΤΡΟ ΔΙΑΔΟΣΗΣ ΕΠΙΣΤΗΜΩΝ & ΜΟΥΣΕΙΟ ΤΕΧΝΟΛΟΓΙΑΣ

Το Διοικητικό Συμβούλιο της Εταιρείας Διερεύνησης της Αρχαιοελληνικής και Βυζαντινής Τεχνολογίας (ΕΔΑΒυΤ) ανέλαβε την ανάρτηση στην ιστοσελίδα της (www.edabyt.gr), σε ψηφιακή μορφή, των εργασιών του 3ου Διεθνούς Συνεδρίου Αρχαιοελληνικής και Βυζαντινής Τεχνολογίας (Αθήνα 19-21 Νοεμβρίου 2024).

Οι εργασίες είχαν γίνει αντικείμενο κρίσεων και σχολιασμού από την Επιστημονική Επιτροπή. Επι πλέον, έγιναν κι άλλες παρατηρήσεις και σχόλια κατά την συζήτηση που ακολούθησε μετά την προφορική τους παρουσίαση στο Συνέδριο.

Οι εργασίες αναρτώνται όπως κατατέθηκαν από τους συγγραφείς μετά την ολοκλήρωση του Συνεδρίου. Οι συγγραφείς φέρουν την ευθύνη του περιεχομένου της εργασίας τους, τόσο ως προς τις απόψεις τους όσο και ως προς την ακρίβεια και την ορθότητα των στοιχείων που παραθέτουν.

The Board of Directors of the Association for Research on Ancient Greek and Byzantine Technology (EDAByT) undertook the posting on its website (www.edabyt.gr) of the papers presented at the 3rd International Conference on Ancient Greek and Byzantine Technology (Athens, November 19-21, 2024).

The papers had been subject to reviews and comments by the Scientific Committee. Additionally, further observations and comments were made during the discussion that followed their oral presentation at the Conference.

The papers are posted as submitted by the authors after the conclusion of the Conference. The authors are responsible for the content of their work, both in terms of their views and the accuracy and correctness of the data they present.

LOCKING AND SAFETY MECHANISMS IN ANTIQUITY

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Abstract. A fundamental human need is the feeling of safety, the ability to protect not just ourselves from potentially harmful individuals or objects, but also our possessions. This necessity has led to the development of locks and security mechanisms over thousands of years, which, alongside other technological innovations, have undergone extensive historical evolution. In this article, we will explore this evolutionary journey. Initially, there lies the intention and vision preceding the implementation of new technologies. This is evident in both mythological tales, like the intricate bonds crafted by Hephaestus to bind Aphrodite or Prometheus, and in descriptions of grand gates, such as those found in Alcinoos' palace. These gates needed to open and close securely from both inside and outside, shaping the design of their mechanisms and locks. Ancient inscriptions and tomb reliefs depict the bulky, unwieldy keys of Homeric times, suitable for large doors but impractical for securing valuable items and treasures. Consequently, smaller, more user-friendly keys with corresponding locks were developed, crafted from wood or iron, including vertical simple, rotating, or sliding toothed keys. The evolution of locking and safety mechanisms continued with the creation of locks and padlocks featuring bolts for movement and securing after closure. An exemplary instance of this development is the lock-padlock mechanism unearthed from excavations at Ancient Eleutherna in Crete.

Keywords: lock, padlock, secure mechanisms, mechanism of Eleutherna

Περίληψη. Μια θεμελιώδης ανθρώπινη ανάγκη είναι η αίσθηση της ασφάλειας, η ικανότητα να προστατεύσουμε όχι μόνο τον εαυτό μας από επικίνδυνα άτομα ή αντικείμενα αλλά και τα υπάρχοντα μας. Η ανάγκη αυτή δημιούργησε εδώ και χιλιετίες κλειδαριές και μηχανισμούς κλειδώματος, που παρόμοια και με τις άλλες τεχνολογικές επινοήσεις και κατασκευές, παρουσιάζει μακρά ιστορική εξέλιξη. Στο άρθρο αυτό θα σκιαγραφήσουμε την εξέλιξη αυτή. Αρχικά η πρόθεση και το όραμα, που προηγείται της υλοποίησης των νέων τεχνολογιών, και καταγράφεται τόσο στις μυθολογικές αναφορές των περίτεχνων δεσμών του Ηφαίστου που έδεσαν την Αφροδίτη ή τον Προμηθέα, όσο και στις περιγραφές επιβλητικών πυλών, όπως στο παλάτι του Αλκίνοου, που η ανάγκη να ανοίγουν και να κλείνουν, από μέσα αλλά από έξω, καθόρισε και την μορφή των μηχανισμών και

των κλειδαριών τους. Επιγραφικές μνείες και επιτύμβια ανάγλυφα απεικονίζουν την καμπυλόγραμμη, δύσχρηστη και μεγάλη, ομηρική κλείδα κατάλληλη για μεγάλες πόρτες αλλά όχι για την φύλαξη πολύτιμων αντικειμένων και θησαυρών. Έτσι επινοούνται μικρά και εύχρηστα κλειδιά με τις αντίστοιχες κλειδαριές τους, ξύλινα ή σιδερένια, όπως τα κάθετα λακωνικά ή τα περιστρεφόμενα ή τα συρόμενα οδοντωτά κλειδιά. Και η εξέλιξη συνεχίζεται στην γενιά κλειδαριών και λουκετών με ελάσματα για την μετακίνηση αλλά και την ασφάλιση του σύρτη μετά το κλείσιμο του. Σε αυτήν την κατηγορία χαρακτηριστικό και ιδιαίτερο αρχαιολογικό εύρημα είναι ο μηχανισμός – κλειδαριά λουκέτο – από τις ανασκαφές στην Αρχαία Ελεύθερνα της Κρήτης.

1 Introduction

Locking mechanism, lock, key, padlock, Homeric lock (*κλείδα*/*klΐdē*) are some technological terms that refer both to the deep human need for security, control, access and privacy, and, as symbols of power, authority, wealth and stature, reveal cultural, economic, and social practices and customs. Dictionaries and encyclopedias offer definitions of the term "lock" that vary from era to era or from edition to edition (Yan H.S., Huang H.H. 2004). In any case, a device referred to as a *lock* is a mechanism that secures a door or receptacle so that it cannot be opened except by someone who has the key and can perform the appropriate manipulations. Regardless of the material of construction, locking mechanisms can be divided into *fixed locks*, which cannot be moved and are permanently installed on doors or windows, and *padlocks*, which are portable and can be adjusted to fit anywhere (Kan Shi et al. 2020).

The historical development of locking mechanisms stretches far back in time, with a wide range of techniques and materials used in their construction. Exploring all the historical milestones across different centuries and cultures that have shaped the techniques and types of locks, as well as the security they provide, extends beyond the scope of this article. This study focuses mainly on the following key aspects that outline the historical evolution of locking mechanisms:

- The vision and intention of construction of locks in ancient Greek mythology
- Archaeological discoveries and the function of Homeric locks
- Laconian keys and related archaeological finds
- Locks with bolts
- The mechanism/padlock from Ancient Eleutherna

2 The mythical locks

2.1 The Homeric bonds

In Homeric epics, we encounter the intention, vision, and desire that precede the development of new technologies. Just as the mythical automata created by Hephaestus – such as the self-moving tripods, the automated bellows, and the golden handmaidens – represented an early vision of real automata, the mythical bonds invented by the same god,

Hephaestus, anticipated the later development of actual locks and their complex mechanisms. Among these mythical bonds are:

- The elaborate bonds with which Hephaestus bound Aphrodite and Ares, who were caught in an affair on the marital bed. These bonds were so complex that only Hephaestus himself could undo them. As described in the *Odyssey*: “These two went to bed, and slept there, and all about them were bending the artful bonds that had been forged by subtle Hephaestus” (Lattimore R. 1965, Odyssey Book 8, θ296).
- The invisible bonds with which Hephaestus bound his mother, Hera, when she sat on a throne he had crafted. This throne locked automatically in a secret manner. “One of the Greek legends is that Hephaestus, when he was born, was thrown down by Hera. In revenge he sent as a gift a golden chair with invisible fetters. When Hera sat down she was held fast, and Hephaestus refused to listen to any other of the gods save Dionysus” (Jones W.H.S. 1935, Pausanias, *Description of Greece* 1.20.3).
- The unbreakable bronze bonds that Hephaestus crafted at Zeus's command, which were used to bind Prometheus on the peaks of the Caucasus. Poetic descriptions refer to wedges, shackles, and rings, highlighting their unbreakable construction and steel-like strength (Aeschylus, *Prometheus Bound* 6, 19, 54, 64, and 71).

2.2 The Homeric doors

In Homeric descriptions, there are also references to real human inventions of mechanisms that locked the gates of palaces, the doors at the entrances of homes, and the doors to private rooms such as bedrooms and storerooms in Homeric world of the 8th century B.C.

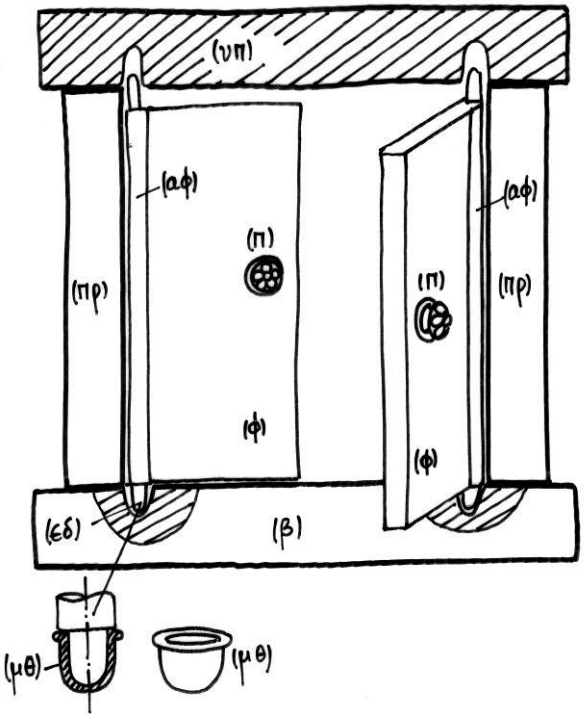
Descriptions of imposing doors can be found in various contexts, such as:

- In the *Iliad*, the automatic gates of heaven, which were held by the Hours and opened with a motion from the goddess Hera: “…Hera laid the lash swiftly on the horses; and moving of themselves (Homer uses the word *αυτόματα* / automatically) groaned the gates of the sky that the Hours guarded”, by themselves) (Lattimore R. 1951, Iliad, Book 5, E749)”.
- In the same epic, the solid doors that Hephaestus crafted for Zeus's palace (Iliad, Book 14, Ξ 338).
- In the *Odyssey*, the elaborate metal gates of Alcinoos' palace, marking the entrance to Scheria, the city of the Phaeacians (Odyssey, Book 7, η81).

Doors, along with their technology, have their own evolution. They represent the movable and dynamic element of an architectural ensemble, gradually evolving from a simple barrier to a sophisticated mechanism. What should a door do? It must open and close. It should allow entry and exit. Initially, it needs to open from the outside and close from the inside. Ultimately, it must be able to open and close from both inside and outside. Last but not least, a door must be secured to ensure safety and privacy. How is this achieved? And how did the functioning of these doors influence the design of their locking mechanisms?

Let us once again look into Homeric descriptions, which encapsulate the technological knowledge up to that time, to find historical answers to these questions. Homeric doors were often double-leafed. The Achaean wall at Troy had double gates (Iliad, Book 12, M455) that Hector broke by smashing both wooden hinges (Iliad, Book 12, M459).

How does a double-leaf door open?



leaves of the door (φ)

pivoting vertical axles (αφ)

stone base or threshold (β)

stone lintel (υπ)

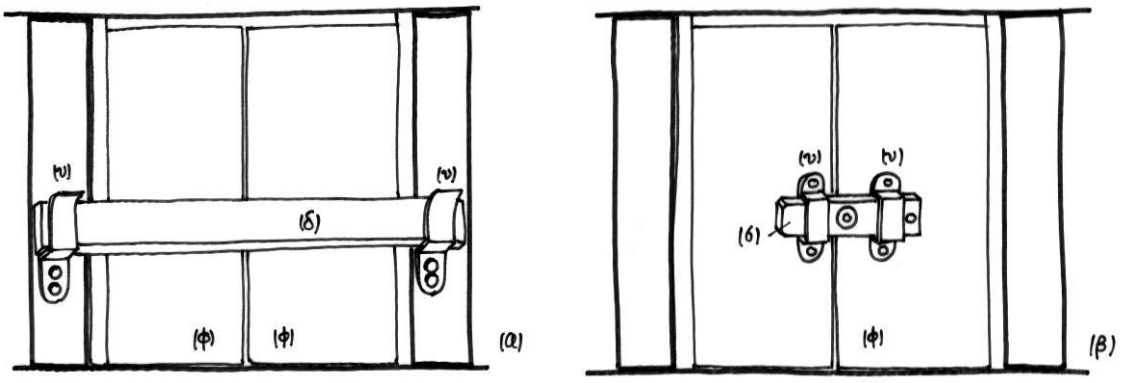
stone jambs (πρ)

mounting point (εδ)

metal sleeve (μθ)

handle or knob (π)

Figure 1: How a double-leaf door opens (Exterior View) [Drawing by D. Kalligeropoulos]



With a horizontal beam (α)

With a manual bolt (β)

Door leaves (φ)
Wooden horizontal beam (δ)
Recesses (υ)
Bolt (σ)

Figure 2: How a double-leaf door opens (Interior View) [Drawing by D. Kalligeropoulos]

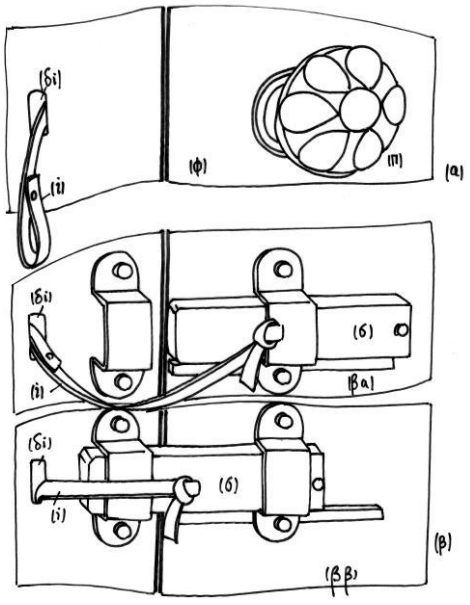
A double-leaf door opens by having its leaves rotate on pivoting vertical axles that are mounted in hollow recesses carved into the stone base or threshold of the door. These axles are frequently reinforced at their ends with metal fittings, such as bronze or copper sleeves. The door is operated manually using handles or knobs attached to the door leaves.

How does a double-leaf door lock from the inside?

The '*organon'*, a horizontal wooden beam that blocked the door from the inside and was supported by two fixed recesses mounted on the door jambs, gradually evolved into a manual bolt with recesses now fitted into the door leaves. This internal bolt secures the door from the inside.*How does a double-leaf door lock from the outside?*

The answer to this question is found in the first book of Homer's Odyssey. There, Telemachus enters his bedroom, accompanied by his loyal nurse, Eurycleia. "He opened the doors of the strong chamber", and after he had undressed and lay down, the old woman Eurycleia "then left the chamber, and by its silver ring pulled to the door, drawing the bolt home by its strap." (Lattimore R. 1965, Odyssey α436)

This description refers to a double-leaf door that opens and closes from the outside by using a silver handle. It is secured from the inside with a bolt, which can be locked from the outside by pulling a flexible strap, a cord that communicates with the outside through an opening or slot in the door. Thus, the bolt locks from the outside but can only be opened from the inside – unless the strap is tied from outside to the handle.



Exterior view of the door (α)

Interior view of the door (β)

Interior view with the bolt open (βα)

Interior view with the bolt closed (ββ)

Handle / Knob (π)

Bolt (σ)

Strap (ι)

Passage for the strap to the outside (δι)

Figure 3: The locking mechanism with strap on Telemachus' door

[Drawing by D. Kalligeropoulos]

2.3 The Homeric locks

How does a double-leaf door lock and unlock from the outside?

The answer to this question can be found towards the end of Homer's *Odyssey*. Here, Homer describes Penelope opening the chamber door where she keeps the treasures and Odysseus' bow.

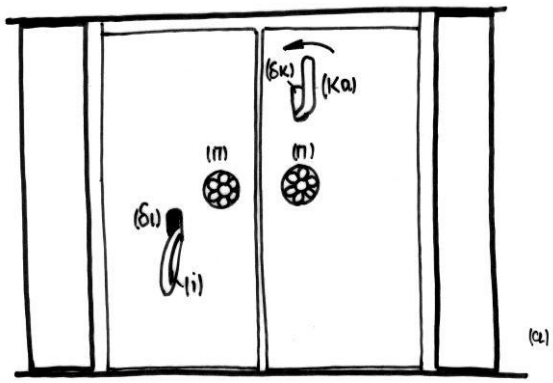
"She mounted the long stairway of her house, holding a crooked key in her firm hand,—a goodly key of bronze, having an ivory handle, — and hastened with her damsels to a far-off

room where her lord's treasure lay, bronze, gold, and well-wrought steel." (Lattimore R. 1965, Odyssey υ5).

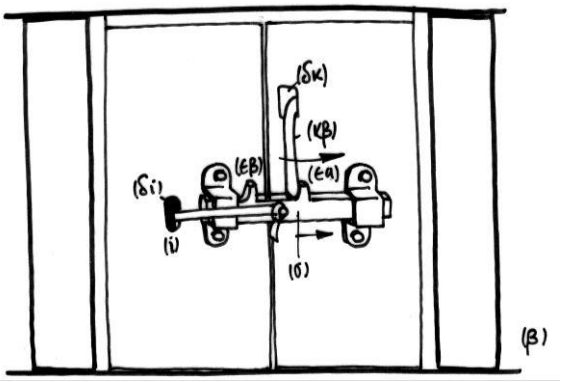
She "then quickly from its ring she loosed the strap, thrust in the key, and with a careful aim shot back the door-bolts. As a bull roars when feeding in the field, so roared the goodly door touched by the key, and open flew before her." (Lattimore R. 1965, Odyssey υ21).

In this description, the mechanism that secures the double-leaf door incorporates several elements:

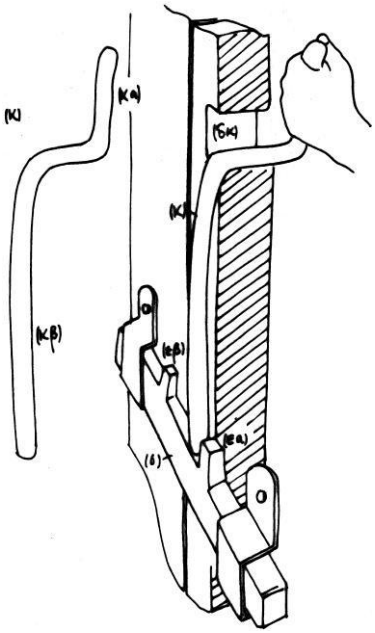
- The *bolt* as the main locking mechanism inside the door.
- The *strap* that can be pulled from the outside and is secured by tying it to the external handle, allowing the door to be opened only from the outside.
- The *key* as a new element introduced by Homer. The key is curved in shape, designed to be inserted through an opening (a keyhole) from the outside into the door's interior.



Exterior view of the door (α)



Interior view of the door (β)



Key (κ)

Key handle (κα)

Key arm (κβ)

Key passage (δκ)

Bolt (σ)

Projections for opening and closing the bolt (εα), (εβ)

Strap (ι)

Passage of the strap outward (δι)
Knob (π)

Figure 4: Homeric key and its operation for locking and unlocking a double-leaf door [Drawing by D. Kalligeropoulos]

This type of key, known as the *Homeric key*, represents one of the earliest forms of locking and unlocking mechanisms, showcasing the ingenuity and technical advancements of the time. It is a distinctive key with significant symbolic and practical value. It is usually kept and handled by the keyholder, who in many cases is a deity, such as Hera, Athena, Artemis, Persephone, Eros, a priestess, or the lady of the house. Therefore, the key is not only a tool but also a symbol of authority and protection.

Some notable quotations from ancient Greek sources about those who hold the key to a palace or temple include:

- Hecuba, the queen of Troy, goes with her entourage to the Temple of Athena in Troy, where "… Theano of the fair cheeks opened the door for them … she whom the Trojans had established to be Athena's priestess." (Lattimore R. 1951, Iliad, Book 6, Z298).
- Iphigenia was the key keeper at the Temple of Brauron, holding the keys for the two ascending entrances of the temple (Euripides, *Iphigenia in Taurus*, line 131).

On the other hand, some indicative iconographic or relief archaeological findings that confirm the Homeric description of keys and locking mechanisms are:

- A bronze ancient key with an engraved inscription reading "ΤΑΣ ΑΡΤΑΜΙΤΟΣ ΤΑΣ ΕΝ ΛΟΥΣΟΙΣ" features a Z-shaped, curved form. It dates back to the 5th century B.C. and was discovered around 1880 during excavations at the Temple of Artemis in Lousoi, Arcadia. The key is currently on display at the Museum of Fine Arts in Boston.

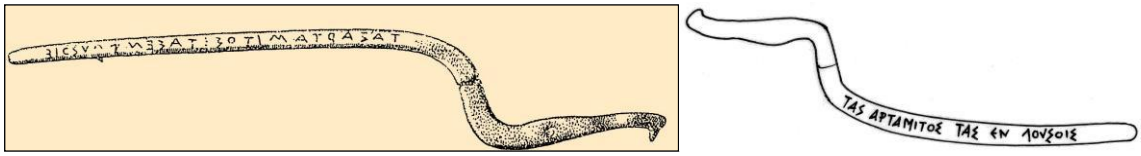


Figure 5: Ancient Homeric key from the Temple of Artemis in Lousoi, Arcadia, MFA Boston (Diels, 1965)

- A representation of a maiden using a Homeric key to open a double-leaf door of a treasure chamber on a classic red-figure hydria. The artifact is located in the Berlin Museum (Inventory No. 2382).

Figure 6: Maiden opening a door with a Homeric key, Red-figure hydria,Berlin Museum (Diels, 1965)

A depiction of a young woman carrying a Homeric key over her shoulder appears on an Attic marble funerary relief. The relief is housed in the Berlin Museum (Inventory No. 812).

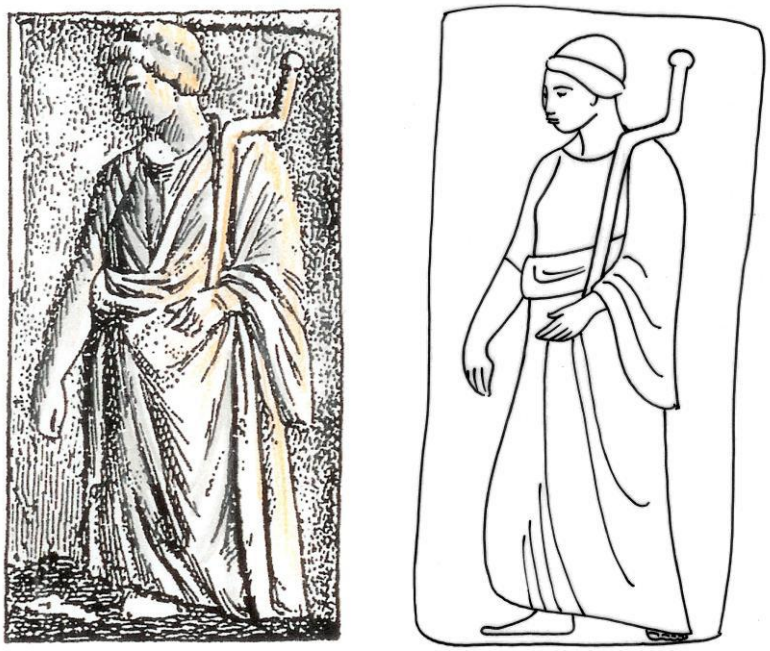


Figure 7: Attic marble funerary relief with a key over her shoulder, Berlin Museum (Diels, 1965)

- Engraved reverse of a silver coin features the head of Hera on one side and a temple key with a strap on the other. It dates from 370-350 B.C. and originates from Argos. This coin is part of the collection at the Numismatic Museum of Athens.

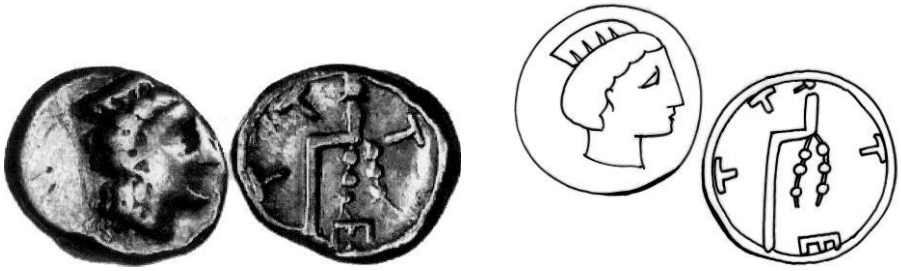


Figure 8: Silver coin from Argos with an engraved depiction of a Homeric key, Numismatic Museum of Athens (Diels, 1965)

2.4 The ‘hidden’ keys

The Homeric key is cumbersome, large, and only useful for big doors. However, it has a significant drawback: it is not unique, hidden, secret, or different for each door. The need to secure doors with concealed locks, as well as the need to protect valuable items, treasures, and gifts in small chests and boxes, led to new technological innovations.

2.4.1 The ‘hidden’ key of Hera

This intention is described by Homer, where the strong, impenetrable doors at Hera's palace, also a creation of the god Hephaestus, equipped with a hidden mechanism. “She (Hera) went into her chamber, which her beloved son Hephaestus had built for her, and closed the leaves in the door-posts snugly with a secret door-bar, and no other of the gods could open it.” (Lattimore R. 1951, Iliad Book 14, Ξ166).

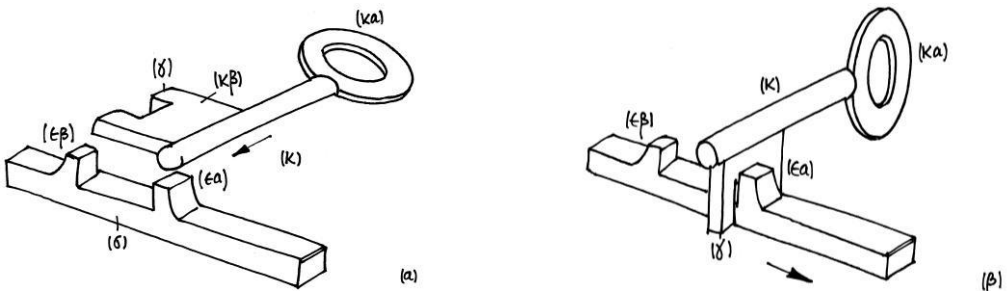
2.4.2 Arete's chest

A similar intention is also recorded in the Homeric Odyssey. On the island of the Phaeacians, the wife of King Alcinoos, Arete, offers Odysseus a beautiful chest, places the precious gifts inside, and gives it to him, saying: “Now see to the lid yourself, the fastening of the chest, and quickly tie the knot.” And he “immediately began to fit the lid and quickly tied the knot with great skill, which the revered Circe had once taught him.” (Lattimore R. 1965, Odyssey, Book 8, θ438, θ446)

This secret, magical knot that Homer envisions later finds its realization with small, convenient keys and their corresponding locks.

2.4.3 The portable hidden keys of Aristophanes

Aristophanes describes in Thesmophoriazusae (line 421) the anger of women when they find locked doors and boxes, and the small, toothed keys that men carry with them: “For the men now carry the keys themselves, with their bad intentions, and the Laconian keys have three teeth.”



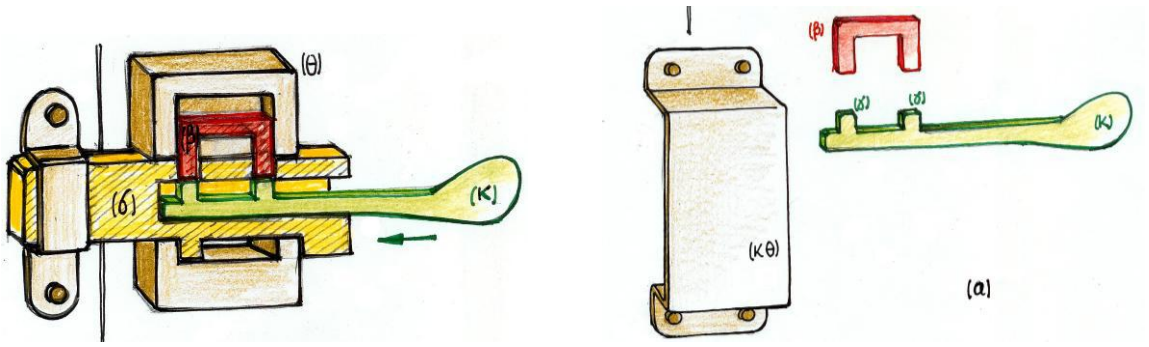
Upon entry (α) During rotation (β)

The key (κ)
The handle of the key (κα)
The head functioning as the lever arm of the key (κβ)
The teeth of the key (γ)
The bolt (σ)
Projections for opening and closing the bolt (εα), (εβ)

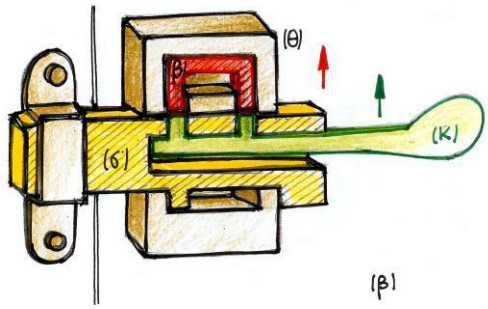
Figure 9: The small toothed key [Drawings by D. Kalligeropoulos]

2.4.4 The small toothed keys

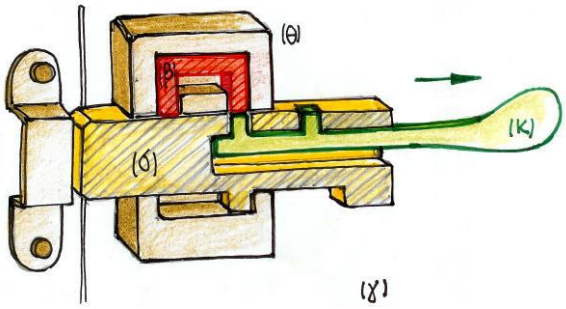
Small keys, with a compact circular end that corresponds to the handle of the Homeric key and a small head that acts as a lever, similar to the large arm of the Homeric key, are known from Classical times. The head of these keys has teeth or projections, which enable them to fit into the notches of the internal bolt and move it, allowing the bolt to be opened or closed from the outside.



The key entry (α)



The lifting of the key upwards (β)



The pulling of the bolt (γ)

The key (κ)
The teeth of the key (γ)
The bolt (σ)
The safety mechanism (β)
The lock chamber (θ)
The cover of the chamber (κθ)

Figure 10: The Laconian key
[Drawings by D. Kalligeropoulos based on the wooden models of G. R. Jacobi, Diels 1965]

2.4.5 The small external locks

The *Laconian* keys mentioned by Aristophanes had a different function. They were designed for small external locks, characterized by their slender and elongated shape with two or more teeth at the end. To use these keys, one would insert them through a lateral slot into

the secured bolt, lift it upwards to release the small safety mechanism, thereby unlocking the bolt and pulling it back to open the door. To secure the door again, one would manually push the bolt back into position.

The innovation in these locks is the small safety mechanism, shaped like a "Π," which prevented the movement of the bolt and could only be disengaged with a special, "secret" key.

3 Locks with plates

The third generation of locks consists of locks with plates. These locks use plates to hold the bolt in place during its sliding motion, while simultaneously preventing its retraction after the door is closed.

Among these, the Eleutherna lock stands out. This sophisticated padlock features a unique, hidden key designed to fit precisely within its internal mechanism. It employs a flexible metal blade to move the bolt and a secondary metal blade to secure it.

An analogous archaeological find is a padlock from Olympia with a rotating key and bolt, which was used to secure the end of a chain. This lock differs from the Eleutherna mechanism in that it has a bronze body rather than iron, and it dates back to the late Roman or early Byzantine period.

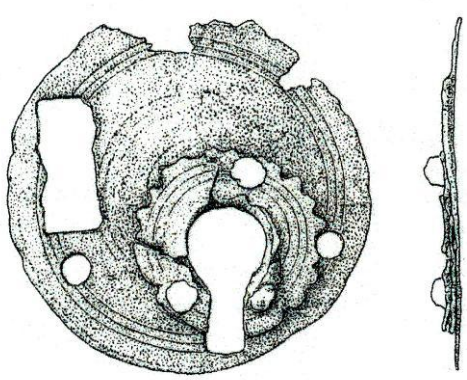


Figure 11: Plate of a lock from Olympia (~300 A.D.) (Baitinger, 2007)

3.1 The Eleutherna mechanism

The ancient city of Eleutherna is built on a hill 30 kilometers southeast of the modern city of Rethymno in central Crete. Its history dates back to the prehistoric period. The city flourished particularly during the Archaic, Classical, and especially the Hellenistic periods. During the Roman period, there was significant construction activity and a growth in the city's population and wealth. However, at the end of the Roman period, around 365 A.D., the city was destroyed by a major earthquake. In the early Byzantine era, the city was rebuilt and continued to exist until the 8th century. However, after repeated Arab attacks and especially after another strong earthquake in 796 A.D., the city was permanently abandoned.

The Eleutherna mechanism was discovered during excavations led by archaeologist Professor Petros Themelis on the eastern side of the city in 1997. It was found in the ruins of a small Roman bathhouse, known as the *Small Balaneion*, buried under the debris from the roof of a space, likely a storage area. The mechanism is dated to around 365 A.D., placing it

in the late Roman or early Byzantine period, and it was buried during the great earthquake that struck the city.

The archaeological find was unique. It consisted of a small cylindrical object, corroded by rust. Through an opening in its broken base, one could speculate about the presence of an internal mechanism with an unknown shape and function. A heavy iron chain, detached from the top of the mechanism, was found nearby. After restoration, the form of the mechanism became clearer. The bronze exterior surface of the cylindrical body was revealed. The fragment with the chain and its base were repositioned at the top of the mechanism. The internal elements of the hollow body also became more distinguishable.

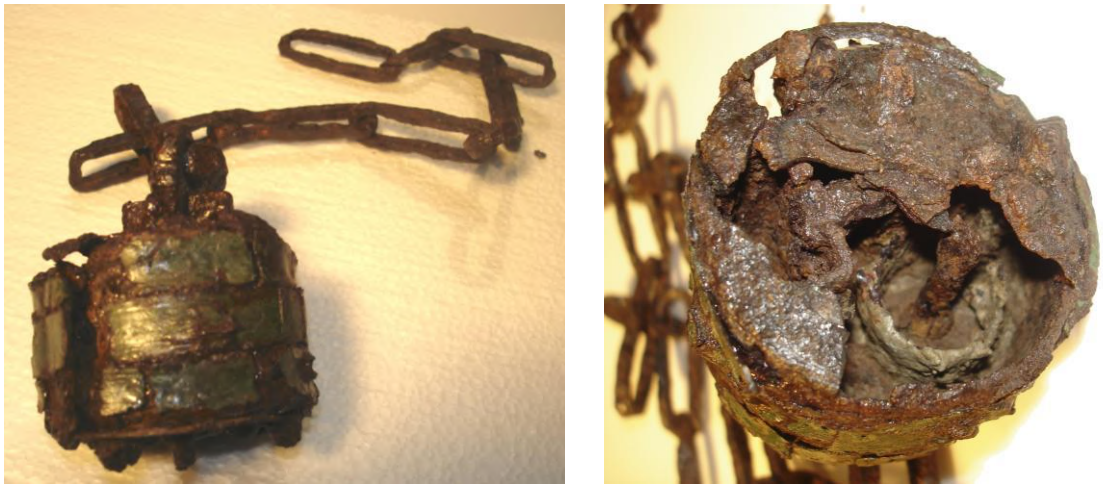


Figure 12: The mechanism of Eleutherna, Archaeological Museum of Rethymno, Crete

The research on the Mechanism, which is preserved at the Archaeological Museum of Rethymno, was entrusted by Petros Themelis to Dimitris Kalligeropoulos and Soultana Vasileiadou. The research followed these stages: *analysis* of the Mechanism through photography and systematic study of its components, precise measurement and drawing of these elements and the Mechanism as a whole, X-ray imaging to reveal areas not visibly accessible, investigation for the existence of related archaeological findings, determination of its use and clarification of its function.

The *analysis* reveals that the Mechanism consists of a heavy, forged iron chain with ten links, measuring approximately 50 centimeters in total length, suspended from a strong, cross-shaped base resembling a temple. This base is attached to the top of the cylindrical body of the Mechanism, which is small, about 5 centimeters in height and 7 centimeters in diameter, made of iron with a bronze coating and double plates on its top and bottom. The openings at its base partially allow for the clarification of the interior, which contains: three cylindrical axles mounted at the bottom, two smaller axles towards the center, a strong horizontal iron beam towards the bottom, and two vertical metal plates – one spiral around the free axle and one tangent to the beam.

The analysis of the Mechanism's components partially allowed for its complete design reconstruction. However, the non-visible accessible sections were examined using X-ray and computed tomography (CT) scans, conducted both with a portable X-ray machine and with the large hospital equipment at the General Hospital of Rethymno. This entire process led to the complete representation of the interior of the mechanism, as shown in the image below.

To determine the previously unknown use of the Mechanism, researchers sought related archaeological findings. A common feature among these related findings, such as the one discovered in the ruins of a Roman palace in western Sussex, England, dating to 290 A.D., or the one found in a Byzantine fortification complex on Mount Jelica in western Serbia, buried within the debris of a Byzantine church and dating to the 6th century A.D. is that they are all identified as padlocks.

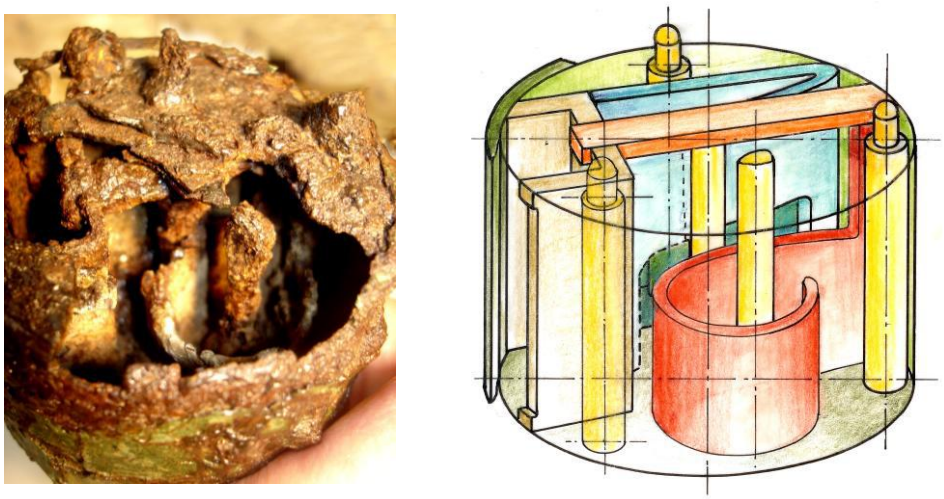


Figure 13: The bottom of the mechanism and a complete diagram of its internal structure

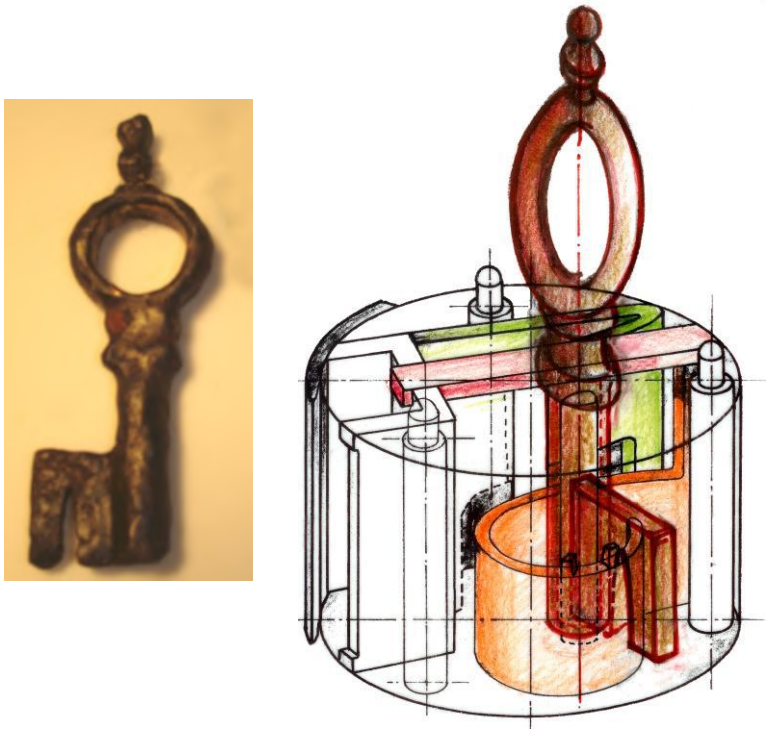


Figure 14: The key and its position in the spiral cam of the mechanism

The use of the Mechanism was now clear: it was a complex, specialized, and rare padlock. The interpretation of its function is as follows: the end of the chain fits into a rectangular opening at the bottom. The beam of the Mechanism acts as the bolt of the lock, which

moves to secure the trapped link of the chain. The spiral cam is the mechanism that moves the bolt and operates with a key that fits into the notches of the cam. When rotated, the key draws the bolt towards the chamber with the link. The other cam in the Mechanism functions as a security feature, preventing the bolt from returning once it has locked.

Interestingly, within the vicinity of the find, a key was also discovered that matches the dimensions and openings of the Mechanism and may indeed be its key.

4 Conclusion

The journey of locking mechanisms from ancient mythological visions to tangible historical artifacts underscores the profound human quest for security and protection. Mythological accounts, such as the intricate bonds crafted by Hephaestus and the elaborate gates described in Homeric epics, reveal early intentions and conceptualizations of locking mechanisms. These stories not only reflect a deep-seated desire for control and safety but also foreshadow the technological advancements that would follow. Archaeological discoveries further illuminate this evolution. Homeric descriptions offer early insights into locking technologies, including cumbersome keys for large doors and the gradual refinement of smaller, more practical designs. Over time, innovations such as the development of padlocks and complex locking systems demonstrated a significant leap in securing both large structures and valuable possessions. The Eleutherna mechanism, uncovered in Crete, exemplifies these advancements with its sophisticated design and functionality. This padlock, dating to around 365 A.D., integrates a complex locking system featuring a flexible metal blade and a security cam, representing a notable evolution in ancient locking technology.

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