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Articolo

The use of radiographic techniques to support typological studies of iron finds

Part two: Lovere knives¹

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Key words

- Lovere, Valcamonica
- Late Iron Age
- Roman Age
- X-Ray
- iron knives

Parole chiave

- Lovere
- Valcamonica
- tarda età del Ferro
- età romana
- radiografie
- coltelli in ferro

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Summary

Parts or complete iron knives of Lovere type² (1st and the 2nd century AD)³ were subjected to X-ray examinations as made for the knife from Introbio (Roncoroni 2013: 301-307) in order to better define the shape of the blade, the characteristics of the sheaths and to verify the presence of decorations. These analyses permitted to find on two of the sheaths the presence of a decoration, identified on two other knives of the same type: one from Ascona (CH – Cantone Ticino), in a closed and dating find, and another one from Carvanno (BS), that is an isolated find. The decoration is a spoked wheel on the front of the sheath and in one of the knives from Lovere it was no recognisable by eye.

Riassunto

Parti di coltelli o coltelli interi in ferro del tipo Lovere⁴ (I e II secolo d.C.)⁵, come si è proceduto per il coltello di Introbio già edito (Roncoroni 2013: 301-307), sono stati sottoposti ad esami radiografici. Ciò è stato fatto per comprendere la forma della lama, analizzare la tecnica di produzione del fodero e verificare l'esistenza di decorazioni. Tali analisi hanno mostrato su due foderi la presenza di una decorazione già nota su due esemplari dello stesso tipo, l'uno proveniente dalla necropoli di Ascona (CH - Canton Ticino), l'altro da Carvanno in Val Degagna (BS). Si tratta di ruote raggriate poste sulla parte frontale del fodero, la cui presenza in un caso era del tutto insospettabile a occhio nudo.

1 The knives from Lovere are the property of the Civic Archaeological Museum of Milan, while the one from Capo di Ponte is the property of the State. Graphic and photographic documentation, and publication have the permission of the Civic Museum for the first finds and of the Soprintendenza per i Beni Archeologici (today Soprintendenza ABAP CO-LC) della Lombardia for the latter. The X-ray analysis was permitted by the Ministero per i Beni, le Attività Culturali e il Turismo – Soprintendenza per i Beni Archeologici della Lombardia (today Soprintendenza ABAP CO-LC).

2 Figg. 1-5; Figg. 11, 13, 15-17

3 For dating see Roncoroni 2012

4 Figg. 1-5; Figg. 11, 13, 15-17

5 Per la datazione si veda Roncoroni 2012

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1. Introduction

This is the second part of the uses of radiographic techniques in typological studies of iron finds. The first study described the classification of iron knife finds from Introbio, Coccaglio (BS) and Casalromano (MN)⁶. Furthermore, the radiographic technique showed that in the Introbio knife the shape of the blade underneath the front quillon was hardly altered by the restoration made in 1979¹.

The classification and study of these finds was begun in the eighties by M. Tizzoni (1984) and continued by A.E. Fossati (1989). But unlike the Introbio type, the Lovere knife, even though widely spread in Valcamonica as a real object, seems to be represented in just a couple of rock engravings. Despite the number of publications that mention this kind of object, distinction is rarely made between the Introbio and Lovere types and usually the names are used as synonymous. Sometimes the engravings, that clearly represent the more ancient type with sheathes characterised by a tip that is reminiscent of an animal's tail (Fossati 1989; Roncoroni 2011: 207, note 47) are recognised as Lovere type with a very big approximation in the methodology.

2. The Lovere type knife: general description

This kind of knife has a large complete tang, flat, with a rectangular section and often with curving upwards sides, so that it is likely that the tang was visible in the sides of the handle. Moreover it is curved, and in the complete finds (A.20993 from Lovere – Fig. 2; A.58933.17a from Ascona – CH – Fig. 6; St50333 from Borno – BS, Valcamonica – Fig. 7) the shape is very closed, like the handle of Italic *kopides*, and encircling around the hand. The proximal part resembles a horse head. The very sinuous blade has a concave-convex back and the tip curves higher than the spine, the front quillon is very prominent, and the edge of the blade has a large concavity underneath the front quillon. The handle is covered by two scales in organic material (wood, bone or horn), as is possible to see on the tang of the knife from Ascona where some wood fibres are present. The rivets are not standard in the number and they have an L position. They were probably not in iron but in a copper alloy, as suggested by an XRF analysis made by Vera Hubert in the Laboratories of the Collection Centre of the Swiss National Museum in Affoltern am Albis (Zürich) on the knife from Ascona (Hubert in Carlevaro & Roncoroni 2014: 156-157). The front quillon is decorated and strengthened with an iron plate.

The sheath, when preserved, has a tip with a plastic ring, it is closed at the front and open at the back with a triangular window. The back is closed in the proximal part by the superimposition of two tongues of an iron plate, fixed by a rivet, and in the lower part the edges are just drawn into each other. The window was closed with a wooden plate. We can say the sheath was lined with wood from comparison with the more ancient Introbio knife (Roncoroni 2013: 303), and also with the Ascona one that conserves a lot of mineralized wooden fibres inside (Fig. 8; Carlevaro & Roncoroni 2014: 153). Furthermore, some other alpine knives conserved the lining. The front side has an iron triangular loop to hang the knife to the belt, and it is decorated above and below in relation to the loop by linear transversal incisions. In some cases traces of copper oxides on them could be derived from contact with bronze objects in the grave. The sheaths of all the knives can be considered anatomic, as in the Introbio type. In fact, when the

knife is still inside the sheath it is not possible to draw it, meaning that they were made as cognates. It is also reasonable to suppose that the working plan consisted of modelling two wooden plates little bigger than the blade and then folding up the iron sheath, first flat, all around the blade with its lining. Just a rivet was used to strengthen the completed sheath.

As mentioned before, the decoration on the Ascona knife is a wheel (Fig. 9) with originally eight spokes (now seven), a round a hub in the middle and two concentric circles on the outside (Donati et al. 1987: 65-67, 112, 114, 153). The wheel was made with the inlay technique², and the material used was originally recognized from the group of Donati as brass. As there was no documentation about analyses on the metal, new analyses were made and they seemed to confirm the first hypothesis (Hubert in Carlevaro & Roncoroni 2014: 156-157). If usually inlays can be also in silver, the colour contrast between brass and iron was sure more clear.

3. Methods

The methods used have been described earlier (Roncoroni 2013). The knives were photographed with a Canon 5D Mark II, to produce a photographic documentation and then they were X-rayed using a portable X-ray generator (CP120B of the ICM s.a) and phosphorus plates (50 µm). The exposure time for each knife was 30 seconds with 80 kV, 1.5 mA, and each plate was scanned with a Durr product and processed with a CR (Computer Radiography) – System / W000153, producing high-resolution - 16 bit digital images, (Radelet 2013; www.duerr-ndt.de; www.icmray.com). The knives were radiographed in a horizontal position, and the analysis were realized by Thierry Radelet.

4. Results and discussion

The X-ray analysis shows the shape and the state of conservation of the blades of the knife from Capo di Ponte, locality Le Sante (Fig. 1), and from two knives from Lovere (A.20993 and A.20994), still inside of their sheaths (Fig. 2, 3). The blades are visible for the most part but the sheath of each covers some points. So the vision is now the best one and it shows some little lacks of the blades, all characterized by a very sinuous shape (Fig. 11, 15, 16). Moreover there were the hope and the suspect of the presence of traces of inlays on the sheaths.

The Capo di Ponte knife is not well conserved, and at first sight the presence of a wheel on the sheath is quite clear (Fig. 10). It is a sort of shadow because the decay of the iron is very deep and the iron oxides very thick. At this point it was interesting to see if the metallic inlays were still present underneath the corrosion. Brass or silver, used in the inlay technique, are usually well conserved in comparison to iron, so in the X-ray images they are readily visible.

The images of the sheath of Capo di Ponte show just a pale shadow of the wheel, visible more clearly using a graphic editing program (Fig. 12). After little the shade appears clearer but not light as first imagined.

It is possible to see a part of a wheel with some spokes and a round hub, and all around the first external circle a continuous zigzag is present, probably in origin included in a more external circle.

1 Formica's report of restoration, placed at disposal by Michela Ruffa, curator of the Museum of Lecco.

2 The word damascening is generally used to define this technique, but the term is misleading, because it has no connection with the real damascening that is a peculiar technique of iron forging (Maryon 1954, p. 151).

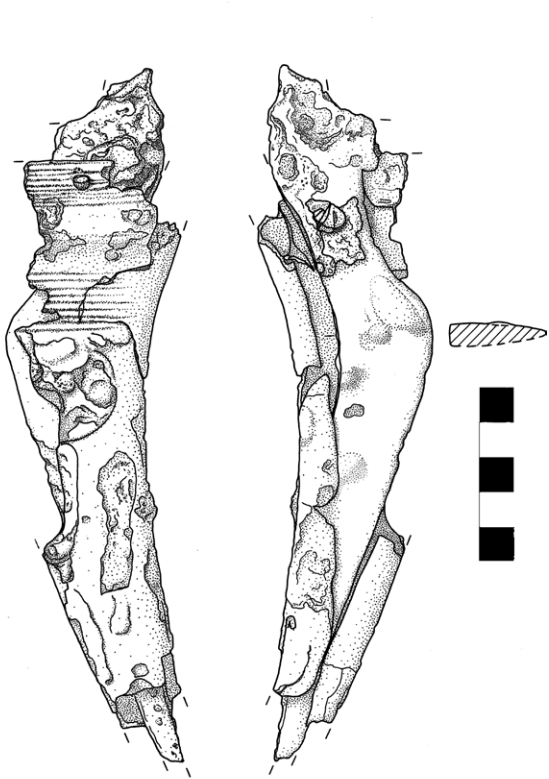


Fig. 1 - Knife from Capo di Ponte (BS), (drawing F. Roncoroni). / Coltello da Capo di Ponte (BS), (disegno F. Roncoroni).

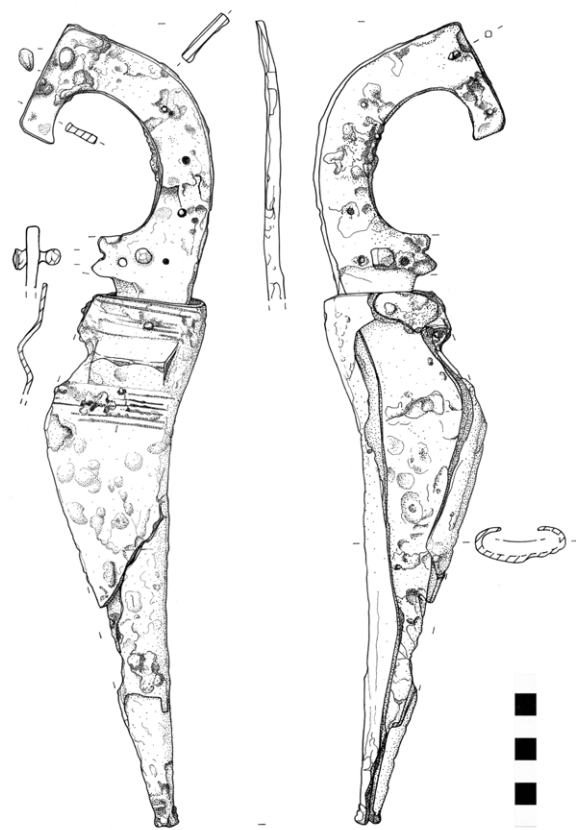


Fig. 2 - Knife inside its sheath from Lovere (BG), Civic Archaeological Museum in Milan, A.20993 (drawing F. Roncoroni). / Coltello all'interno del suo fodero da Lovere (BG), Museo Archeologico di Milano, A.20993 (disegno F. Roncoroni).

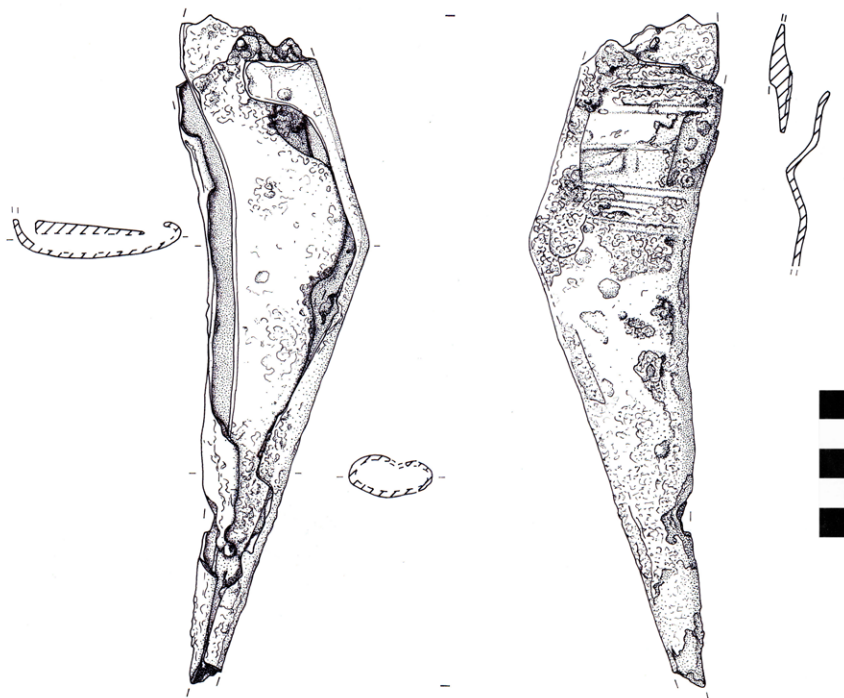


Fig. 3 - Fragment of a knife inside its sheath from Lovere (BG), Civic Archaeological Museum in Milan, A.20994 (drawing F. Roncoroni). / Coltello frammentario all'interno del suo fodero da Lovere (BG), Museo Archeologico di Milano, A. 20994 (disegno F. Roncoroni).



Fig. 4 - Knife and its sheath from Lovere (BG), Civic Archaeological Museum in Milan, A.20992, a-b (drawings F. Roncoroni). / Coltello e suo fodero da Lovere (BG), Museo Archeologico di Milano, A. 20992, a-b (disegni F. Roncoroni).

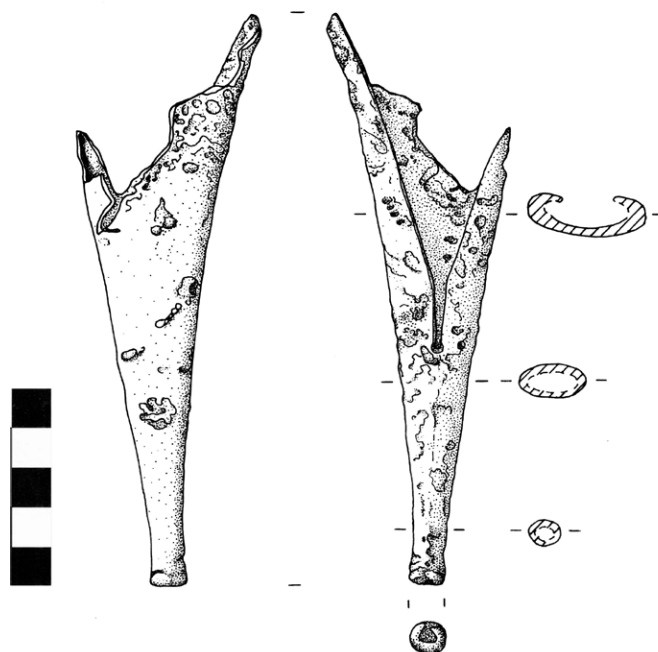


Fig. 5 - Tip of the sheath of knife from Lovere (BG), Civic Archaeological Museum in Milan, A.2905 (drawing F. Roncoroni). / Puntale di un fodero di coltello da Lovere (BG), Museo Archeologico di Milano, A.2905 (disegno F. Roncoroni).

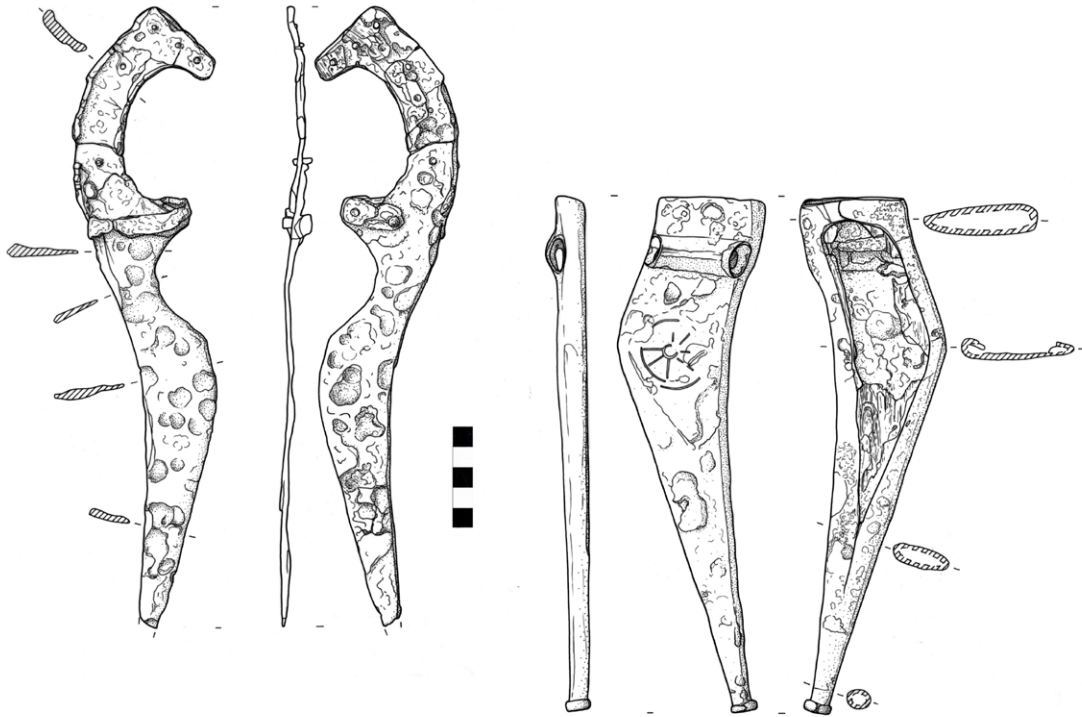


Fig. 6 - Knife and sheath from Ascona (CH), t. S 17, Schweizerisches Nationalmuseum, Zürich, A-58933.17a/b (drawings F. Roncoroni). / Coltello e fodero da Ascona, t. S 17, Schweizerisches Nationalmuseum, Zurigo, A-58933.17a/b (disegni F. Roncoroni).



Fig. 7 - Knife and its sheath from Borno (BS), t. 11, Archaeological National Museum of Valle Camonica, Cividate Camuno (BS), St50333 (drawings F. Roncoroni). / Coltello e suo fodero dalla t. 11 di Borno (BS), Museo Archeologico Nazionale della Valle Camonica, Cividate Camuno (BS), St50333 (disegno F. Roncoroni).



Fig. 8 - Detail of the wood lining of the sheath from Ascona (photo Swiss National Museum). / Dettaglio del rivestimento interno in legno del fodero di Ascona (fotografia Museo Nazionale Svizzero).



Fig. 9 - Detail of the brass enlay of the sheath from Ascona (photo Swiss National Museum). / Particolare dell'agemina in ottone del fodero da Ascona (fotografia Museo Nazionale Svizzero).



Fig. 10 - Detail of the wheel recognisable by eye on the sheath of Capo di Ponte (photo F. Roncoroni). / Dettaglio della ruota sul fodero di Capo di Ponte così come visibile a occhio nudo (fotografia F. Roncoroni).



Fig. 11 - Radiography of the knife from Capo di Ponte (Th. Radelet). / Radiografia del coltello di Capo di Ponte (Th. Radelet).

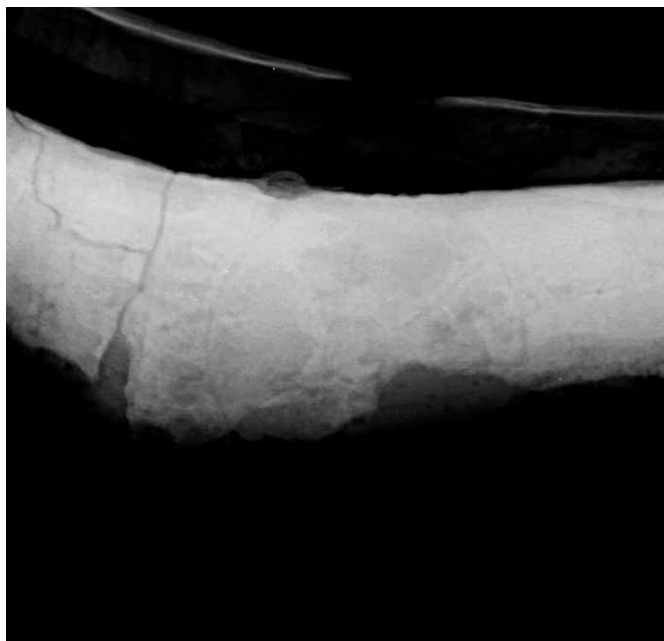


Fig. 12 - Detail of the engraving of the knife from Capo di Ponte (radiography Th. Radelet). / Particolare dell'incisione del coltello di Capo di Ponte (radiografia Th. Radelet).

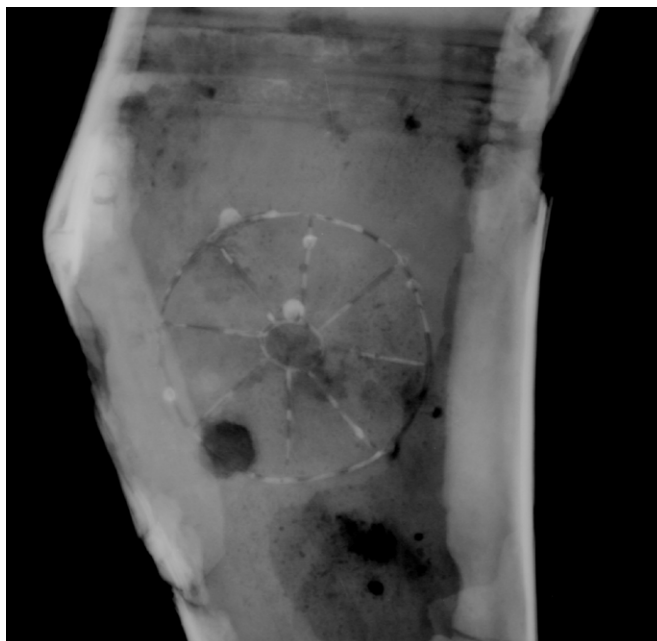


Fig. 14 - Detail of the enlay of the knife A.20992b from Lovere (radiography Th. Radelet) / Particolare dell'agemina del coltello A.20992b da Lovere (radiografia Th. Radelet).



Fig. 13 - Radiography of the sheath A.20992b of a knife from Lovere (Th. Radelet). / Radiografia del fodero A.20992b di un coltello da Lovere (Th. Radelet).



Fig. 15 - Radiography of the knife A.20993 inside its sheath from Lovere (Th. Radelet). / Radiografia del coltello A.20993 all'interno del suo fodero da Lovere (Th. Radelet).



Fig. 16 - Radiography of the knife A.20994 from Lovere (Th. Radelet). / Radiografia del coltello A.20794 da Lovere (Th. Radelet).



Fig. 17 - Radiography of the tip A.2905 of the sheath of knife from Lovere (Th. Radelet). / Radiografia del puntale A.2905 di un fodero di coltello da Lovere (Th. Radelet).

The colour of the wheel is not clear, as expected, but is just a thin grey line. Two hypothesis are possible: the first is that these are just the original lines prepared by chasing to put in place the brass. As this knife was found in an *ustrinum* or *Brandhopperplatz* (Anati et al. 1976; Solano 2008: 187-188), it was quite certainly put in the fire. Remembering that the point of fusion of brass is lower than that of iron, it is possible that the metallic inlays were lost. The second hypothesis is that the wheel was just made by chasing or engraving like the more ancient bronze sheaths. Now we are informed that another sheath of Lovere type was found some years ago near Carvanno in Val Degagna, a secondary valley of Val Sabbia (BG)³. This sheath, under study but unpublished, has a wheel made by chasing, without inlay (the find was not seen and the description is based just on an oral communication).

The decoration of the sheath of the knife from Le Sante – Capo di Ponte is very interesting, as it is not a simple wheel but it is a solar wheel.

The knife is small and similar in size to the smallest one from Borno (Roncoroni 2011: 228, Fig. 5), that is part of a work equipment in a grave of the late 1st century - 2nd century AD (grave n. 11 in Jorio 1999: 237), but bigger in comparison with the one from Terlago

(TN), that unfortunately was found with the metal detector by an enthusiast (Marzatico 1988: 88, Fig. 6,8).

Today no X-ray analyses have been made on the two knives from Borno (BS) and neither on the sheath from Terlago (TN), because they seemed hardly restored.

The sheath of the Lovere knife A.20992 b (Fig. 4) has a sort of iron bubble on the surface, but it is altogether well preserved and it has no indications of decay like iron oxides. The X-ray examinations showed exactly under this sort of bubble a well defined and clear wheel composed of a large circle around, eight spokes, and a round hub in the middle (Figg. 13, 14). The find was never restored and its stable situation advises against touching it. So at the moment it is not possible to know the material of the inlay, but it is very likely brass.

5. Conclusions

In conclusion it is clear that X-ray analyses have shown part of the blades covered by their sheath and in particular some inlay works invisible from a simple observation. At first the Ascona knife was considered a *unicum*, for its decoration, but now it is clear that this is not the case. Just during the study I knew of the existence of the knife from Carvanno (BS).

The analyses have shown a very well preserved wheel on a sheath from Lovere and another, visible but not so clear, on the Capo

3 Kindly information from Mr Gabriele Bocchio, Associazione Museo Gruppo Grotte Gavardo.

di Ponte knife, both coming from Valcamonica, where the Lovere type is undoubtedly more diffused. In fact we know four knives and the tip of a sheath from Lovere, two knives from Borno, one from Capo di Ponte and a miniature one from Cividate Camuno (Roncoroni 2011: 229, Fig. 8). We have also one from Carvanno (BS) and one from Terlago (TN). Ten items are from central Alps and just one is from western Alps, that is the one from Ascona. So the Lovere type, derived from Introbio type, was probably produced in Valcamonica or nearby.

The presence of the wheel on sheaths is common, not only in Roman Age (for example, on *pugiones*) but also in more ancient periods. It is known in La Tène culture, on sheaths or scabbards, and it is usually connected with the sun or lightning. The zigzag all around the wheel on the sheath of the Capo di Ponte knife seems to be a solar disc. Anyhow it is a symbol of power and strength and during the 1st and 2nd century AD it probably had a transcultural meaning. This idea could be supported by one engraving in Valcamonica, in Dos del Mirichì, not far from Bedolina (Capo di Ponte - BS). It was published the first time by Anati (1989: 336, Fig. 358; after in Fossati 1991: 58) and shows a three-headed man that has in his left hand (he has just one hand) a knife that seems of Lovere type. The style of the figure is clearly late (style IV 5 of Fossati, II sec. AD - I sec. BC).

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