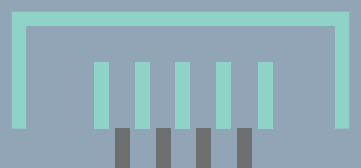


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Extended Abstracts

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Caves and Rock Shelters, Burials and Smelting

Mark Pearce

Keywords

Trentino, Northern Italy, Smelting, Caves, Ritual

At present, two separate phases of prehistoric smelting activity are recognised in the Italian Trentino - Alto Adige/Südtirol Region: the first in the later Copper Age and Early Bronze Age (Pearce, 2007, pp. 74-76), the second in the Middle, Recent and Final Bronze Age and Early Iron Age (Pearce, et al., 2020). They have very different characteristics. In the second phase of smelting, there are groups of stone-built open-air furnaces, sometimes in pairs with a roasting bed, and large heaps of slag (Cierny, 2008); production is on a large scale and would seem to have been highly visible in the landscape. Smelting mostly takes place in the areas where copper ore outcrops were mined (Preuschen, 1973). However, smelting in the first phase, the later Copper Age and Early Bronze Age, is entirely different and seems to have had a ritual connotation.

This can particularly be seen in the area close to the present-day city of Trento, where Copper Age and Early Bronze Age slag has been found at various rock shelters: Acquaviva (Besenello - TN), and Riparo Gaban, Romagnano Loch, La Vela di Valbusa and Riparo Marchi (Trento - TN). These are situated some distance from copper ore sources, at least 10 km as the crow flies (D'Amico, et al., 1998, p. 37); moreover, because of the mountainous Alpine terrain the

actual distance travelled between the mine and the smelting place would have been greater and journey times long.

At Acquaviva, layers with a small furnace and slag heap overlie a female secondary burial (Angelini, et al., 1980, fig. 2) whose radiocarbon date of 3340-2900 cal BC¹ (bone sample, ETH-12497: 4410±70 BP; Pedrotti, 2001, pp. 202-203, 211-212, note 86 on p. 244) gives a *terminus post quem* for the metallurgical activity, though it is not clear how long a time elapsed between the burial and the smelting. Another furnace and an associated tuyère were also found at the site.

At Riparo Gaban, slag, tuyères, a crucible and a furnace were found (D'Amico, et al., 1998, p. 31, table 1) and a radiocarbon date of 2630-2300 cal BC (layer C5, Bln-1776: 3985±50 BP; Pedrotti, 2001, note 142 on p. 249) gives a *terminus ante quem* for the earliest smelting in layer C6.

At Romagnano Loch, the earliest evidence for metalworking, a crucible found in layer Q, sector III, is bracketed by radiocarbon dates (Alessio, et al., 1978, p. 80) - the layer below dates to 3710-3380 cal BC (layer R, R-775: 4810±50 BP) while the layer above dates to 2290-1960 cal BC (layer P, R-769: 3720±50 BP). There is also evidence for early Bronze Age metalworking. Smelting evidence includes slag, two tuyères and a

¹ All radiocarbon dates are calibrated to 95.4% using OxCal v4.4.2 and the IntCal20 calibration curve: Bronk Ramsey, 2009; Reimer, et al., 2020.

furnace. Burials are found in layer P of sector III (Perini, 1971, pp. 92-95; 1989; 1992, p. 53) and fragments of a crucible with traces of metal were found in the stone setting of tomb 12, which contained an adult whose bones were damaged by fire, probably as a result of later metalworking (Perini, 1975, pp. 300-301; Nicolis, 2001, p. 340). In sector IV, adjacent to sector III, slag associated with early Bronze Age pottery was found underlying a burial (Perini, 1971, p. 100).

At the Vela di Valbusa, a spread of slag, plus an area of baked clay and a furnace associated with a tuyère, was overlain by an Early Bronze Age tumulus and inhumation burial; a further two tuyères were also found at the rock shelter (Fasani, 1990).

At the Riparo Marchi, smelting can be dated to the end of the Copper and beginning of the Early Bronze Age (Mottes, et al., 2014); slag can be found in layers dating to the Early, Middle and final Middle-Recent Bronze Age of the nearby tumulus I at Gardolo di Mezzo (Mottes, et al., 2011; 2017).

Smelting slag has also been found at the Riparo di Monte Terlago rock shelter (Terlago TN), west of the Adige (Etsch) valley on the slopes of the Paganella massif, in layers dating to the Early and Middle Bronze Age (Dalmeri, et al., 2011).

It should be noted that smelting is also documented at open air sites (*pace* Dolfini, 2014, p. 497), for example a furnace and tuyères were found in a context with late Copper Age pottery at Tof de la Val, close to the Romagnano Loch rock shelter (Perini, 1973). Open air smelting sites are also known in the upper Adige valley e.g. at Bressanone/Brixen-circonvallazione ovest (BZ) and Gudon/Gufidaun-propr. Plank (Chiusa/Klausen - BZ) (Tecchiati, 2013, pp. 473-474), and at two hilltop settlements in the Fersina valley, close to copper ore outcrops of the Valsugana and Valle dei Mòcheni mining districts east of the Adige: Montesei di Serso and Croz del Cius (Pergine Valsugana - TN). A late Copper Age furnace was found at Montesei (Perini, 1978, pp. 10-

25; Pedrotti, 2001, pp. 210-211), and a contemporary furnace and slag were found at Croz del Cius (Perini, 1989, figs 16-17). Likewise, not all Copper Age and Early Bronze burials in the region are associated with evidence for metallurgy (Perini, 1975, pp. 206-307; Nicolis, 2001) though burials are linked to rock shelters in the Adige valley south of Bolzano/Bozen (Tecchiati, 2013, pp. 457, 474, fig. 24).

The picture – at least as regards the Trento section of the Adige valley – seems to indicate a pattern of smelting in rock shelters and a strong association with places used also for burial (Pedrotti, 2001, p. 211; Nicolis, 2001, p. 356; Pearce, 2007, pp. 74-76). It is well known from ethnography that smelting, which sees the transformation of a powdered ore into a red liquid metal, has magical aspects (e.g. Budd and Taylor, 1995) and we might therefore argue that later Copper Age and Early Bronze Age copper smelting in this area was a secret activity; certainly we can say that it seems to have taken place in a ritualised context, perhaps as secret knowledge that had to be kept hidden both from the miners who extracted the ore and also those who cast and worked the copper and bronze metal, and protected by ritual (Forbes, 1950, pp. 79-91). Herbert (1993) has drawn attention to the numinous quality of slag in sub-Saharan Africa, and perhaps it is no accident that slag seems to have been included in multiple layers of tumulus I at Gardolo di Mezzo, as noted above. In Bolzano/Bozen province, in the upper Adige valley, slag seems to have been ritually buried along with tuyère fragments at the third millennium BC site of Millan/Milland-metanodotto SNAM (BZ; ETH-26698: 4090±50 BP, 2880-2480 cal BC; Tecchiati, 2013, pp. 465-467, fig. 17) and deposited in the tumuli at Velturmo/Feldthurns-Tanzgasse (BZ; Dal Ri, et al., 2004, pp. 158, 162). However, Early Bronze Age metalworking (as opposed to smelting) is documented by crucibles at the Trentino lake villages (*palafitte*) of Ledro (Battaglia, 1943, pp. 40, 53-54, tav. XXVI.2; Rageth, 1974, pp.

175-176, taf. 89, 90: 1-4) and Fiavè-Carera (Perini, 1987, p. 34, fig. 14.1) and so it was arguably carried out openly within settlements, at least in the Valli Giudicarie of south-eastern Trentino.

This pattern would seem to present a different picture to Copper Age smelting elsewhere in modern-day Italy. For example, at Lovere (BG) on the shores of Lake Iseo in the Lombardy Alps, smelting seems to take place inside a settlement (Giardino, 2006; Poggiani Keller, 2000) and the same pattern is seen in central Italy, for example at San Carlo-Cava Solvay (San Vincenzo - LI) (Artioli, et al., 2016).

There does, however, seem to be a relationship between metalworking, caves and burials in central Italy later in the Bronze Age (Nicolis, 2001, note 80 on p. 364; Pacciarelli and Sassatelli, 1997, p. 16): for example, at the Grotta dei Baffoni (Genga - AN), in the Sentino gorge, in the Early or Middle Bronze Age (Lucentini, 1997, pp. 37-39) and at the Grotta a Male near Assergi (L'Aquila - AQ) in the Middle Bronze Age (d'Ercole, 1997, pp. 54-61). We may also note that there are Middle Bronze Age burials at the Grotta della Monaca (Sant'Agata d'Èsaro - CS), in Calabria, where copper minerals were likely mined for pigments in the third millennium BC. After the burial phase there was a new phase of mining at the end of the Middle Bronze Age in the cave (Larocca, 2001; Larocca, ed., 2005). This association between metalworking and caves may have been very long-lived: in Graeco-Roman mythology, the smith of the gods, Hephaistos/Vulcanus, worked underground in places with volcanic activity, such as the Aeolian islands (d'Ercole, 1997a, p. 57 - see for example Apollonius, *Argonautica*, 3, 41-42)².

We can therefore see that in the later Copper Age and Early Bronze Age Trentino - Alto Adige / Südtirol the world view of copper smelters was different to that in the

second phase of prehistoric smelting. In this first phase, smelting often takes place in caves and rock shelters, which were often also used for burials, and slag was incorporated in ritual monuments. The picture is of a craft that was secret and ritualised, rather than a 'rational' semi-industrial craft.

References

- Alessio, M., Allegri, L., Bella, F., Improta, S., Belluomini, G., Calderoni, G., Cortesi, C., Manfra, L. and Turi, B., 1978. University of Rome Carbon-14 dates XV. *Radiocarbon*, 20(1), pp. 79-104.
- Angelini, B., Bagolini, B., and Pasquali, T., 1980. Acquaviva di Besenello (Trento). *Preistoria Alpina*, 16, pp. 67-69.
- Artioli, G., Angelini, I., Addis, A., Canovaro, C., Chiarantini, L. and Benvenuti, M., 2016. Ceramiche tecniche, scorie, minerali e metalli: interpretazione del processo metallurgico. In: F. Fedeli and A. Galiberti, eds, *Metalli e metallurghi della preistoria: l'insediamento eneolitico di San Carlo-Cava Solvay*. Pontedera: Tagete Edizioni, pp. 68-81.
- Battaglia, R., 1943. La palafitta del Lago di Ledro nel Trentino. *Memorie del Museo di Storia Naturale della Venezia Tridentina*, 7, pp. 3-63.
- Bronk Ramsey, C., 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon*, 51(1), pp. 337-360.
- Budd, P. and Taylor, T., 1995. The faerie smith meets the bronze industry: magic versus science in the interpretation of prehistoric metal-making. *World Archaeology*, 27(1), pp. 133-143.
- Cierny, J., 2008. *Prähistorische Kupferproduktion in den südlichen Alpen, Region Trentino Orientale*. Der Anschnitt, Beiheft, 163. Bochum: Deutsches Bergbau-Museum.
- Dalmeri, G., Flor, E. and Neri, S., 2011. Sondaggio con verifica stratigrafica a Riparo Monte Terlago (Monte Terlago - Terlago). *Preistoria Alpina*, 45, pp. 327-329.
- Dal Ri L., Rizzi G. and Tecchiati U., 2004. L'area megalitica dell'età del Rame di Velturmo - loc. Tanzgasse (BZ): aggiornamenti sullo stato delle ricerche. In: E. Bianchin Citton, ed., *L'area funeraria e culturale dell'età del Rame di Sovizzo nel contesto archeologico dell'Italia*

² For the ritual significance of caves in prehistoric Italy more generally, see Whitehouse (1992) and Pacciarelli (ed., 1997).

- settentrionale. Quaderni di Archeologia 1. Vicenza: Museo Naturalistico Archeologico, pp. 125-174.
- D'Amico, C., Gasparotto, G. and Pedrotti, A., 1998. Scorie eneolitiche di Gaban e Acquaviva (Trento). Caratteri, provenienza ed estrazione del metallo. In: C. D'Amico and C. Albore Livadie, eds, *Le Scienze della Terra e l'Archeometria*. Pubblicazioni dell'Istituto Suor Orsola Benincasa. Naples: CUEN, pp. 31-38.
- d'Ercole, Vincenzo 1997. Grotte dell'Abruzzo con rinvenimenti delle età del rame e del bronzo. In: M. Pacciarelli, ed., *Acque, grotte e Dei. 3000 anni di culti preromani in Romagna, Marche e Abruzzo*. Imola: Musei Civici di Imola, pp. 50-61.
- Dolfini, A., 2014. Early Metallurgy in the Central Mediterranean. In: Roberts, B.W. and Thornton C.P., eds, *Archaeometallurgy in Global Perspective*. New York: Springer, pp. 473-506.
- Fasani, L., 1990. La sepoltura e il forno di fusione de La Vela di Valbusa. *Preistoria Alpina*, 24(1988), pp. 165-81.
- Forbes, R.J., 1950. *Metallurgy in Antiquity: a notebook for archaeologists and technologists*. Leiden: Brill.
- Giardino, C., 2006. Le prime attestazioni di estrazione del Rame dai suoi minerali nell'area prealpina: le evidenze di Lovere (Bergamo). *Civico Museo Archeologico della Valle Sabbia: Annali del Museo*, 20(2003-2006), pp. 51-59.
- Herbert, E.W., 1993. *Iron, gender, and power: rituals of transformation in African societies*. Bloomington: Indiana University Press.
- Larocca, F., 2001. Una miniera di età preistorica in Calabria. La grotta della Monaca di Sant'Agata d'Èsaro (Cosenza). *L'Universo*, 81(1), pp. 59-73.
- Larocca, F., ed., 2005. *La miniera pre-protostorica di Grotta della Monaca (Sant'Agata di Èsaro – Cosenza)*. Roseto Capo Spulico Stazione (CS): Centro Regionale di Speleologia "Enzo dei Medici".
- Lucentini, N., 1997. Le grotte della Gola del Sentino. In: M. Pacciarelli, ed., *Acque, grotte e Dei. 3000 anni di culti preromani in Romagna, Marche e Abruzzo*. Imola: Musei Civici di Imola, pp. 36-49.
- Mottes, E., Bassetti, M. and Silvestri, E., 2011. The Bronze Age Tumuli of Gardolo di Mezzo (Trento, Italy) in the Adige Valley. In: E. Borgna and S. Müller Celka, eds, *Ancestral landscape: Burial mounds in the Copper and Bronze Ages (Central and Eastern Europe – Balkans – Adriatic – Aegean, 4th-2nd millennium B.C.): Proceedings of the International Conference held in Udine, May 15th-18th 2008*. Travaux de la Maison de l'Orient et de la Méditerranée, Série recherches archéologiques, 58. Lyon: Maison de l'Orient et de la Méditerranée Jean Pouilloux, pp. 523-532.
- Mottes, E., Bassetti, M., Silvestri, E. and Stefan, L., 2014. Il sito archeometallurgico dell'età del Rame di Riparo Marchi in Valle dell'Adige (Trento). *AdA: Archeologia delle Alpi*, 2014, pp. 39-43.
- Mottes, E., Bassetti, M. and Maggioni, C., 2017. Nuove scoperte archeologiche a Gardolo di Mezzo (Trento). Necropoli a cremazione della Cultura di Luco/Laugen. *AdA: Archeologia delle Alpi*, 2016, pp. 149-151.
- Nicolis, F., 2001. Il culto dei morti nell'antica e media età del Bronzo. In: M. Lanzinger, F. Marzatico and A. Pedrotti, eds, *Storia del Trentino, I, La preistoria e la protostoria*. Il Mulino, Bologna, pp. 337-365.
- Pacciarelli, M., ed., 1997. *Acque, grotte e Dei. 3000 anni di culti preromani in Romagna, Marche e Abruzzo*. Imola: Musei Civici di Imola.
- Pacciarelli, M. and Sassatelli, G. 1997. Acque, grotte e Dei. In: M. Pacciarelli, ed., *Acque, grotte e Dei. 3000 anni di culti preromani in Romagna, Marche e Abruzzo*. Imola: Musei Civici di Imola, pp. 10-19.
- Pearce, M., 2007. *Bright Blades and Red Metal: essays on north Italian prehistoric metalwork*. Specialist Studies on Italy 14. London: Accordia Research Institute.
- Pearce, M., Bellintani, P. and Nicolis, F., 2020. Frattesina and the later Bronze Age – early Iron Age metals trade: the absolute chronology of smelting sites in the Trentino-Alto Adige/Südtirol. *Padusa*, 55(2019), pp. 67-86.
- Pedrotti, A., 2001. L'età del Rame. In: M. Lanzinger, F. Marzatico, and A. Pedrotti, eds, *Storia del Trentino, I, La preistoria e la protostoria*. Bologna: Il Mulino, pp. 183-253.
- Perini, R., 1971. I depositi preistorici di Romagnano – Loc (Trento). *Preistoria Alpina*, 7, pp. 7-106 [reprinted 2004, In: *Scritti di archeologia, I parte*. Trento: Provincia autonoma di Trento, Soprintendenza per i beni archeologici, pp. 295-369].
- Perini, Renato 1973. Romagnano – Tof de la Val (Trento). *Preistoria Alpina*, 9, pp. 247-50 [reprinted 2004, In: *Scritti di archeologia, I parte*. Trento: Provincia autonoma di Trento, Soprintendenza per i beni archeologici, pp. 491-493].
- Perini, R., 1975. La necropoli di Romagnano – Loc III e IV. Le tombe all'inizio dell'età del Bronzo nella regione Sudalpina Centroorientale. *Preistoria Alpina*, 11, pp. 295-315 [reprinted 2004, In: *Scritti di archeologia, I parte*. Trento: Provincia autonoma di Trento, Soprintendenza per i beni archeologici, pp. 587-607].
- Perini, R., 1978. *2000 anni di vita sui Montesi di Serso*. Trento: Provincia Autonoma di Trento, Assessorato alle Attività culturali.
- Perini, R., 1987. *Scavi archeologici nella zona palafitticola di Fiavé-Carera. Parte II. Campagne 1969-76: Resti della cultura materiale: metallo – osso – litica – legno*.

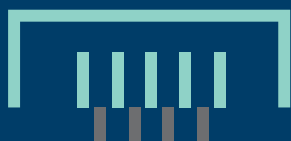
- Patrimonio storico e artistico del Trentino 9. Trento: Provincia Autonoma di Trento, Servizio Beni Culturali.
- Perini, R., 1989. Testimonianze di attività metallurgica dall'Eneolitico alle fasi finali dell'Età del Bronzo nel Trentino. In: *Per Giuseppe Šebesta: scritti e nota bio-bibliografica per il settantesimo compleanno*. Trento: Biblioteca Comunale di Trento, Comune di Trento, pp. 377-404 [reprinted 2004, In: *Scritti di archeologia, II parte*. Trento: Provincia autonoma di Trento, Soprintendenza per i beni archeologici, pp. 1115-1120].
- Perini, R., 1992. Evidence of metallurgical activity in Trentino from Chalcolithic times to the end of the Bronze Age. In: E. Antonacci Sanpaolo, ed., *Archeometallurgia. Ricerche e prospettive, Atti del colloquio internazionale di Archeometallurgia, Bologna-Dozza Imolese, 18-21 ottobre 1988*. Bologna: Cooperativa Libreria Universitaria Editrice, pp. 53-80 [reprinted 2004, In: *Scritti di archeologia, II parte*. Trento: Provincia autonoma di Trento, Soprintendenza per i beni archeologici, pp. 1121-1146].
- Poggiani Keller, R., 2000. Lovere (Bergamo): una sequenza stratigrafica esemplare dal Neolitico Antico al Bronzo Finale in area prealpina, *Rivista di Scienze Preistoriche*, 50, pp. 297-374.
- Preuschen, E., 1973. Estrazione mineraria dell'età del bronzo nel Trentino. *Preistoria Alpina*, 9, pp. 113-150.
- Rageth, J., 1974. Der Lago di Ledro im Trentino und seine Beziehungen zu den alpinen und mittel-europäischen Kulturen. *Bericht der Römisch-Germanischen Kommission*, 55, pp. 73-259.
- Reimer, P.J., Austin, W.E.N., Bard, E., Bayliss, A., Blackwell, P.G., Bronk Ramsey, C., Butzin, M., Cheng, H., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Hajdas, I., Heaton, T.J., Hogg, A.G., Hughen, K.A., Kromer, B., Manning, S.W., Muscheler, R., Palmer, J.G., Pearson, C., van der Plicht, J., Reimer, R.W., Richards, D.A., Scott, E.M., Southon, J.R., Turney, C.S.M., Wacker, L., Adolphi, F., Büntgen, U., Capano, M., Fahrni, S.M., Fogtmann-Schulz, A., Friedrich, R., P Köhler, K., Kudsk, S., Miyake, F., Olsen, J., Reinig, F., Sakamoto, M., A., Sookdeo, Talamo, S., 2020. The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0-55 cal kBP). *Radiocarbon*, 62(4), pp. 725-757.
- Tecchiati, U., 2013. Luoghi di culto, sepolture e sepolcreti dell'età del Rame dell'area atesina. In: R.C. de Marinis, ed., *L'età del Rame: la pianura padana e le Alpi al tempo di Ötzi*. Roccafranca (BS): La Compagnia della Stampa Massetti Rodella editori, pp. 457-480.
- Whitehouse, R., 1992. *Underground religion: cult and culture in prehistoric Italy*. Specialist Studies on Italy 1. Accordia Research Centre, London.

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metallum, i, n:
Mine (often pl.)
Metal, also stone, mineral

μεταλλον, το:
Mine, shaft, gallery;
esp. a) Mine (usually pl.)
b) Quarry



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