

# ARCL0098: Archaeometallurgy I: Mining and Extractive Metallurgy: Marcos Martinon-Torres

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1.

Tylecote, R. F.: The early history of metallurgy in Europe. Longman, London (1987).

2.

Craddock, P. T.: Early metal mining and production. Edinburgh University Press, Edinburgh (1995).

3.

Roberts, B.W., Thornton, C.P. eds: Archaeometallurgy in global perspective: methods and syntheses. Springer, New York (2014). <https://doi.org/10.1007/978-1-4614-9017-3>.

4.

Bayley, J., Crossley, David W., Ponting, Matthew, Historical Metallurgy Society: Metals and metalworking: a research framework for archaeometallurgy. Historical Metallurgy Society, London (2008).

5.

Thilo, R.: Metals: Chemical analysis. In: Encyclopedia of archaeology. pp. 1614–1620. ScienceDirect, Amsterdam (2008). <https://doi.org/10.1016/B978-012373962-9.00188-6>.

6.

Craddock, P.T.: Mining and smelting in Antiquity. In: Science and the past. pp. 57–73. British Museum Press, London (1991).

7.

Killick, David., Fenn, T.: Archaeometallurgy: The Study of Preindustrial Mining and Metallurgy. *Annual Review Of Anthropology*. 41, 559-575 (2012).  
<https://doi.org/10.1146/annurev-anthro-092611-145719>.

8.

Lambert, J.B.: Metals. In: *Traces of the past: unraveling the secrets of archaeology through chemistry*. pp. 168-213. Addison-Wesley, Reading, Mass (1997).

9.

Archaeometallurgy: Guidelines for best practice,  
<http://historicengland.org.uk/images-books/publications/archaeometallurgy-guidelines-best-practice/>, (2015).

10.

Archaeometallurgy in Europe, Associazione italiana di metallurgia: Archaeometallurgy in Europe: international conference, 24-25-26 September 2003, Milan, Italy : proceedings. Associazione italiana di metallurgia, Milano (2003).

11.

Archaeometallurgy in Europe, Associazione italiana di metallurgia: Archaeometallurgy in Europe: 2nd international conference, Aquileia, Italy, 17-21 June 2007 : selected papers. AIM, Milano (2007).

12.

Cech, B., Rehren, T. eds: *Early iron in Europe*. Éditions Monique Mergoïl, Montagnac (2014).

13.

Lang, Janet, Craddock, P. T.: *Mining and metal production through the ages*. British

Museum, London (2003).

14.

Hauptmann, A., Modarressi-Tehrani, D., International Conference Archaeometallurgy in Europe: Archaeometallurgy in Europe III: proceedings of the 3rd international conference ; June 29 - July 1, 2011. Dt. Bergbau-Museum, Bochum (2015).

15.

Hošek, J., Cleere, H., Mihok, L., Pleiner, R., Archeologický ústav: The archaeometallurgy of iron: recent developments in archaeological and scientific research. Institute of Archaeology of the ASCR, Praha (2011).

16.

Humphris, J., Rehren, T.: The world of iron. Archetype, London (2013).

17.

Craddock, P. T., Hook, Duncan R., La Niece, Susan: Metals and mines: studies in archaeometallurgy. Archetype in association with the British Museum, London (2007).

18.

Rehren, Thilo, Mei, Jianjun: Metallurgy and civilisation: Eurasia and beyond : proceedings of the 6th International Conference on the Beginnings of the Use of Metals and Alloys (BUMA VI). Archetype, London (2009).

19.

Mitteldeutscher Archäologentag: Metals of Power – Early gold and silver [Metalle der Macht: Frühes Gold und Silber]. Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Landesmuseum für Vorgeschichte, Halle (Saale) (2014).

20.

Montero, I. ed: Archaeometallurgy: Technological, Economic and Social Perspectives in Late Prehistoric Europe (TESME). Trabajos de prehistoria. Trabajos de Prehistoria. 67, (2010). <https://doi.org/10.3989/tp.2010.v67.i2>.

21.

Bayley, J., Rehren, T.: Towards a functional and typological classification of crucibles. In: Metals and mines: studies in archaeometallurgy. pp. 46–55. Archetype in association with the British Museum, London (2007).

22.

Paul T. Craddock: Refractories: Ceramics with a Purpose. The Old Potter's Almanack. 18, 9–20 (2013).

23.

Paul T. Craddock: Refractories with a purpose II: ceramics for casting. The Old Potter's Almanack. 19, 2–17 (2014).

24.

Freestone, I., Tite, M.S.: Refractories in the ancient and preindustrial world. In: High technology ceramics: past, present, and future : the nature of innovation and change in ceramic technology. pp. 35–63. American Ceramic Society, Westerville, OH (1986).

25.

Kearns, T., Martín-Torres, M., Rehren, T.: Metal to mould: alloy identification in experimental casting moulds using XRF. Historical metallurgy: journal of the Historical Metallurgy Society. 44, 48–58 (2010).

26.

Liu, S., Wang, K., Cai, Q., Chen, J.: Microscopic study of Chinese bronze casting moulds from the Eastern Zhou period. Journal of Archaeological Science. 40, 2402–2414 (2013). <https://doi.org/10.1016/j.jas.2012.11.010>.

27.

Martinón-Torres, M., Rehren, T.: Technical Ceramics. In: Roberts, B.W. and Thornton, C.P. (eds) *Archaeometallurgy in global perspective: methods and syntheses*. pp. 107–131. Springer, New York (2014).

28.

Rademakers, F.W., Rehren, T.: Seeing the forest for the trees: Assessing technological variability in ancient metallurgical crucible assemblages. *Journal of Archaeological Science: Reports*. 7, 588–596 (2016). <https://doi.org/10.1016/j.jasrep.2015.08.013>.

29.

Rehren, T.: Crucibles as reaction vessels in ancient metallurgy. In: *Mining and metal production through the ages*. pp. 207–215. British Museum, London (2003).

30.

Craddock, P., Hook, D.: An economic history of the post-medieval world in 50 ingots: the British Museum collection of ingots from dated wrecks. *The British Museum Technical Research Bulletin*. 6, 55–68 (2012).

31.

Main Archaeo-Metallurgical Bibliography,  
<http://users.ox.ac.uk/~salter/arch-metals/met-bib-ak.htm>.

32.

Abstract of International Conservation Literature, <http://aata.getty.edu/Home>.

33.

The Historical Metallurgy Society, <https://historicalmetallurgy.org/>.

34.

HMS Datasheets, <https://historicalmetallurgy.org/publications/hms-datasheets/>.

35.

JISCMail - ARCH-METALS List at [WWW.JISCMAIL.AC.UK](http://WWW.JISCMAIL.AC.UK),  
<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=ARCH-METALS>.

36.

Crew, Peter, Crew, Susan: Early mining in the British Isles: proceedings of the Early Mining Workshop at Plas Tan y Bwlch, Snowdonia National Park Study Centre, 17-19 November, 1989. Plas Tan y Bwlch, Snowdonia National Park Study Centre, Tan y Bwlch, Gwynedd (1990).

37.

Knapp, Arthur Bernard, Piggott, Vincent C., Herbert, Eugenia W.: Social approaches to an industrial past: the archaeology and anthropology of mining. Routledge, London (1998).

38.

O'Brien, William: Bronze age copper mining in Britain and Ireland. Shire, Princes Risborough (1996).

39.

Piggott, V.C., Weisgerber, G.: Mining archaeology in geological context. The prehistoric copper mining complex at Phu Lon, Nong Khai Province, northeast Thailand. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 69–76. Deutsches Bergbau-Museum, Bochum (1998).

40.

Timberlake, S.: Early mining research in Britain: The Development of the last Ten Years. In: *Mining and metal production through the ages*. pp. 22–42. British Museum, London (2003).

41.

Timberlake, Simon, Mighall, Tim: Excavations on Copa Hill, Cwmystwyth (1986-1999): an early Bronze Age copper mine within the uplands of Central Wales. Archaeopress, Oxford (2003). <https://doi.org/https://doi.org/10.30861/9781841714868>.

42.

Craddock, P.: The development of early mining geology. In: Early metal mining and production. pp. 23–31. Edinburgh University Press, Edinburgh (1995).

43.

Agricola, Georgius, Hoover, Lou Henry, Hoover, Herbert: De re metallica. The Mining magazine, London (1912).

44.

Shackleton, W.G.: Introduction and Chapter 1, Mineral deposits. In: Economic and applied geology: an introduction. pp. 1–18. Croom Helm, London (1986).

45.

Edwards, Richard, Atkinson, Keith: Ore deposit geology and its influence on mineral exploration. Chapman and Hall, London (1986).

46.

Rehder, J.: High temperature technology in antiquity. In: The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy', Bochum 1995. pp. 305–315. Deutsches Bergbau-Museum, Bochum (1999).

47.

Rehren, Th.: Ores from the ore washeries in the Lavriotiki. Metalla: Forschungsberichte des Deutschen Bergbau-Museums. 9, 27–46 (2002).

48.

Rostoker, W., Pigott, V., Dvorak, J.R.: Direct reduction to copper metal by oxide-sulfide mineral interaction. *Archeomaterials*. 3, 69–87 (1989).

49.

Artioli, G., Angelini, I., Tecchiati, U., Pedrotti, A.: Eneolithic copper smelting slags in the Eastern Alps: Local patterns of metallurgical exploitation in the Copper Age. *Journal of Archaeological Science*. 63, 78–83 (2015). <https://doi.org/10.1016/j.jas.2015.08.013>.

50.

Paul T. Craddock: From Hearth to Furnace : Evidences for the Earliest Metal Smelting Technologies in the Eastern Mediterranean. *Paléorient*. 26, 151–165 (2000).

51.

Chernykh, E. N.: *Ancient metallurgy in the USSR: the early metal age*. Cambridge University Press, Cambridge (1991).

52.

Craddock, Paul.: Paradigms of metallurgical innovation in prehistoric Europe. In: *The Beginnings of Metallurgy*. pp. 175–192. Deutsches Bergbau-Museum, Bochum (1999).

53.

Golden, J., Levy, T.E., Hauptmann, A.: Recent Discoveries Concerning Chalcolithic Metallurgy at Shiqmim, Israel. *Journal of Archaeological Science*. 28, 951–963 (2001). <https://doi.org/10.1006/jasc.2000.0626>.

54.

Hauptmann, Andreas: *The archaeometallurgy of copper: evidence from Faynan, Jordan*. Springer, Berlin (2007).

55.

Hoppner, B., Bartelheim, M., Huijsmans, M., Krauss, R., Martinek, K.-P., Pernicka, E., Schwab, R.: Prehistoric copper production in the Inn Valley (Austria), and the earliest copper in central Europe. *Archaeometry*. 47, 293–315 (2005).  
<https://doi.org/10.1111/j.1475-4754.2005.00203.x>.

56.

Killick, D.: Science, Speculation and the Origins of Extractive Metallurgy. In: *Handbook of archaeological sciences*. pp. 483–492. John Wiley, Chichester (2001).

57.

Maddin, R., Muhly, J.D., Stech, T.: Early metalworking at Cayonu. In: *The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy'*, Bochum 1995. pp. 37–44. Deutsches Bergbau-Museum, Bochum (1999).

58.

Mei, J.: Early metallurgy in China: some challenging issues in current studies. In: *Metallurgy and civilisation: Eurasia and beyond : proceedings of the 6th International Conference on the Beginnings of the Use of Metals and Alloys (BUMA VI)*. pp. 9–16. Archetype, London (2009).

59.

Murillo-Barroso, M., Montero-Ruiz, I.: Copper Ornaments in the Iberian Chalcolithic: Technology versus Social Demand. *Journal of Mediterranean Archaeology*. 25, 53–73 (2012). <https://doi.org/10.1558/jmea.v25i1.53>.

60.

Murillo-Barroso, M., Martín-Torres, M., Massieu, M.D.C., Socas, D.M., González, F.M.: Early metallurgy in SE Iberia. The workshop of Las Pilas (Mojácar, Almería, Spain). *Archaeological and Anthropological Sciences*. 9, 1539–1569 (2017).  
<https://doi.org/10.1007/s12520-016-0451-8>.

61.

Pernicka, E., Begemann, F., Schmitt-Strecker, S.: Eneolithic and Early Bronze Age copper artefacts from the Balkans and their relation to Serbian copper ores. *Præhistorische Zeitschrift*. 68, 1–54 (1993). <https://doi.org/10.1515/prhz.1993.68.1.1>.

62.

Pigott, V.C., Ciarla, R.: On the origins of metallurgy in prehistoric Southeast Asia: the view from Thailand. In: *Metals and mines: studies in archaeometallurgy*. pp. 76–88. Archetype in association with the British Museum, London (2007).

63.

Pryce, T.O., Pollard, M., Martinon-torres, M., Pigott, V.C., Pernicka, E.: SouthEast Asia's first isotopically defined prehistoric copper production system: when did extractive metallurgy begin in the Khao Wong Prachan Valley of central Thailand? *Archaeometry*. 53, 146–163 (2011). <https://doi.org/10.1111/j.1475-4754.2010.00527.x>.

64.

Radivojevic, R., Rehren, T., Pernicka, E.: On the origins of extractive metallurgy: new evidence from Europe. *Journal of archaeological science*. 37, 2775–2787 (2010). <https://doi.org/10.1016/j.jas.2010.06.012>.

65.

Radivojevic, M., Rehren, T., Kuzmanović Cvetković, J., Jovanovic, M., Northover, P.: Tainted ores and the rise of tin bronzes in Eurasia, c. 6500 years ago. *Antiquity*. 87, 1030–1045 (2013). <https://doi.org/10.1017/S0003598X0004984X>.

66.

Benjamin W. Roberts: Production Networks and Consumer Choice in the Earliest Metal of Western Europe. *Journal of World Prehistory*. 22, 461–481 (2009).

67.

Roberts, B.: Ancient technologies and archaeological cultures: understanding the earliest metals in Eurasia. In: *Investigating archaeological cultures: material culture, variability, and transmission*. pp. 137–150. Springer, New York (2011).

68.

Roberts, B.W., Thornton, C.P., Pigott, V.: Development of metallurgy in Eurasia. *Antiquity*. 83, 1012–1022 (2009).

69.

Rothenberg, B.: Smelting furnaces and installations from the New Kingdom to the Early Islamic Period. In: *The Ancient metallurgy of copper: archaeology, experiment, theory*. pp. 8–73. Institute for Archaeo-Metallurgical Studies [and] Institute of Archaeology, University College, London, London (1990).

70.

Ruiz-Taboada, A., Montero-Ruiz, I.: The oldest metallurgy in western Europe. *Antiquity*. 73, 897–903 (1999).

71.

Stech, T.: Neolithic copper metallurgy in South West Asia. *Archeomaterials*. 4, 55–61 (1990).

72.

Stech, T.: Aspects of early metallurgy in Mesopotamia and Anatolia. In: *The archaeometallurgy of the Asian old world*. pp. 59–71. Museum University of Pennsylvania, Philadelphia (1999).

73.

Wayman, M.L., Duke, M.J.M.: The effects of melting on native copper. In: *The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy'*, Bochum 1995. pp. 55–60. Deutsches Bergbau-Museum, Bochum (1999).

74.

Bass, G.: *Prolegomena to a study of maritime traffic in raw materials to the Aegean during*

th 14th and 13th centuries BC. In: *Techne: craftsmen, craftswomen and craftsmanship in the Aegean Bronze Age : proceedings of the 6th International Aegean Conference/6e Rencontre égéenne internationale* Philadelphia, Temple University, 18-21 April 1996. pp. 153–170. Université de Liège, Liège (1997).

75.

Begemann, F., Kallas, K., Schmitt-Strecker, S., Pernicka, E.: Tracing ancient tin via isotope analyses. In: *The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy'*, Bochum 1995. pp. 277–284. Deutsches Bergbau-Museum, Bochum (1999).

76.

Branigan, Keith: *Aegean metalwork of the Early and Middle Bronze Age*. Clarendon Press, Oxford (1974).

77.

Craddock, P.T., Meeks, N.D.: Iron in Ancient Copper. *Archaeometry*. 29, 187–204 (1987). <https://doi.org/10.1111/j.1475-4754.1987.tb00411.x>.

78.

Crew, P.: The iron and copper slags at Baratti, Populonia, Italy. *Historical metallurgy: journal of the Historical Metallurgy Society*. 25, 109–115 (1991).

79.

Diaz-Andreu, M., Montero, I.: Metallurgy and social dynamics in the later prehistory of Mediterranean Spain. In: *Metals make the world go round: the supply and circulation of metals in Bronze Age Europe : proceedings of a conference held at the University of Birmingham in June 1997*. pp. 116–132. Oxbow, Oxford (2000).

80.

Fang, J.L., McDonnell, G.: The colour of copper alloys. *Historical metallurgy: journal of the Historical Metallurgy Society*. 45, 52–61 (2011).

81.

Gale, N. H.: Bronze age trade in the Mediterranean. Åstrom, Jonsered (1991).

82.

Gale, N.: Archaeology, science-based archaeology and the Mediterranean Bronze Age metals trade: a contribution to the debate. *European Journal of Archaeology*. 4, 113–130 (2001). <https://doi.org/10.1179/eja.2001.4.1.113>.

83.

Gale, N.H., Stos-Gale, z, Raduncheva, A.: Early metallurgy in Bulgaria. In: *Mining and metal production through the ages*. pp. 122–173. British Museum, London (2003).

84.

Georgakopoulou, M., Bassiakos, Y., Philaniotou, O.: Seriphos surfaces: A study of copper slag heaps and copper sources in the context of early Bronze Age Aegean metal production. *Archaeometry*. 53, 123–145 (2011). <https://doi.org/10.1111/j.1475-4754.2010.00529.x>.

85.

Giumlia-Mair, Alessandra R., Lo Schiavo, Fulvia: The problem of early tin. *Archaeopress*, Oxford (2003). <https://doi.org/https://doi.org/10.30861/9781841715643>.

86.

Bryan Hanks and Roger Doonan: From Scale to Practice: A New Agenda for the Study of Early Metallurgy on the Eurasian Steppe. *Journal of World Prehistory*. 22, 329–356 (2009).

87.

Hauptmann, A., Rehren, Th., Schmitt-Strecker, S.: Early Bronze Age copper metallurgy at Shahr-i Sokhta (Iran), reconsidered. In: *Man and mining: Mensch und Bergbau : studies in*

honour of Gerd Weisgerber on occasion of his 65th birthday. pp. 197–213. Deutsches Bergbau-Museum, Bochum (2003).

88.

Hauptmann, A.: Developments in copper metallurgy during the fourth and third millennia BC at Feinan, Jordan. In: Mining and metal production through the ages. pp. 90–100. British Museum, London (2003).

89.

Haustein, M., Gillis, C., Pernicka, E.: Tin isotopy - A new method for solving old questions. *Archaeometry*. 52, 816–832 (2010). <https://doi.org/10.1111/j.1475-4754.2010.00515.x>.

90.

Hunt Ortiz, Mark A.: Prehistoric mining and metallurgy in South West Iberian Peninsula. *Archaeopress*, Oxford (2003). <https://doi.org/https://doi.org/10.30861/9781841715544>.

91.

Keswani, P.S.: Death, Prestige, and Copper in Bronze Age Cyprus. *American journal of archaeology*. 109, 341–401 (2005).

92.

Laughlin, G.J., Todd, J.A.: Evidence for Early Bronze Age tin ore processing. *Materials Characterization*. 45, 269–273 (2000). [https://doi.org/10.1016/S1044-5803\(00\)00111-X](https://doi.org/10.1016/S1044-5803(00)00111-X).

93.

Liu, S., Rehren, T., Pernicka, E., Hausleiter, A.: Copper processing in the oases of northwest Arabia: technology, alloys and provenance. *Journal of Archaeological Science*. 53, 492–503 (2015). <https://doi.org/10.1016/j.jas.2014.10.030>.

94.

Levy et al., T.E.: Early Bronze Age metallurgy: a newly discovered copper manufactory in southern Jordan. *Antiquity*. 76, 425–437 (2002).

<https://doi.org/10.1017/S0003598X00090530>.

95.

Roger Matthews and Hassan Fazeli: Copper and Complexity: Iran and Mesopotamia in the Fourth Millennium B.C. *Iran: journal of the British Institute of Persian Studies*. 42, 61–75 (2004).

96.

Martinón-Torres, M., Rehren, T.: Technical Ceramics. In: Roberts, B.W. and Thornton, C.P. (eds) *Archaeometallurgy in global perspective: methods and syntheses*. pp. 107–131. Springer, New York (2014).

97.

Moorey, P.R.S.: Metalworking: 3. Base metals, part iii: copper and its alloys. In: *Ancient Mesopotamian materials and industries: the archaeological evidence*. pp. 242–278. Clarendon Press, Oxford (1994).

98.

Muhly, J.: Copper and bronze in Cyprus and the Eastern Mediterranean. In: *The archaeometallurgy of the Asian old world*. pp. 15–25. Museum University of Pennsylvania, Philadelphia (1999).

99.

Müller, R., Rehren, Th., Rovira, S.: Almizaraque and the early copper metallurgy of southeast Spain: new data. *Madrider Mitteilungen*. 45, 33–56 (2004).

100.

Nezafati, N., Pernicka, E., Momenzadeh, M.: Ancient Tin: Old Question and New Answer, <http://www.cais-soas.com/CAIS/Science/tin.htm>.

101.

Nocete, et al, F.: The smelting quarter of Valencina de la Concepción (Seville, Spain): the specialised copper industry in a political centre of the Guadalquivir Valley during the third millennium BC (2750-2500 BC). *Journal of Archaeological Science*. 35, 717–732 (2008).  
<https://doi.org/10.1016/j.jas.2007.05.019>.

102.

O'Brien, W.: Resource availability and metal supply in the insular Bronze Age. In: *The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy'*, Bochum 1995. pp. 227–235. Deutsches Bergbau-Museum, Bochum (1999).

103.

Ottaway, B.: Innovation, production and specialization in early Prehistoric copper metallurgy. *European Journal of Archaeology*. 4, 87–112 (2001).  
<https://doi.org/10.1179/eja.2001.4.1.87>.

104.

Ottaway, B.S., Seibel, S.: Dust in the wind: experimental casting of bronze in sand moulds. In: *Paléoméallurgie des cuivres: actes du colloque de Bourg-en-Bresse et Beaune, 17-18 octobre 1997*. pp. 59–63. M. Mergoïl, Montagnac (1998).

105.

Pare, C. F. E.: *Metals make the world go round: the supply and circulation of metals in Bronze Age Europe*. Oxbow, Oxford (2000).

106.

Pearce, Mark: Reconstructing prehistoric metallurgical knowledge: the northern Italian Copper and Bronze Ages. *European Journal of Archaeology*. 1, 51–70 (1998).  
<https://doi.org/10.1179/eja.1998.1.1.51>.

107.

Penhallurick, R. D., *Institute of Metals: Tin in antiquity: its mining and trade throughout the ancient world with particular reference to Cornwall*. Institute of Metals, London (1986).

108.

Phelps, William W., Lólos, Yannos, Vēchos, Giannēs, Institouto Enaliōn Archaialogikōn Ereunōn: The Point Iria wreck: interconnections in the Mediterranean, ca. 1200 BC. Hellenic Institute of Marine Archaeology, Athens (1999).

109.

Pigott, V.C.: Reconstructing the copper production process as practised among prehistoric mining/metallurgical communities in the Khao Wong Prachan Valley of central Thailand. In: *Metals in antiquity*. pp. 10–21. Archaeopress, Oxford (1999).  
<https://doi.org/https://doi.org/10.30861/9781841710082>.

110.

Pryce, T.O., Pigott, V.C., Martínón-Torres, M., Rehren, T.: Prehistoric copper production and technological reproduction in the Khao Wong Prachan Valley of Central Thailand. *Archaeological and Anthropological Sciences*. 2, 237–264 (2010).  
<https://doi.org/10.1007/s12520-010-0043-y>.

111.

Pulak, C.: The copper and tin ingots from the Late Bronze Age shipwreck at Uluburnun. In: *Anatolian metal I*. pp. 137–157. Deutsches Bergbau-Museum, Bochum (2000).

112.

Rehren, Th., Hess, K., Philip, G.: Fourth millennium BC copper metallurgy in Northern Jordan: The evidence from Tell esh-Shuna. In: *The prehistory of Jordan, II: perspectives from 1997*. pp. 625–640. Ex Oriente, Berlin (1997).

113.

Renfrew, C.: Cycladic Metallurgy and the Aegean Early Bronze Age. *American Journal of Archaeology*. 71, 1–20 (1967).

114.

Rehren, T., Boscher, L., Pernicka, E.: Large scale smelting of speiss and arsenical copper at Early Bronze Age Arisman, Iran. *Journal of Archaeological Science*. 39, 1717–1727 (2012). <https://doi.org/10.1016/j.jas.2012.01.009>.

115.

Rohl, B., Needham, S.: Lead isotope and chemical composition variation in ores and metals. In: *The circulation of metal in the British Bronze Age: the application of lead isotope analysis*. pp. 3–8. British Museum, London (1998).

116.

Segal, I., Rothenberg, B., Bar-Matthews, M.: Smelting slag from prehistoric Site F2 and N3 in Timna, SW Arabah, Israel. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 223–234. Deutsches Bergbau-Museum, Bochum (1998).

117.

Shennan, S.: Cost, benefit and value in the organization of early European copper production. *Antiquity*. 73, 352–363 (1999).

118.

Stos-Gale, S., Macdonald, C.: Sources of metals and trade in the Bronze Age Aegean. In: *Bronze age trade in the Mediterranean: papers presented at the Conference held at Rewley House, Oxford, in December 1989*. pp. 249–288. Åstrom, Jonsered (1991).

119.

Thornton, C.P., Rehren, T., Pigott, V.C.: The production of speiss (iron arsenide) during the Early Bronze Age in Iran. *Journal of Archaeological Science*. 36, 308–316 (2009). <https://doi.org/10.1016/j.jas.2008.09.017>.

120.

Weeks, Lloyd R.: *Early metallurgy of the Persian Gulf: technology, trade, and the Bronze Age World*. Brill, Boston (2004).

121.

Weisgerber, G., Yule, P.: Al-Aqir near Bahla' - an Early Bronze Age dam site with planoconvex 'copper' ingots. *Arabian Archaeology and Epigraphy*. 14, 24-53 (2003). <https://doi.org/10.1034/j.1600-0471.2003.00003.x>.

122.

Pulak, Cemal, Slotta, Rainer, Yalçın, Ünsal, Deutsches Bergbau-Museum Bochum: Das Schiff von Uluburun: Welthandel vor 3000 Jahren : Katalog der Ausstellung des Deutschen Bergbau-Museums Bochum vom 15. Juli 2005 bis 16. Juli 2006. Deutsches Bergbau-Museum, Bochum (2005).

123.

Yener, K. Aslihan: The domestication of metals: the rise of complex metal industries in Anatolia. Brill, Leiden (2000).

124.

Yener, K.A., Adriaens, A., Earl, B., Ozbal, H.: Analyses of metalliferous residue, crucible fragments, experimental smelts, and ores from Kestel tin mine and the tin processing site of Goltepe, Turkey. In: *Mining and metal production through the ages*. pp. 181-197. British Museum, London (2003).

125.

Anguilano, L., Rehren, Th., Muller, W., Rothenberg, B.: Roman Jarosite exploitation at Riotinto(Spain). In: *Archaeometallurgy in Europe: 2nd international conference, Aquileia, Italy, 17-21 June 2007 : selected papers*. pp. 21-29. AIM, Milano (2009).

126.

Bartelheim, M., Contreras Cortés, F., Moreno Onorato, A., Murillo-Barroso, M., Pernicka, E.: The silver of the South Iberian El Argar Culture: A first look at production and distribution. *Trabajos de Prehistoria*. 69, 293-309 (2012). <https://doi.org/10.3989/tp.2012.12093>.

127.

Cohen, C.R., Rehren, Th., Van Buren, M.: An archaeo-metallurgical study of the use of European furnaces in colonial Bolivia. In: Archaeometallurgy in Europe: 2nd international conference, Aquileia, Italy, 17-21 June 2007 : selected papers. pp. 529-540. AIM, Milano (2009).

128.

Bayley, J.: Medieval precious metal refining: archaeology and contemporary texts compared. In: Archaeology, history and science: integrating approaches to ancient materials. pp. 131-150. Left Coast Press, Walnut Creek, CA (2008).

129.

Boni, M., Maio, G.D., Frei, R., Villa, I.M.: Lead isotopic evidence for a mixed provenance for Roman water pipes from Pompeii. *Archaeometry*. 42, 201-208 (2000).  
<https://doi.org/10.1111/j.1475-4754.2000.tb00876.x>.

130.

Cochet, André, Pernot, Michel: Le plomb en Gaule romaine: techniques de fabrication et produits. Monique Mergoïl, Montagnac (2000).

131.

Cohen, C.R., Rehren, T., Van Buren, M.: When the wind blows: environmental adaptability in current day silver production within the Bolivian Andes. In: Proceedings: ISA 2006 : 36th International Symposium on Archaeometry : 2-6 May 2006, Quebec City, Canada. pp. 465-475. CELAT, Université Laval, Québec (2009).

132.

Craddock, P., Catwright, C., Eckstein, K., et al.: Simple sophistication: Mauryan silver production in North West India,  
[http://www.britishmuseum.org/research/publications/online\\_journals/technical\\_research\\_bulletin/bmtrb\\_volume\\_7.aspx](http://www.britishmuseum.org/research/publications/online_journals/technical_research_bulletin/bmtrb_volume_7.aspx), (2013).

133.

Durali-Mueller, S., Brey, G.P., Wigg-Wolf, D., Lahaye, Y.: Roman lead mining in Germany: its

origin and development through time deduced from lead isotope provenance studies. *Journal of Archaeological Science*. 34, 1555–1567 (2007).  
<https://doi.org/10.1016/j.jas.2006.11.009>.

134.

Hunter, F., Davis, M.: Early Bronze Age lead — a unique necklace from southeast Scotland. *Antiquity*. 68, 824–830 (1994).

135.

Liu, S., Rehren, T., Chen, J., Et al.: Bullion production in imperial China and its significance for sulphide ore smelting world-wide. *Journal of Archaeological Science*. 55, 151–165 (2015). <https://doi.org/10.1016/j.jas.2014.12.023>.

136.

Martinón-Torres, Marcos., Thomas, N., Rehren, Th., Mongiatti, A.: Some problems and potentials of the study of cupellation remains: the case of post-medieval Montbéliard. *ArcheoSciences: Revue d'Archeometrie*. 32, 59–70 (2008).

137.

Martinon-Torres, M., Rehren, T., Thomas, N., Mongiatti, A.: Identifying materials recipes and choices: some suggestions for the study of archaeological cupels. *Archaeometallurgy in Europe: 2nd international conference, Aquileia, Italy, 17-21 June 2007 : selected papers*. (2009).

138.

Murphy, S., Baldwin, H.: Early lead smelting sites in the Swaledale area of Yorkshire. *Historical metallurgy: journal of the Historical Metallurgy Society*. 35, 1–22 (2001).

139.

Merkel, J.F.: Imperial Roman production of lead and silver in the northern part of Upper Moesia (Mt. Kosmaj area). *Glasnik: Srpsko arheološko društvo*. 39–78 (2007).

140.

Pernicka, E., Rehren, T., Schmitt-Strecker, S.: Late Uruk silver production by cupellation at Habuba Kabira, Syria. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 123–134. Deutsches Bergbau-Museum, Bochum (1998).

141.

Ploquin, A., Bailly-Maitre, M.-C., Allee, P. eds: Mines et metallurgies anciennes du plomb dans leurs environments. Apports des methodes contribuant a leur etude. Special issue of *ArcheoSciences: Revue d'Archeometrie*. 34, (2010).

142.

Rehren, T., Prange, M.: Lead metal and patina: a comparison. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 183–196. Deutsches Bergbau-Museum, Bochum (1998).

143.

Rehren, T., Schneider, J., Bartels, C.: Medieval lead-silver smelting in the Siegerland, West Germany. In: *Historical metallurgy: journal of the Historical Metallurgy Society*. pp. 73–84. Historical Metallurgy Society, Sheffield (1999).

144.

Rehren, T.: The production of silver in South America. *Archaeology international*. 13/14, 76–86 (2011). <https://doi.org/10.5334/ai.1318>.

145.

Schultze, C.A., Stanish, C., Scott, D.A., Et al.: Direct evidence of 1,900 years of indigenous silver production in the Lake Titicaca Basin of Southern Peru. *Proceedings of the National Academy of Sciences*. 106, 17280–17283 (2009). <https://doi.org/10.1073/pnas.0907733106>.

146.

Mary Van Buren, Barbara H. Mills: *Huayrachinas and Tocoachimbo: Traditional Smelting*

Technology of the Southern Andes. *Latin American Antiquity*. 16, 3–25 (2005).  
<https://doi.org/10.2307/30042484>.

147.

Wood, J.R., Charlton, M.F., Murillo-Barroso, M., Martín-Torres, M.: Iridium to provenance ancient silver. *Journal of Archaeological Science*. 81, 1–12 (2017).  
<https://doi.org/10.1016/j.jas.2017.03.002>.

148.

Pernicka, E.: Provenance and recycling of ancient silver. A comment on "Iridium to provenance ancient silver" by Jonathan R. Wood\*, Michael F. Charlton, Mercedes Murillo-Barroso, Marcos Martín-Torres. *J. Archaeol. Sci.* 81, 1–12. *Journal of Archaeological Science*. (2017). <https://doi.org/10.1016/j.jas.2017.07.004>.

149.

Wood, J.R., Charlton, M.F., Murillo-Barroso, M., Martín-Torres, M.: Gold parting, iridium and provenance of ancient silver: A reply to Pernicka. *Journal of Archaeological Science*. (2017). <https://doi.org/10.1016/j.jas.2017.07.005>.

150.

Wytenbach, A., Schubiger, P.A.: Trace element content of Roman lead by neutron activation analysis. *Archaeometry*. 15, 199–207 (1973).  
<https://doi.org/10.1111/j.1475-4754.1973.tb00090.x>.

151.

Zori, C., Tropper, P.: Silver lining: evidence for Inka silver refining in northern Chile. *Journal of Archaeological Science*. 40, 3282–3292 (2013).  
<https://doi.org/10.1016/j.jas.2013.03.020>.

152.

Alipour, R., Rehren, T.: Persian Pulād Production: Chāhak Tradition. *Journal of Islamic Archaeology*. 1, 231–261 (2014). <https://doi.org/10.1558/jia.v1i2.24174>.

153.

Benoit, Paul, Fluzin, Philippe: *Paléoméallurgie du fer et Cultures*. Association pour l'Edition et la Diffusion des Etudes Historiques, Paris (1995).

154.

Biggs, L., Bellina, B., Martínón-Torres, M., Pryce, T.O.: Prehistoric iron production technologies in the Upper Thai-Malay Peninsula: metallography and slag inclusion analyses of iron artefacts from Khao Sam Kaeo and Phu Khao Thong. *Archaeological and Anthropological Sciences*. 5, 311–329 (2013). <https://doi.org/10.1007/s12520-012-0115-2>.

155.

Blakelock, E., Martínón-Torres, M., Veldhuijzen, H.A., Young, T.: Slag inclusions in iron objects and the quest for provenance: an experiment and a case study. *Journal of Archaeological Science*. 36, 1745–1757 (2009). <https://doi.org/10.1016/j.jas.2009.03.032>.

156.

Buchwald, Vagn Fabritius, Kongelige Danske videnskabernes selskab: *Iron and steel in ancient times*. Det Kongelige Danske Videnskabernes Selskab, Copenhagen (2005).

157.

Cech, B., Rehren, T. eds: *Early iron in Europe*. Éditions Monique Mergoïl, Montagnac (2014).

158.

Cleere, H.: Ironmaking in the economy of the ancient world: The potential of archaeometallurgy. In: *The Crafts of the blacksmith*. pp. 1–6. UISPP Comité pour la Sidérurgie Ancienne and the Ulster Museum, [Belfast?] (1984).

159.

Charlton, M.F., Crew, P., Rehren, T., Shennan, S.J.: Explaining the evolution of ironmaking recipes – An example from northwest Wales. *Journal of Anthropological Archaeology*. 29, 352–367 (2010). <https://doi.org/10.1016/j.jaa.2010.05.001>.

160.

Charlton, M.F., Blakelock, E., Martín-Torres, M., Young, T.: Investigating the production provenance of iron artifacts with multivariate methods. *Journal of Archaeological Science*. 39, 2280–2293 (2012). <https://doi.org/10.1016/j.jas.2012.02.037>.

161.

Craddock, P. T.: Early metal mining and production. Edinburgh University Press, Edinburgh (1995).

162.

Crew, P.: The experimental production of prehistoric bar iron. *Historical metallurgy: journal of the Historical Metallurgy Society*. 25, 21–36 (1991).

163.

Crew, P.: Aspects of the iron supply. In: *Danebury: an Iron Age hillfort in Hampshire, Vol.6: A hillfort community in perspective*. pp. 276–286. Council for British Archaeology, London (1995).

164.

Dieudonne-Glad, N., Conte, P.: Smithing at the priory of Lavinadiere, Correze, France, 13th and 16th centuries. *Historical metallurgy: journal of the Historical Metallurgy Society*. 45, 1–7 (2011).

165.

Dungworth, D., Mephram, L.: Prehistoric iron smelting in London: evidence from Shooters Hill. *Historical metallurgy: journal of the Historical Metallurgy Society*. 46, 1–8 (2012).

166.

Gassmann, G.: Recent discoveries and excavations of 6th -2nd century BC furnaces in SW Germany. *Historical metallurgy: journal of the Historical Metallurgy Society*. 36, 71-77 (2002).

167.

Hendrickson, M.: A transport geographic perspective on travel and communication in Angkorian Southeast Asia (ninth to fifteenth centuries). *World Archaeology*. 43, 444-457 (2011). <https://doi.org/10.1080/00438243.2011.605846>.

168.

Hošek, J., Cleere, H., Mihok, L., Pleiner, R., Archeologický ústav: The archaeometallurgy of iron: recent developments in archaeological and scientific research. Institute of Archaeology of the ASCR, Praha (2011).

169.

Huang, X., Qian, W., Wei, W., Guo, J., Liu, N.: 3D numerical simulation on the flow field of single tuyere blast furnaces: A case study of the Shuiquangou iron smelting site dated from the 9th to 13th century in China. *Journal of Archaeological Science*. 63, 44-58 (2015). <https://doi.org/10.1016/j.jas.2015.08.009>.

170.

Humphris, Jane, Rehren, Thilo: *The world of iron*. Archetype, London (2013).

171.

Joosten, Ineke: *Technology of early historical iron production in the Netherlands*. Institute for Geo- and Bioarchaeology, Vrije Universiteit, Amsterdam (2004).

172.

Lang, J.: Roman iron and steel: A review. *Materials and Manufacturing Processes*. 32, 857-866 (2017). <https://doi.org/10.1080/10426914.2017.1279326>.

173.

Martinon-Torres, M., Rehren, T.: Analytical study of iron slag from the Novgorod hinterland. In: The archaeology of medieval Novgorod in context: studies in centre/periphery relations. pp. 185–194. Oxbow, Oxford (2008).

174.

Nørbach, Lars Christian: Prehistoric and medieval direct iron smelting in Scandinavia and Europe: aspects of technology and society. Aarhus University Press, Aarhus (2003).

175.

Park, J.-S., Rehren, T.: Large-scale 2nd to 3rd century AD bloomery iron smelting in Korea. *Journal of Archaeological Science*. 38, 1180–1190 (2011).  
<https://doi.org/10.1016/j.jas.2010.12.007>.

176.

Paynter, S.: Regional variations in bloomery smelting slag of the Iron Age and Romano-British periods. *Archaeometry*. 48, 271–292 (2006).  
<https://doi.org/10.1111/j.1475-4754.2006.00256.x>.

177.

Paynter, S.: Romano-British workshops for iron smelting and smithing at Westhawk Farm, Kent. *Historical metallurgy: journal of the Historical Metallurgy Society*. 41, 15–31.

178.

Paynter, S.: Innovations in bloomery smelting in iron Age and Romano-British England. In: *Metals and mines: studies in archaeometallurgy*. pp. 202–210. Archetype in association with the British Museum, London (2007).

179.

Pleiner, Radomír: Iron in archaeology: the European bloomery smelters. *Archeologický*

ústav AVČR, Praha (2000).

180.

Pleiner, Radomír: Iron in archaeology: early European blacksmiths. Archeologický ústav AV ČR, Praha (2006).

181.

Pryce, T. O. Natapintu, S.: Smelting Iron from Laterite: Technical Possibility or Ethnographic Aberration? Asian Perspectives: Journal of Archeology for Asia & the Pacific. 48, 249–264 (2009).

182.

Rehren, Th., Papakhristu, O.: Cutting edge technology – The Ferghana Process of medieval crucible steel smelting. Metalla: Forschungsberichte des Deutschen Bergbau-Museums. 7, 55–69 (2000).

183.

Rostoker, William, Bronson, Bennet: Pre-industrial iron: its technology and ethnology. [Archeomaterials], Philadelphia, Pa (1990).

184.

Rovira, S., Lopez-Medina, M., Roman-Diaz, M.P., Martinez-Padillar, C.: Los Callejones: a Roman Republican iron mining and smelting centre in the south east of the Iberian Peninsula. Historical metallurgy: journal of the Historical Metallurgy Society. 38, 1–9 (2004).

185.

Sim, David, Ridge, Isabel: Beyond the bloom: bloom refining and iron artifact production in the Roman world. Archaeopress, Oxford (1998).  
<https://doi.org/https://doi.org/10.30861/9780860549017>.

186.

Tylecote, R.F.: Forging and hammering techniques. In: The early history of metallurgy in Europe. pp. 243–279. Longman, London (1987).

187.

Rehren, T., Belgia, T., Jambon, A., Et al.: 5,000 years old Egyptian iron beads made from hammered meteoritic iron. *Journal of Archaeological Science*. 40, 4785–4792 (2013).  
<https://doi.org/10.1016/j.jas.2013.06.002>.

188.

Veldhuijzen, H.A., Rehren, Th.: Slags and the city: early iron production at Tell Hammeh, Jordan and Tell Beth-Shemesh, Israel. *Metals and mines: studies in archaeometallurgy*. 189–201 (2007).

189.

Waldbaum, J.: The coming of iron in the eastern Mediterranean. The archaeometallurgy of the Asian old world. *University Museum symposium series*, 27–57 (1999).

190.

Muhly, James David, Wertine, Theodore A.: The coming of the age of iron. Yale University Press, New Haven (1980).

191.

Young, T.: Some preliminary observations on hammerscale and its implications for understanding welding. *Historical metallurgy: journal of the Historical Metallurgy Society*. 45, 26–41 (2011).

192.

Young, T., Poyner, D.: Two medieval bloomery smelting sites in Shropshire: the adoption of water power for iron smelting. *Historical metallurgy: journal of the Historical Metallurgy Society*. 46, 78–97 (2012).

193.

Belford, D.: Hot blast iron smelting in the early 19th century: a re-appraisal. *Historical metallurgy: journal of the Historical Metallurgy Society*. 46, 9–18 (2012).

194.

Crossley, D.: The blast furnace at Rockley, South Yorkshire. *The Archaeological journal*. 152, 381–421 (1995). <https://doi.org/10.1080/00665983.1995.11021434>.

195.

Dillmann, P., perez, A., Vega, E., Arribet-Derion, D., Arnada, R., L'Heritier, M., Neff, D., Bellot-Gurlet, L.: Understanding the Walloon method of iron refining: archaeological and archaeometric experiments, phase 1. *Historical metallurgy: journal of the Historical Metallurgy Society*. 46, 19–31 (2012).

196.

Gelegdorj, E., Chunag, A., Gordon, R.B., Park, J.-S.: Transitions in cast iron technology of the nomads in Mongolia. *Journal of Archaeological Science*. 34, 1187–1196 (2007). <https://doi.org/10.1016/j.jas.2006.10.007>.

197.

Hayman, Richard: *Ironmaking: the history and archaeology of the iron industry*. Tempus, Stroud (2005).

198.

Starley, D.: Determining the Technological Origins of Iron and Steel. *Journal of Archaeological Science*. 26, 1127–1133 (1999). <https://doi.org/10.1006/jasc.1999.0408>.

199.

Wagner, D.B.: Chinese blast furnaces from the 10th to the 14th century. *Historical metallurgy: journal of the Historical Metallurgy Society*. 37, 25–37 (2003).

200.

Wagner, D.B.: Science and Civilisation in China. Vol. 5: Chemistry and Chemical Technology. Part 11: Ferrous Metallurgy. Cambridge University Press, London (2008).

201.

Bisson, Michael S., Vogel, Joseph O.: Ancient African metallurgy: the socio-cultural context. AltaMira, Walnut Creek, Calif (2000).

202.

Ver un reduction des prejuges et la fonte des antagonismes: un bilan de l'expansion de la metallurgie du fer en Afrique sub-Saharienne. Journal of African archaeology. 10, (2012).

203.

Craddock, P.T.: New paradigms for old iron: thoughts on E. Zangato & A.F.C Holl's 'On the iron front'. Journal of African archaeology. 8, 29–36 (2010).

204.

Chirikure, S.: Indigenous mining and metallurgy in Africa. Cambridge University Press, Cambridge (2010).

205.

Chirikure, S.: Geochemistry of Ancient Metallurgy: Examples from Africa and Elsewhere. In: Treatise on Geochemistry. pp. 169–189. Elsevier (2014).

206.

Shadreck Chirikure and Thilo Rehren: Ores, Furnaces, Slags, and Prehistoric Societies: Aspects of Iron Working in the Nyanga Agricultural Complex, AD 1300-1900. The African Archaeological Review. 21, 135–152 (2004).

207.

Chirikure, Shadreck., Burrett, Rob., Heimann, R.B.: Beyond furnaces and slags: a review study of bellows and their role in indigenous African metallurgical processes. *Azania: Archaeological Research in Africa*. 44, 195–215 (2009). <https://doi.org/10.1080/00671990903047108>.

208.

Humphris, J., Martín-Torres, M., Rehren, T., Reid, A.: Variability in single smelting episodes – a pilot study using iron slag from Uganda. *Journal of Archaeological Science*. 36, 359–369 (2009). <https://doi.org/10.1016/j.jas.2008.09.020>.

209.

Humphris, J., Carey, C.: New methods for investigating slag heaps: Integrating geoprospection, excavation and quantitative methods at Meroe, Sudan. *Journal of Archaeological Science*. 70, 132–144 (2016). <https://doi.org/10.1016/j.jas.2016.04.022>.

210.

Iles, L., Martín-Torres, M.: Pastoralist iron production on the Laikipia Plateau, Kenya: wider implications for archaeometallurgical studies. *Journal of Archaeological Science*. 36, 2314–2326 (2009). <https://doi.org/10.1016/j.jas.2009.06.023>.

211.

Killick, D.: What do we know about African iron working? *Journal of African archaeology*. 2, 97–112 (2004).

212.

David Killick: Cairo to Cape: The Spread of Metallurgy Through Eastern and Southern Africa. *Journal of World Prehistory*. 22, 399–414 (2009).

213.

Killick, D.: Invention and Innovation in African Iron-smelting Technologies. *Cambridge Archaeological Journal*. 25, 307–319 (2015). <https://doi.org/10.1017/S0959774314001176>.

214.

Killick, D., Miller, D.: Smelting of magnetite and magnetite-ilmenite iron ores in the northern Lowveld, South Africa, ca. 1000 CE to ca. 1880 CE. *Journal of Archaeological Science*. 43, 239–255 (2014). <https://doi.org/10.1016/j.jas.2013.12.016>.

215.

La Niece, S., Hook, D.R., Craddock, P.T., British Museum: Metals and mines: studies in archaeometallurgy. Archetype in association with the British Museum, London (2007).

216.

MacDonald, K.C., Vernet, R., Martínón-Torres, M., Fuller, D.Q.: Dhar Néma: from early agriculture to metallurgy in southeastern Mauritania. *Azania: Archaeological Research in Africa*. 44, 3–48 (2009). <https://doi.org/10.1080/00671990902811330>.

217.

Duncan E. Miller and Nikolaas J. Van Der Merwe: Early Metal Working in Sub-Saharan Africa: A Review of Recent Research. *The Journal of African History*. 35, 1–36 (1994).

218.

Rehren, T., Charlton, M., Chirikure, S., Humphris, J., Ige, A., Veldhuijzen, H.A.: Decisions set in slag: the human factor in African iron smelting. In: *Metals and mines: studies in archaeometallurgy*. pp. 211–218. Archetype in association with the British Museum, London (2007).

219.

Schmidt, Peter R.: Iron technology in East Africa: symbolism, science, and archaeology. Indiana University Press, Bloomington, IN (1997).

220.

Serneels, V.: The massive production of iron in the Sahelian belt: Archaeological investigations at Korsimoro (Sanmatenga – Burkina Faso). *Materials and Manufacturing Processes*. 32, 900–908 (2017). <https://doi.org/10.1080/10426914.2016.1244842>.

221.

Woodhouse, J.: Iron in Africa: the metal from nowhere. In: *Transformations in Africa: essays on Africa's later past*. pp. 160–185. Leicester University Press, London (1998).

222.

Zangato, E.: On the iron front: new evidence from North-Central Africa. *Journal of African Archaeology*. 8, 7–23 (2010).

223.

Thilo, R.: Metals: Chemical analysis. In: *Encyclopedia of archaeology*. pp. 1614–1620. ScienceDirect, [Amsterdam?] (2008).

224.

Bottaini, C., Vilaça, R., Schiavon, N., Mirão, J., Candeias, A., Bordalo, R., Paternoster, G., Montero-Ruiz, I.: New insights on Late Bronze Age Cu-metallurgy from Coles de Samuel hoard (Central Portugal): A combined multi-analytical approach. *Journal of Archaeological Science: Reports*. 7, 344–357 (2016). <https://doi.org/10.1016/j.jasrep.2016.05.009>.

225.

Bray, P.J., Pollard, A.M.: A new interpretative approach to the chemistry of copper-alloy objects: Source, recycling and technology. *Antiquity*. 86, 853–867 (2012).

226.

Pollard, A.M., Bray, P., Gosden, C., Wilson, A., Hamerow, H.: Characterising copper-based metals in Britain in the first millennium AD: a preliminary quantification of metal flow and recycling. *Antiquity*. 89, 697–713 (2015). <https://doi.org/10.15184/aqy.2015.20>.

227.

Bayley, J., Butcher, S.: Roman brooches in Britain: a technological and typological study based on the Richborough Collection. Society of Antiquaries of London, London (2004).

228.

Dungworth, D.: Roman Copper Alloys: Analysis of Artefacts from Northern Britain. *Journal of Archaeological Science*. 24, 901–910 (1997). <https://doi.org/10.1006/jasc.1996.0169>.

229.

Dungworth, D.: Iron Age and Roman Copper Alloys from Northern Britain. *Internet Archaeology* 2. (1997).

230.

Frame, L.: Metallurgical investigations at Godin Tepe, Iran, Part I: the metal finds. *Journal of Archaeological Science*. 37, 1700–1715 (2010). <https://doi.org/10.1016/j.jas.2010.01.030>.

231.

Jouttijärvi, A.: Roman alloying practice. *Materials and Manufacturing Processes*. 32, 813–826 (2017). <https://doi.org/10.1080/10426914.2017.1279325>.

232.

Martinón-Torres, M., Li, X.J., Bevan, A., Xia, Y., Zhao, K., Rehren, T.: Forty Thousand Arms for a Single Emperor: From Chemical Data to the Labor Organization Behind the Bronze Arrows of the Terracotta Army. *Journal of Archaeological Method and Theory*. (2012). <https://doi.org/10.1007/s10816-012-9158-z>.

233.

Murillo-Barroso, M., Pryce, T.O., Bellina, B., Martinón-Torres, M.: Khao Sam Kaeo – an archaeometallurgical crossroads for trans-asiatic technological traditions. *Journal of Archaeological Science*. 37, 1761–1772 (2010). <https://doi.org/10.1016/j.jas.2010.01.036>.

234.

Pagès, G., Dillmann, P., Fluzin, P., Long, L.: A study of the Roman iron bars of Saintes-Maries-de-la-Mer (Bouches-du-Rhône, France). A proposal for a comprehensive metallographic approach. *Journal of Archaeological Science*. 38, 1234–1252 (2011). <https://doi.org/10.1016/j.jas.2010.12.017>.

235.

Scott, David A.: *Metallography and microstructure of ancient and historic metals*. Getty Conservation Institute, [Marina del Rey, CA] (1991).

236.

Bayley, J.: Medieval precious metal refining: archaeology and contemporary texts compared. In: *Archaeology, history and science: integrating approaches to ancient materials*. pp. 131–150. Left Coast Press, Walnut Creek, CA (2008).

237.

Cech, B.: A roman gold mining district in eastern Austria. *Historical metallurgy: journal of the Historical Metallurgy Society*. 46, 66–77 (2012).

238.

Hosler, Dorothy: *The sounds and colors of power: the sacred metallurgical technology of ancient West Mexico*. MIT Press, Cambridge, Mass (1994).

239.

Jansen, M., Aulbach, S., Hauptmann, A., Höfer, H.E., Klein, S., Krüger, M., Zettler, R.L.: Platinum group placer minerals in ancient gold artifacts – Geochemistry and osmium isotopes of inclusions in Early Bronze Age gold from Ur/Mesopotamia. *Journal of Archaeological Science*. 68, 12–23 (2016). <https://doi.org/10.1016/j.jas.2016.02.004>.

240.

La Niece, S., Meeks, N.: Diversity of Goldsmithing Traditions in the Americas and the Old World. In: *Precolumbian gold: technology, style and iconography*. pp. 220–239. British Museum Press, London (2000).

241.

Lechtman, H.: The Gilding of metals in pre-Columbian Peru. In: *Application of science in examination of works of art: proceedings of the seminar September 7-16, 1965*. pp. 38–52. [Museum of Fine Arts], [Boston, Mass.] (1973).

242.

Lechtman, Heather: Pre-Columbian Surface Metallurgy. *Scientific American*. 250, 56–63 (1984). <https://doi.org/10.1038/scientificamerican0684-56>.

243.

Leusch, V., Armbruster, B., Pernicka, E., Slavcev, V.: On the Invention of Gold Metallurgy: The Gold Objects from the Varna I Cemetery (Bulgaria) - Technological Consequence and Inventive Creativity. *Cambridge Archaeological Journal*. 25, 353–376 (2015). <https://doi.org/10.1017/S0959774314001140>.

244.

Maldonado, Blanca., Rehren, Thilo.: Early copper smelting at Itziparátzico, Mexico. *Journal of Archaeological Science*. 36, 1998–2006 (2009). <https://doi.org/10.1016/j.jas.2009.05.019>.

245.

Martinon-Torres, M., Rehren, T.: Trials and errors in search of mineral wealth: metallurgical experiments in early colonial Jamestown. *Rittenhouse: journal of the American Scientific Instrument Enterprise*. 21, 82–97 (2007).

246.

Martinón-Torres, M., Rojas, R.V., Cooper, J., Rehren, T.: Metals, microanalysis and meaning:

a study of metal objects excavated from the indigenous cemetery of El Chorro de Maíta, Cuba. *Journal of Archaeological Science*. 34, 194–204 (2007).  
<https://doi.org/10.1016/j.jas.2006.04.013>.

247.

Martinon-Torres, M., Cooper, J., Valcarcel Rojas, R., Rehren, Th.: Diversifying the picture: indigenous responses to European arrival in Cuba. *Archaeology international*. 37–40 (2008).

248.

Martinón-Torres, M., Valcárcel Rojas, R., Sáenz Samper, J., Guerra, M.F.: Metallic encounters in Cuba: The technology, exchange and meaning of metals before and after Columbus. *Journal of Anthropological Archaeology*. 31, 439–454 (2012).  
<https://doi.org/10.1016/j.jaa.2012.03.006>.

249.

Martinón-Torres, M., Uribe-Villegas, M.A.: The prehistoric individual, connoisseurship and archaeological science: The Muisca goldwork of Colombia. *Journal of Archaeological Science*. 63, 136–155 (2015). <https://doi.org/10.1016/j.jas.2015.08.014>.

250.

McEwan, Colin, British Museum: *Precolumbian gold: technology, style and iconography*. British Museum Press, London (2000).

251.

Mitteldeutscher Archäologentag: Metals of Power – Early gold and silver [Metalle der Macht: Frühes Gold und Silber]. Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Landesmuseum für Vorgeschichte, Halle (Saale) (2014).

252.

Plaza, M.T., Martín-Torres, M.: Metallurgical traditions under Inka rule: a technological study of metals and technical ceramics from the Aconcagua Valley, Central Chile. *Journal of Archaeological Science*. 54, 86–98 (2015). <https://doi.org/10.1016/j.jas.2014.11.029>.

253.

Ramage, Andrew, Cowell, M. R., Craddock, P. T.: King Croesus' gold: excavations at Sardis and the history of gold refining. British Museum Press in association with Archaeological Exploration of Sardis, Harvard University Art Museums, London (2000).

254.

Cardale de Schrimppff, Marianne, Bray, Warwick: Calima and Malagana: art and archaeology in southwestern Colombia. Pro Calima Foundation, Bogotá (2005).

255.

Thibodeau, A.M., Killick, D.J., Ruiz, J., Chesley, J.T., Deagan, K., Cruxent, J.M., Lyman, W.: The strange case of the earliest silver extraction by European colonists in the New World. *Proceedings of the National Academy of Sciences*. 104, 3663–3666 (2007).  
<https://doi.org/10.1073/pnas.0607297104>.

256.

Martinon-Torres, M., Uribe Villegas, M.A.: Composition, colour and context in Muisca votive metalwork (Colombia, AD 600-1800). *Antiquity*. 86, 772–791 (2012).

257.

Boiurgarit, D., Thomas, N.: From laboratory to field experiments: shared experience in brass cementation. *Historical metallurgy: journal of the Historical Metallurgy Society*. 45, 8–16 (2011).

258.

Craddock, P., Zhou, W.: Traditional Zinc Production in Modern China: Survival and Evolution. In: *Mining and metal production through the ages*. pp. 267–292. British Museum, London (2003).

259.

Craddock, P., Eckstein, K.: Production of brass in Antiquity by direct reduction. In: Mining and metal production through the ages. pp. 230–216. British Museum, London (2003).

260.

Craddock, P.T., British Museum: 2000 years of zinc and brass. British Museum, London (1998).

261.

Dungworth, D.: Roman Copper Alloys: Analysis of Artefacts from Northern Britain. *Journal of Archaeological Science*. 24, 901–910 (1997). <https://doi.org/10.1006/jasc.1996.0169>.

262.

Dungworth, D.: Iron Age and Roman Copper Alloys from Northern Britain. *Internet Archaeology*. (1997). <https://doi.org/10.11141/ia.2.2>.

263.

Martinón-Torres, M., Rehren, T.: Agricola and Zwickau: theory and practice of Renaissance brass production in SE Germany. *Historical metallurgy: journal of the Historical Metallurgy Society*. 45, 95–111 (2002).

264.

Ponting, M.: Keeping up with the Romans? Romanisation and Copper Alloys in First Revolt Palestine. *IAMS Newsletter*. 3–6.

265.

Ponting, M.J.: Roman military copper-alloy artefacts from Israel: questions of organization and ethnicity. *Archaeometry*. 44, 555–571 (2008). <https://doi.org/10.1111/1475-4754.t01-1-00086>.

266.

Rehren, T.: Small Size, Large Scale Roman Brass Production in Germania Inferior. *Journal of*

Archaeological Science. 26, 1083–1087 (1999). <https://doi.org/10.1006/jasc.1999.0402>.

267.

Rehren, T.: The same... but different: A juxtaposition of Roman and Medieval brass making in Central Europe. In: *Metals in antiquity*. pp. 252–257. Archaeopress, Oxford (1999).

268.

Rehren, T., Martínón-Torres, M.: *Naturam ars imitata: European brassmaking between craft and science*. In: *Archaeology, history and science: integrating approaches to ancient materials*. pp. 167–188. Left Coast Press, Walnut Creek, CA (2008).

269.

Thornton, C.P., Ehlers, C.: Early brass in the ancient Near East. *IAMS Newsletter*. 3–8 (2003).

270.

Welter, J.-M.: The zinc content of brass: a chronological indicator. *Techne: La Science au Service de L'Histoire de L'Art Et des Civilisations*. 18, 27–36 (2003).

271.

Zacharias, S.: Brass making in medieval western Europe. In: *All that glitters: readings in historical metallurgy*. pp. 35–40. Metallurgical Society of the Canadian Institute of Mining and Metallurgy, Montréal (1989).

272.

Zhou, W., Martinon-Torres, M., Chen, J., Liu, H., Li, Y.: Distilling zinc for the Ming Dynasty: the technology of large scale zinc production in Fengdu, southwest China. *Journal of Archaeological Science*. 39, 908–921 (2012). <https://doi.org/10.1016/j.jas.2011.10.021>.

273.

La Niece, S., Hook, D.R., Craddock, P.T., British Museum: *Metals and mines: studies in*

archaeometallurgy. Archetype in association with the British Museum, London (2007).

274.

Bayley, J.: Innovation in later medieval urban metalworking. *Historical metallurgy: journal of the Historical Metallurgy Society*. 30, 67–71 (1996).

275.

Bayley, J., White, H.: Evidence for workshop practices at the Tudor mint in the Tower of London. In: *The Renaissance workshop*. pp. 138–143. Archetype Publications in association with the British Museum, London (2013).

276.

Hogarth, D.: Martin Frobisher's largest 'gold mine' in Baffin Island. *Historical metallurgy: journal of the Historical Metallurgy Society*. 33, 85–92 (1999).

277.

Martinon-Torres, M.: The tools of the chymist: archeological and scientific analyses of early modern laboratories. In: *Chymists and chymistry: studies in the history of alchemy and early modern chemistry*. pp. 149–163. Science History Publications/USA, Sagamore Beach, Mass (2007).

278.

Martinón-Torres, M.: Some recent developments in the historiography of alchemy. *Ambix*. 58, 215–237 (2011). <https://doi.org/10.1179/174582311X13129418299063>.

279.

Martinon-Torres, M.: Inside Solomon's House: An Archaeological Study of the Old Ashmolean Chymical Laboratory in Oxford. *Ambix*. 59, 22–48 (2012). <https://doi.org/10.1179/174582312X13296104891436>.

280.

Martinon-Torres, M., Rehren, Th., Sigrid von Osten, S. von O.: A 16th century lab in a 21st century lab: archaeometric study of the laboratory equipment from Oberstockstall (Kirchberg am Wagram, Austria). *Antiquity*. 77, (2003).

281.

Martinon-Torres, M., Rehren, Th.: Alchemy, chemistry and metallurgy in Renaissance Europe. A wider context for fire assay remains. *Historical metallurgy: journal of the Historical Metallurgy Society*. 39, 14–31 (2005).

282.

Martinon-Torres, M., Rehren, T.: Post-Medieval crucible production and distribution: A study of materials and materialities. *Archaeometry*. 51, 49–74 (2009).  
<https://doi.org/10.1111/j.1475-4754.2007.00380.x>.

283.

Mongiatti, A., Martinon-Torres, M., Rehren, Th.: Testing ores for gold and silver in Renaissance Austria: new techniques, new discoveries. In: *Proceedings: ISA 2006 : 36th International Symposium on Archaeometry : 2-6 May 2006, Quebec City, Canada*. p. 444/37-444/46. CELAT, Université Laval, Québec (2009).

284.

Rehren, Th.: Alchemy and fire assay - an analytical approach. *Historical metallurgy: journal of the Historical Metallurgy Society*. 30, 136–142 (1996).

285.

Budd, P.D., Ottaway, B.S.: The properties of arsenical copper alloys: implications for the development of Eneolithic metallurgy. In: *Archaeological sciences 1989: proceedings of a conference on the application of scientific techniques to archaeology, Bradford, September 1989*. pp. 132–142. Oxbow, Oxford (1991).

286.

J. A. Charles: Early Arsenical Bronzes-A Metallurgical View. *American Journal of Archaeology*. 71, 21–26 (1967).

287.

Northover, P.: Properties and use of arsenic-copper alloys. Archäometallurgie der alten Welt: Beiträge zum Internationalen Symposium 'Old World Archaeometallurgy', Heidelberg 1987. Der Anschnitt, Beiheft, 111–118 (1989).

288.

Young, S.M.M., O'Brien, W.: Arsenical copper in early Irish metallurgy. In: Metals in antiquity. pp. 33–42. Archaeopress, Oxford (1999).  
<https://doi.org/https://doi.org/10.30861/9781841710082>.

289.

Bayley, J.: Innovation in later medieval urban metalworking. Historical metallurgy: journal of the Historical Metallurgy Society. 30, 67–71 (1996).

290.

Bourgarit, D., Thomas, N.: Late medieval copper alloying practices: a view from a Parisian workshop of the 14th century AD. Journal of Archaeological Science. 39, 3052–3070 (2012). <https://doi.org/10.1016/j.jas.2012.04.009>.

291.

Brownsword, R.: Medieval metalwork: an analytical study of copper-alloy objects. Historical metallurgy: journal of the Historical Metallurgy Society. 38, 84–105 (2004).

292.

Dungworth, D., Nicholas, M.: Caldarium? An antimony bronze used for medieval and post-medieval cast domestic vessels. Historical metallurgy: journal of the Historical Metallurgy Society. 38, 24–34 (2004).

293.

Rehren, T.: The same.... but different: A juxtaposition of Roman and Medieval brass making

in Central Europe. In: *Metals in antiquity*. pp. 252–257. Archaeopress, Oxford (1999).

294.

Budd et al, P.: The early development of metallurgy in the British Isles. *Antiquity*. 66, 677–686 (1992). <https://doi.org/10.1017/S0003598X00039375>.

295.

Chernych, E.N.: Some of the most important aspects and problems of early Metal Age studying. In: *Die Anfänge der Metallurgie in der alten Welt = The beginnings of metallurgy in the old world*. pp. 25–31. Verlag Marie Leidorf, Rahden, Westf (2002).

296.

Craddock, P.T.: Copper smelting in Bronze Age Britain: Problems and Possibilities. In: *Early mining in the British Isles: proceedings of the Early Mining Workshop at Plas Tan y Bwlch, Snowdonia National Park Study Centre, 17-19 November, 1989*. pp. 69–71. Plas Tan y Bwlch, Snowdonia National Park Study Centre, Tan y Bwlch, Gwynedd (1990).

297.

O'Brien, William, Brindley, Anna L.: *Ross Island: mining, metal and society in early Ireland*. Dept. of Archaeology, National University of Ireland, Galway, Galway (2004).

298.

Murillo-Barroso, M., Pryce, T.O., Bellina, B., Martínón-Torres, M.: Khao Sam Kaeo – an archaeometallurgical crossroads for trans-asiatic technological traditions. *Journal of Archaeological Science*. 37, 1761–1772 (2010). <https://doi.org/10.1016/j.jas.2010.01.036>.

299.

Piggott, V.C., Ciarla, R.: On the origins of metallurgy in prehistoric Southeast Asia: the view from Thailand. In: *Metals and mines: studies in archaeometallurgy*. pp. 76–88. Archetype in association with the British Museum, London (2007).

300.

Pryce, T.O., Pigott, V.C., Martín-Torres, M., Rehren, T.: Prehistoric copper production and technological reproduction in the Khao Wong Prachan Valley of Central Thailand. *Archaeological and Anthropological Sciences*. 2, 237–264 (2010).  
<https://doi.org/10.1007/s12520-010-0043-y>.

301.

Joyce C. White and Elizabeth G. Hamilton: The Transmission of Early Bronze Technology to Thailand: New Perspectives. *Journal of World Prehistory*. 22, 357–397 (2009).

302.

Bareham, T.: Bronze casting experiments. *Historical metallurgy: journal of the Historical Metallurgy Society*. 28, 112–116 (1994).

303.

Crew, P.: The experimental production of prehistoric bar iron. *Historical metallurgy: journal of the Historical Metallurgy Society*. 25, 21–36 (1991).

304.

Ottaway, Barbara S., Wang, Quanyu: Casting experiments and microstructure of archaeologically relevant bronzes. Archaeopress, Oxford (2004).  
<https://doi.org/https://doi.org/10.30861/9781841716763>.

305.

Pryce, T.O., Bassiakos, Y., Catapotis, M., Doonan, R.C.: 'De Caerimoniae' Technological choices in copper-smelting furnace design at early Bronze Age Chrysokamino, Crete. *Archaeometry*. 49, 543–557 (2007). <https://doi.org/10.1111/j.1475-4754.2007.00319.x>.

306.

Aldenderfer, M., Craig, N.M., Speakman, R.J., Popelka-Filcoff, R.: From the Cover: Four-thousand-year-old gold artifacts from the Lake Titicaca basin, southern Peru. *Proceedings of the National Academy of Sciences*. 105, 5002–5005 (2008).  
<https://doi.org/10.1073/pnas.0710937105>.

307.

Benson, Elizabeth P., Dumbarton Oaks: Pre-Columbian metallurgy of South America: a conference at Dumbarton Oaks, October 18th and 19th, 1975. Dumbarton Oaks Research Library and Collections, Trustees for Harvard University, Washington, D.C. (1979).

308.

Maldonado, B., Rehren, T., Howell, P.: Archaeological copper smelting at Itziparatzico, Michoacan, Mexico, in Vandiver. In: Materials issues in art and archaeology VII: symposium held November 30-December 3, 2004, Boston, Massachusetts, U.S.A. pp. 231-240. Materials Research Society, Warrendale, Pa (2005).

309.

Martinon-Torres, M., Valcarcel Rojas, R., Rehren, T.: Metals, microanalysis and meaning: a study of metal objects excavated from the indigenous cemetery of El Chorro de Malta, Cuba. *Journal of archaeological science*. 34, 194-204 (2007).  
<https://doi.org/10.1016/j.jas.2006.04.013>.

310.

Schultze, C.A., Stanish, C., Scott, D.A., Rehren, T., Kuehner, S., Feathers, J.K.: Direct evidence of 1,900 years of indigenous silver production in the Lake Titicaca Basin of Southern Peru. *Proceedings of the National Academy of Sciences*. 106, 17280-17283 (2009). <https://doi.org/10.1073/pnas.0907733106>.

311.

Shimada, I., Gordus, A., Griffin, J.A., Merkel, J.F.: Sican alloying, working and use of precious metals: an interdisciplinary perspective. In: *Metals in antiquity*. Archaeopress, Oxford (1999). <https://doi.org/10.30861/9781841710082>.

312.

Garcia-Guinea, J., Correcher, V., Rojas, R.M., Et al.: Chemical tracers in archaeological and natural gold: Aliseda Tartessos treasure and new discovered nuggets (SW Spain). *Gold Bulletin*. 38, 23-28 (2005). <https://doi.org/10.1007/BF03215224>.

313.

Guerra, M.F., Calligaro, T.: Gold and cultural heritage objects: a review of studies of provenance and manufacturing technologies. *Measurement science and technology*. 1527–1537 (1990). <https://doi.org/10.1088/0957-0233/14/9/305>.

314.

Guerra, M.F., Calligaro, T., Perea, A.: The treasure of Guarrazar: Tracing the gold supplies in the Visigothic Iberian peninsula. *Archaeometry*. 49, 53–74 (2007). <https://doi.org/10.1111/j.1475-4754.2007.00287.x>.

315.

Rehren, T., Temme, M.: Pre-Columbian gold processing at Putushio, South Ecuador: the archaeometallurgical evidence. In: *Archaeometry of pre-Columbian sites and artifacts: proceedings of a symposium organized by the UCLA Institute of Archaeology and the Getty Conservation Institute, Los Angeles, California, March 23-27, 1992*. pp. 267–284. Getty Conservation Institute, Marina Del Rey, CA (1994).

316.

et al, G.-M.: Early copper and Brass in Senegal. In: *Society, culture, and technology in Africa*. pp. 45–62. MASCA, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia, PA (1994).

317.

Augustin F. C. Holl: Early West African Metallurgies: New Data and Old Orthodoxy. *Journal of World Prehistory*. 22, 415–438 (2009).

318.

Miller, D.E., Van Der Merwe, N.J.: Early Metal Working in Sub-Saharan Africa: A Review of Recent Research. *The Journal of African History*. 35, (1994). <https://doi.org/10.1017/S0021853700025949>.

319.

Begemann, F.: Tracing tin via isotope analyses. In: The beginnings of metallurgy: proceedings of the International Conference 'The Beginnings of Metallurgy', Bochum 1995. pp. 277–284. Deutsches Bergbau-Museum, Bochum (1999).

320.

Giumlia-Mair, Alessandra R., Lo Schiavo, Fulvia, International Congress of Prehistoric and Protohistoric Sciences: Le problème de l'étain à l'origine de la métallurgie: The problem of early tin. Archaeopress, Oxford (2003).

<https://doi.org/https://doi.org/10.30861/9781841715643>.

321.

Haustein, M., Gillis, C., Pernicka, E.: Tin isotopy: A new method for solving old questions. *Archaeometry*. 52, 816–832 (2010). <https://doi.org/10.1111/j.1475-4754.2010.00515.x>.

322.

Yener, K. Aslihan: The domestication of metals: the rise of complex metal industries in Anatolia. Brill, Leiden (2000).

323.

Barnard, Noel, Bulbeck, David: Ancient Chinese and Southeast Asian bronze age cultures: the proceedings of a conference held at the Edith and Joy London Foundation property, Kioloa, NSW, 8-12 February, 1988 /: conference papers. SMC, Taipei (1996).

324.

Chen, K., Rehren, T., Mei, J., Zhao, C.: Special alloys from remote frontiers of the Shang Kingdom: scientific study of the Hanzhong bronzes from southwest Shaanxi, China. *Journal of Archaeological Science*. 36, 2108–2118 (2009).

<https://doi.org/10.1016/j.jas.2009.04.016>.

325.

Kunlong Chen: Indigenous production and interregional exchange: late second-millennium BC bronzes from the Hanzhong basin, China. *Antiquity*. 90, 665–678.

<https://doi.org/http://dx.doi.org/10.2307/3250165><http://dx.doi.org/10.1016/j.jas.2009.04.016><http://dx.doi.org/10.1016/j.jas.2009.04.017>.

326.

Chen, K., Liu, S., Li, Y., Mei, J., Shao, A., Yue, L.: Evidence of arsenical copper smelting in Bronze Age China: A study of metallurgical slag from the Laoniupo site, central Shaanxi. *Journal of Archaeological Science*. 82, 31–39 (2017).  
<https://doi.org/10.1016/j.jas.2017.04.006>.

327.

Liu, S., Wang, K., Cai, Q., Chen, J.: Microscopic study of Chinese bronze casting moulds from the Eastern Zhou period. *Journal of Archaeological Science*. 40, 2402–2414 (2013).  
<https://doi.org/10.1016/j.jas.2012.11.010>.

328.

Mei, Jianjun: *Copper and bronze metallurgy in late prehistoric Xinjiang: its cultural context and relationship with neighbouring regions*. Archaeopress, Oxford (2000).  
<https://doi.org/https://doi.org/10.30861/9781841710686>.

329.

Mei, J., Chen, K., Cao, W.: Scientific examination of Shang-dynasty bronzes from Hanzhong, Shaanxi Province, China. *Journal of Archaeological Science*. 36, 1881–1891 (2009).  
<https://doi.org/10.1016/j.jas.2009.04.017>.

330.

Mei, J., Wang, P., Chen, K., Wang, L., Wang, Y., Liu, Y.: Archaeometallurgical studies in China: some recent developments and challenging issues. *Journal of Archaeological Science*. 56, 221–232 (2015). <https://doi.org/10.1016/j.jas.2015.02.026>.

331.

Bagley, Robert W., Fong, Wen, So, Jenny F., Hearn, Maxwell K., Metropolitan Museum of Art (New York, N.Y.): *The great bronze age of China: an exhibition from the People's Republic of China*. Metropolitan Museum of Art, New York (1980).

332.

Zhou, W., Dong, Y., Wan, Q., Wang, C.: New research on lost-wax casting in ancient China. In: *Metallurgy and civilisation: Eurasia and beyond: proceedings of the 6th International Conference on the Beginnings of the Use of Metals and Alloys (BUMA VI)*. pp. 73–78. Archetype, London (2009).

333.

Alipour, R., Rehren, T.: Persian Pulād Production: Chāhak Tradition. *Journal of Islamic Archaeology*. 1, 231–261 (2014). <https://doi.org/10.1558/jia.v1i2.24174>.

334.

Allan, James W., Gilmour, Brian J. J., University of Oxford, British Institute of Persian Studies: *Persian steel: the Tanavoli collection*. Oxford University Press for the Board of the Faculty of Oriental Studies, University of Oxford and the British Institute of Persian Studies, Oxford (2000).

335.

Feuerbach, A., Merkel, J., Griffiths, D.: An examination of crucible steel in the manufacture of Damascus steel, including evidence from Merv, Turkmenistan. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 37–44. Deutsches Bergbau-Museum, Bochum (1998).

336.

Papakristu, O.A., Rehren, T.: Techniques and technology of ceramic vessel manufacture: crucibles for wootz smelting in Central Asia. In: *Modern trends in scientific studies on ancient ceramics: papers presented at the 5th European Meeting on Ancient Ceramics, Athens 1999*. pp. 69–74. Archaeopress, Oxford (2002).  
<https://doi.org/https://doi.org/10.30861/9781841712895>.

337.

Rehren, T., Papakristu, O.: Cutting Edge Technology - The Ferghana process of medieval crucible steel making. *Metalla: Forschungsberichte des Deutschen Bergbau-Museums*. 55–79 (1994).

338.

Blakelock, E., Martínón-Torres, M., Veldhuijzen, H.A., Young, T.: Slag inclusions in iron objects and the quest for provenance: an experiment and a case study. *Journal of Archaeological Science*. 36, 1745–1757 (2009). <https://doi.org/10.1016/j.jas.2009.03.032>.

339.

Coustures, M.P., Beziat, D., Tollon, F., Domergue, C., Long, L., Rebiscoul, A.: The use of trace element analysis of entrapped slag inclusions to establish ore - Bare iron links: Examples from two Gallo-Roman iron-making sites in France (Les Martys, Montagne Noire, and Les Ferrys, Loiret). *Archaeometry*. 45, 599–613 (2003). <https://doi.org/10.1046/j.1475-4754.2003.00131.x>.

340.

Desaulty, A.-M., Dillmann, P., L'Héritiera, M., Et al.: Does it come from the Pays de Bray? Examination of an origin hypothesis for the ferrous reinforcements used in French medieval churches using major and trace element analyses. *Journal of Archaeological Science*. 36, 2445–2462 (2009). <https://doi.org/10.1016/j.jas.2009.07.002>.

341.

Host-Madsen, L., Buchwald, V.F.: The characterization and provenancing of ore, slag and iron from the Iron Age settlements at Snorup. *Historical metallurgy: journal of the Historical Metallurgy Society*. 33, 57–67.

342.

Schwab, R., Heger, D., Hoppner, B., Pernicka, E.: The provenance of iron artefacts from Manching: A multi-technique approach. *Archaeometry*. 48, 433–452 (2006). <https://doi.org/10.1111/j.1475-4754.2006.00265.x>.

343.

Bray, P., Cuenod, A., Gosden, C., Et al.: Form and flow: the 'karmic cycle' of copper. *Journal of Archaeological Science*. 56, 202–209 (2015). <https://doi.org/10.1016/j.jas.2014.12.013>.

344.

Stos-Gale, Z.A., Gale, N.H.: Metal provenancing using isotopes and the Oxford archaeological lead isotope database (OXALID). *Archaeological and Anthropological Sciences*. 1, 195–213 (2009). <https://doi.org/10.1007/s12520-009-0011-6>.

345.

Pernicka, E.: Trace element fingerprinting of ancient copper: a guide to technology or provenance. In: *Metals in antiquity*. pp. 163–171. Archaeopress, Oxford (1999). <https://doi.org/10.30861/9781841710082>.

346.

Pollard, A.M., Bray, P.J., Gosden, C.: Is there something missing in scientific provenance studies of prehistoric artefacts? *Antiquity*. 88, 625–631 (2014). <https://doi.org/10.1017/S0003598X00101255>.

347.

Dungworth, D.: Serendipity in the foundry? Tin oxide inclusions in copper and copper alloys as an indicator of production process. *Bulletin of the metals museum*. 32, 1–5 (2000).

348.

Farci, C., Martín-Torres, M., Álvarez, D.G.: Bronze production in the Iron Age of the Iberian Peninsula: The case of El Castre, Vigaña (Asturias, NW Spain). *Journal of Archaeological Science: Reports*. 11, 338–351 (2017). <https://doi.org/10.1016/j.jasrep.2016.12.009>.

349.

Rostoker, W., McNallan, M., Gebhard, E.R.: Melting/smeltering of bronze at Isthmia. *Historical metallurgy: journal of the Historical Metallurgy Society*. 17, 23–26 (1983).

350.

Rovira, S.: Bronze production in prehistory. (2005).

351.

Zhou, W., Chen, J., Lie, X., Xu, T., Chong, J., Wang, Z.: Three Western Zhou bronze foundry sites in the Zhouyuan are, Shaanxi province, China. In: Metallurgy and civilisation: Eurasia and beyond: proceedings of the 6th International Conference on the Beginnings of the Use of Metals and Alloys (BUMA VI). pp. 62–72. Archetype, London (2009).

352.

Stanley B. Alpern: Did They or Didn't They Invent It? Iron in Sub-Saharan Africa. *History in Africa*. 32, 41–94 (2005).

353.

Bisson, Michael S., Vogel, Joseph O.: Ancient African metallurgy: the socio-cultural context. AltaMira, Walnut Creek, Calif (2000).

354.

Augustin F. C. Holl: Early West African Metallurgies: New Data and Old Orthodoxy. *Journal of World Prehistory*. 22, 415–438 (2009).

355.

Killick, D.: What do we know about African iron working? *Journal of African archaeology*. 2, 97–112 (2004).

356.

J. A. Charles: Early Arsenical Bronzes - A Metallurgical View. *American Journal of Archaeology*. 71, 21–26 (1967).

357.

Bourgarit, D., Thomas, N.: Late medieval copper alloying practices: a view from a Parisian

workshop of the 14th century AD. *Journal of Archaeological Science*. 39, 3052–3070 (2012). <https://doi.org/10.1016/j.jas.2012.04.009>.

358.

Pryce, T.O., Bassiakos, Y., Catapotis, M., Doonan, R.C.: 'De Caerimoniae' Technological choices in copper-smelting furnace design at early Bronze Age Chrysokamino, Crete. *Archaeometry*. 49, 543–557 (2007). <https://doi.org/10.1111/j.1475-4754.2007.00319.x>.

359.

Rehren, T., Temme, M.: Pre-Columbian gold processing at Putushio, South Ecuador: the archaeometallurgical evidence. In: *Archaeometry of pre-Columbian sites and artifacts: proceedings of a symposium organized by the UCLA Institute of Archaeology and the Getty Conservation Institute*, Los Angeles, California, March 23-27, 1992. pp. 267–284. Getty Conservation Institute, Marina Del Rey, CA (1994).

360.

Hein, A., Kilikoglou, V., Kassianidou, V.: Chemical and mineralogical examination of metallurgical ceramics from a Late Bronze Age copper smelting site in Cyprus. *Journal of Archaeological Science*. 34, 141–154 (2007). <https://doi.org/10.1016/j.jas.2006.04.005>.

361.

Mei, Jianjun: *Copper and bronze metallurgy in late prehistoric Xinjiang: its cultural context and relationship with neighbouring regions*. Archaeopress, Oxford (2000). <https://doi.org/https://doi.org/10.30861/9781841710686>.

362.

Feuerbach, A., Merkel, J., Griffiths, D.: An examination of crucible steel in the manufacture of Damascus steel, including evidence from Merv, Turkmenistan. In: *Metallurgica Antiqua: in honour of Hans-Gert Bachmann and Robert Maddin*. pp. 37–44. Deutsches Bergbau-Museum, Bochum (1998).

363.

Desaulty, A.-M., Dillmann, P., L'Héritiera, M., Et al.: Does it come from the Pays de Bray? Examination of an origin hypothesis for the ferrous reinforcements used in French

medieval churches using major and trace element analyses. *Journal of Archaeological Science*. 36, 2445–2462 (2009). <https://doi.org/10.1016/j.jas.2009.07.002>.