ΙΔΡΥΜΑ ΜΕΙΖΟΝΟΣ ΕΛΛΗΝΙΣΜΟΥ

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Summary :

The natural resources of Asia Minor comprise deposits of gold, silver, copper, iron and bronze. The systematic exploitation of these deposits had started from the Early Iron Age (or even earlier) and continued up to Roman times.

Date

Early Iron Age- Roman Period

Geographical Location

Asia Minor

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1. Introduction

The area of Asia Minor was extremely wealthy in precious metals such as gold, silver, copper, iron and bronze and therefore mining started early.

2. Gold

The exploitation of gold deposits in Asia Minor started rather early. Ancient texts recount that the Lydians mined gold in the region of Mount Tmolus and transported it through the rivers Pactolus and Hermus.[1]However, there is disagreement concerning the specific date when these gold deposits were first exploited. Some scholars date it to the Early Iron Age,[2] others to the second half of the 8th cent. BC,[3] or even to the 7th cent. BC.[4] A more recent view supports the idea that the gold of the Pactolus River had been mined since the 3rd millennium BC. Nevertheless, recent researches do not confirm the extracting of gold in Lydia at such an early date.[5] From Herodotus' references to Pactolus River we can conclude that the Greeks considered Sardis to be an important market for precious metals.[6]Ephesus was situated to a close proximity to the rich deposits of gold of Mount Tmolus. It is likely that the exploitation of the gold-bearing fields at Astyra, near Abydus, mentioned by Strabo and Xenophon, had started since the Classical period.[7] Moreover, it cannot be a coincidence that the second more frequently mentioned metal in Homer is gold.[8]

The exploitation of gold and silver ores is considered indisputable for the Hellenistic period. Hellenistic pottery has been located in the mine of Işik Dağ, in the Ankara region. Hellenistic sherds have also been found at Gure, in the Biga peninsula in northwestern Anatolia. In Mount Ida in the Troad, gold and silver were mined for the Pergamene Kingdom and the region of Lampsacus and Abydus. This can explain the rich production of gold coins in the name of Alexander in the aforementioned cities. On the mountainous inland region more mines have been located, such as the silver mines in Pontus, the mines on Mount Taurus in Cilicia and Cappadocia.[9] Taking into consideration the terminology used by Herodotus, it is evident that the Ionians had clear knowledge of the techniques of gold processing. Herodotus' distinction between 'χρυσόν άπλετον' and 'χρυσόν άπευθον' reveals that the technique of alloying gold was well understood.[10] In addition, the establishment of the first system of the two metals by Croesus denotes that the Lydians could differentiate between gold and electrum.[11]

The earliest workshop for gold processing dates to 620-550 BC.[12] However, the content of gold in the electrum coins from several manufacture centers of Asia Minor in the first half of the 6th cent. indicates that the complete process of gold working was not fully known. The widespread dissemination of silver coins in Asia Minor after the middle of the 6th cent. BC is most probably related to the mastering of the technology applied in the different phases of metal working. In the Black Sea region most metal workshops are dated to the 6th cent. BC, while a treasure of gold and electrum coins from Erythrae or Miletus, which was discovered on the island of Berezan in the Black Sea, had presumably been stored by a goldsmith in the beginning of the 6th cent. BC.[13]

3. Silver

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Since 1975, research on the silver mines of Asia Minor, the Balkan Peninsula and the Aegean Islands has been coordinated by the Max Planck Institute in collaboration with other organisations. The study conducted in 1975 confirmed the extraction of silver in the Troad (Mount Ida) during the Classical period. An inscription of the local ruler Tarhunzas, subordinate to the king of Tuvana, Varpalavas (738-710 BC), which was found near the village of Alihoka in the metal bearing area of Bolkardag in southeastern Turkey, is probably related with metal mining. In this area archaeological remains of silver processing have been discovered, as well as slag-heaps of silver and lead with sherds of the Iron Age.[14] However, the methodical exploitation of the silver mines in northwestern Asia Minor must be attributed to the Attalids.[15] In the Troad, for instance, a sherd of a Hellenistic lamp was found in the mine of Serçeören Köy in the province of Balikesir, near the Sea of Marmaras, whereas Hellenistic pottery has been unearthed in the mines of the Biga Peninsula. Finally, the radiocarbon dating of samples from the mine of Altinoluk provides evidence for the dating of the mine to the mid-3rd cent. BC.[16]

4. Copper

The mining of copper in Asia Minor during the Archaic period is only speculative, for example on the coast opposite Samos.[17]

In the Classical period, Artemidorus the geographer mentions the operation of a copper mine in Adramyttion until Alexander's the Great period; this mine is also mentioned by the historian Xenophon.[18]

5. Iron

There were also iron mines in Asia Minor. Ionia had no ferrous deposits and it was difficult to obtain iron. However, since the late 7th-6th cent. more resources became available, as the Phocaeans bought iron from Etruria and the south coast of Pontus was colonized. Literary evidence attests the trade of steel in the Aegean. The first relevant reference is dated to the first half of the 5th cent. BC. It should be mentioned that iron had more value than any other metal at that time.[19]

6. Bronze

The production of bronze in Greece, as well as in Asia Minor, remains a problematic case since there is no evidence for ancient supplies of the metal. Supplies of raw materials for copper production have been discovered recently on Mount Taurus. This production is dated either to the 3rd millennium BC (based on the oxidisation of copper), based on the context in the archaeological site of Göltepe in south and central Turkey, or to around 3000 BC (according to the finds in the copper mine of Kestel).[20] Nevertheless, other researchers are cautious in accepting this dating, as there is no secure evidence to prove the mining of the metal in the region. Recently, it has been suggested that between the 2nd millennium and the 11th cent. AD bronze was imported from Anatolia, probably from Afghanistan and Malaysia. D. Muhly has pointed out the transportation of copper from central Anatolia via a well-known trade route. It seems that in the second half of the 3rd millennium BC there were important changes in metal supplies in the Aegean. However, the provenance of the raw material remains unidentified.[21]

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1. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln: Brill, 1996), p. 21. Cf. Forbes, R. J., *Metallurgy in Antiquity. A Notebook for Archaeologists and Technologists* (Leiden 1950), p. 198 ff. Healy, J. F., *Mining and Metallurgy in the Greek and Roman World* (London 1978), p. 46, 53, 57 ff. Ramin, J., *La technique miniere et mettallurgique des Anciens* (Bruxelles 1977), p. 201 ff. Pleiner, R., *Iron Working in Ancient Greece* (Praha 1969).

2. Davies, O., *Roman Mines in Europe* (Oxford 1935), p. 237.

3. This is argued by S. Przekowski: Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (Cambridge 1983), p. 3 ff.

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4. This view was supported by Roebuck: Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (Cambridge 1983), p. 3 ff.

5. Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (Cambridge 1983), p. 3 ff.

6. Htd. 5.101. For other references to Pactolus River see Hdt. 1.69.

7. Str. 13.1.23, cf. 14.5.28.

8. Gray, D.H.F., 'Metal-working in Homer', *JHS* 74 (1954), p. 1 ff. Healy, J. F., *Mining and Metallurgy in the Greek and Roman World* (London 1978), p. 46.

9. Morkholm, O., *Early Hellenistic Coinage from the Accession of Alexander to the Peace of Apamea (336-188 B.C.)* (Cambridge 1991), p. 3.

10. Hdt. 1.50. Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (Cambridge 1983), p. 7, n. 61 with additional bibliography. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln: Brill, 1996), p. 172.

11. Hdt. 1.94. Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (London 1983), p. 7, n. 61.

12. Waldbaum, J. C., *Metalwork from Sardeis. The finds through 1974* (Cambridge 1983), p. 7, with bibliography. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 172.

13. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 37.

14. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 26, n. 33.

15. Rostovtzeff, M. I., *The Social and Economic History of the Hellenistic World* (Oxford 1941), p. 657 ff. Healy, J. F., *Mining and Metallurgy in the Greek and Roman World* (London 1978), p. 58.

16. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln: Brill, 1996), p. 290.

17. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 21.

18. Forbes, R. J., *Metallurgy in Antiquity. A Notebook for Archaeologists and Technologists* (Leiden 1950), p. 303; Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 187.

19. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 173-174.

20. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 28, n. 42.

21. Treister, M. Y., *The role of Metals in Ancient Greek History* (Leiden-N. York-Koeln 1996), p. 28-29.

Bibliography :

- **Rostovtzeff M.**, *The Social and Economic History of the Hellenistic World*, Oxford 1941
- **Mørkholm O.**, *Early Hellenistic Coinage from the Accession of Alexander to the Peace of Apamaea (336-188 BC)*, Cambridge University Press, Cambridge 1991

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URL: <http://www.ehw.gr/l.aspx?id=7992>

Waldbaum J.C., *Metalwork from Sardis. The finds through 1974*, Cambridge 1983, Sardis 8

Cook J.M., *The Troad. An Archaeological and Topographical Study*, Oxford 1973

Wallace R.W., "The origin of electrum coinage", *AJA*, 91, 1987, 385-397

Davies O., *Roman Mines in Europe*, Oxford 1935

Healy J.F., *Mining and Metallurgy in the Greek and Roman World*, London 1978

Bolin S., *State and Currency in the Roman Empire to 300 AD*, Stockholm 1958

Treister M.Y., *The Role of Metals in Ancient Greek History*, London – N. York – Köln 1996

Tschetkshlatze G.R., "Kolchis im System des antiken Handels (6.-2. Jh. v. u. Z.)", *MünstBeitr*, 11.1, 1992, 80-107

Tschetkshlatze G.R., "Colchians, Greeks and the Achaemenids in the 7th-5th centuries BC: A Critical Look", *Klio*, 76, 1994, 78-102

Ramage A., **Craddock P.**, *King Croesus' Gold Excavations at Sardeis and the history of gold refining*, British museum Press, Cambridge, Mass. 2000, Arcaheological Exploration at Sardeis 11

Forbes R.J., *Metallurgy in Antiquity. A Notebook for Archaeologists and Technologists*, Leiden 1950

Ramin J., *La technique miniere et metallurgique des Anciens*, Bruxelles 1977

Pleiner R., *Iron Working in Ancient Greece*, Praha 1969