THE COPPER AGE IN NORTHERN ITALY

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ABSTRACT. During the period between the IVth and IIIrd millennia BC, profound changes for the ancient populations inhabiting the northern region of Italy occurred. The first Indo-European migrations were altering the ethnographic characteristics and, with the production of the first copper artifacts, the Neolithic Age was drawing to an end. The most significant testimony of that dramatic period is unquestionably the Ötztal iceman. In addition, many other valuable archaeological sites, such as Alba (Cuneo, Italy), have been discovered. Although Alba produced the oldest evidence of copper objects in a Neolithic context (5380 ± 40 BP; GX-25859-AMS), more recent discoveries have underlined the importance of this archaeological site. In this paper we will report on a series of radiocarbon measurements of bone remnants which, combined with morphologic, stratigraphic, paleoanthropologic, and paleopathologic studies, have allowed us to gain new insights into the culture and chronology of the European Copper Age.

INTRODUCTION

Alba is located 50 km southeast of Turin (Italy) and is one of the most important prehistorical sites in northern Italy. Due to its strategic location along the Tanaro river, which was used for transportation, Alba was continuously inhabited from the early Neolithic (6th millennium BC) until the late Bronze Age (12th–10th century BC). Although no remains from the Iron Age have been discovered yet, it is believed that Alba was still inhabited during that period. In fact, the use of the name Alba for the Roman town of Alba Pompeia located farther north—the pre-roman root *alb* means higher place or capital—can be explained only with the existence of dwellings during the Iron Age which preceded the foundation of the Roman colony.

Alba became famous at the beginning of the 20th century when a collection of polished green stone artifacts was retrieved (Gambari et al. 1992). This collection, the largest of its kind, is now displayed at the Pigorini museum in Rome. During the last 20 years, the preservation activities of the *Soprintendenza Archeologica del Piemonte* led to a systematic survey of all construction sites. This allowed the discovery and the documentation of numerous structures belonging to different ages ranging from the Neolithic to the Copper and Bronze Age (Ventutino Gambari et al. 1995; Venturino Gambari 1998). In particular, bone remnants recently discovered in different graves and burial structures have provided a valuable contribution to anthropological, paleopathological and paleonutritional studies (Fulcheri and Micheletti Cremasco 1998).

The reorganization of the archaeological section of the civic museum of Alba, which reopened in September 2001, was the incentive to further deepen the understanding of the prehistorical context of the whole region. In particular, being able to analyze human samples spanning a period of a few millennia but originating from the same confined geographical area is a great opportunity for gaining specific anthropological information. Radiocarbon dating is necessary to assign an absolute chronology to the relative sequence of cultural horizons and to connect the events in Alba to the interregional macrophenomena such as the introduction of monumental tombs, the spreading of metallurgy, and changes in the social organization.

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SAMPLE SELECTION

Along Corso Europa (Figure 1), the main road of Alba, many archaeological vestiges have been unearthed (Venturino Gambari et al. 1999). Of particular interest is the *Papillon* site where an unusual monumental collective burial structure was discovered (Figure 2). The bones from at least 10 individuals (4 adults and 6 children) were clearly mixed together. A few anatomical elements, in particular the usually best-preserved long bones, were missing. This suggests that the structure was in fact a sanctuary for the veneration of the ancestors and not a simple burial site. The tomb was previously accessed from the southwest corner (Figure 2) and, apart from minute copper fragments, nothing remains from the original garments. From this site two samples have been collected: OZE027 (skull) and OZE028 (tibia with a rare pathological lesion due to a fungus).

Another interesting location is *Le Ginestre* (Figure 3) where the skeleton of a young adult was buried with the legs folded at an angle of approximately 90° with respect to the pelvis. Between the ribs, at the presumable resting position of the right hand, a spiral silver ring was found. On the left side of the body, above the shoulder, a copper knife bearing the traces of a dark brown organic substance, probably a leather sheath, was recovered. Also from this site two samples were collected for ^{14}C measurement: OZE031 (skull) and OZE577 (tibia).

All collected samples (see Table 1) were ^{14}C dated at the accelerator mass spectrometry (AMS) facility at ANSTO (Sydney, Australia; Lawson et al. 2000).

RADIOCARBON DATING

Macroscopic contaminants attached to the bone samples, such as soil, sediment, vegetation, and rootlets, were removed using a scalpel. Samples were then cleaned in a sonic bath, freeze-dried and crushed to powder (particle size ~200 μm) using pestle and mortar. All samples were then treated with 0.5M HCl at room temperature for 5 hr to eliminate the inorganic bone component. Humic acids were removed using 0.5% NaOH at room temperature for 1 hr. At last, to extract the collagen, all samples were refluxed in 0.01M HCl at 60 °C for 16 hr. The resulting solutions were then filtered to remove insoluble residues and freeze-dried for 2–3 days before being used for dating.

A small part of the extracted collagen was put aside for C/N and $\delta^{13}C$ determination using a stable isotope mass spectrometer. According to Ambrose (1990), well-preserved terrestrial bone samples are characterized by a C/N ratio between 2.9 and 3.6, and $\delta^{13}C$ value of ~20‰ PDB. For values slightly outside these limits, ^{14}C dating is still possible but the measured ages will have to be cautiously utilized. The collagen of samples suitable for ^{14}C analysis was converted to CO_2 by combustion at 900 °C for 5 hr in a sealed tube in the presence of pre-cleaned CuO and Ag wires. Graphite targets were prepared by reducing CO_2 using zinc (400 °C) and iron (600 °C) catalysts in the presence of a small amount of hydrogen. This reaction lasted for 6–10 hr. The technical details of these methods are described in Hua et al. (2001).

The $^{14}C/^{13}C$ isotopic ratio was measured relative to the internationally accepted HOxI standard material (Stuiver 1983). Corrections were then applied for the spectrometer background, for the contamination introduced in the preparation of the graphite target, and for the isotopic fractionation. Using the corrected radioisotopic ratio, the conventional ^{14}C age was calculated and finally calibrated using the CALIB v4.0 software (Stuiver and Reimer 1993) and the tree ring data set of Stuiver et al. (1998). Results of the ^{14}C dating, including C/N and $\delta^{13}C$ determination, are listed in Table 2.

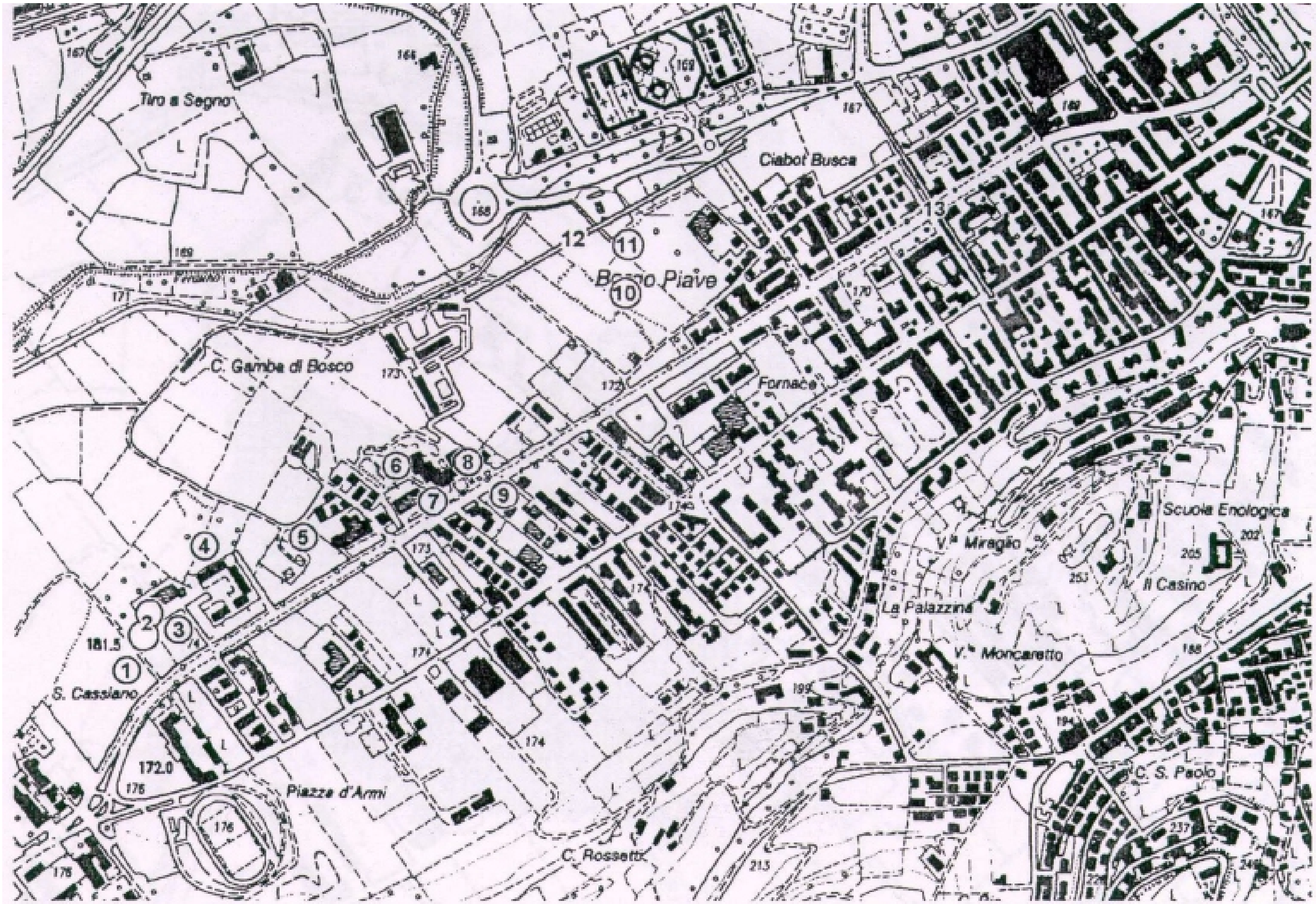

Figure 1 The plan of the town of Alba showing the location of the archaeological sites along Corso Europa

Figure 2 The monumental structure discovered at the *Papillon* site. The damage caused by previous access through the southwest corner is clearly visible.

Figure 3 The skeleton discovered at the *Le Ginestre* site. For additional information see the text.

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Table 1 The samples collected for ^{14}C dating

ANSTO code	Site ([a])	Sample description
OZE027	Papillon (9)	Skull
OZE028	Papillon (9)	Tibia
OZE029	L'Oasi (1)	Indeterminate fraction
OZE030	Via Bubbio (11)	Scapula
OZE031	Ginestre (10)	Skull
OZE032	San Cassiano	Skull
OZE033	Mokafè	Diaphysis of inferior limb
OZE034	Mokafè	Diaphysis of inferior limb
OZE035	Fossano	Humerus
OZE036	Borgo Moretta	Femur
OZE577	Ginestre (10)	Tibia

[a]The number in parenthesis refers to the map displayed in Figure 1

DISCUSSION

In the following, based on the calibrated ages presented in Table 2, we attempt to illustrate some particular episodes, which shaped the ethnographic characteristics of the Alba region through the millennia. Please note that, especially when not supported by independent evidences, our hypotheses will be mere suggestions of possible cultural changes and their causes.

During the Mesolithic period (X–VII millennia BC), it is believed that the Piedmont region, the northern region of Italy comprising Alba, was only occasionally visited by different ethnic groups (Guerreschi 1998). Although no relevant archaeological structures from the Mesolithic were discovered, our dates for OZE032 and OZE033 suggest that Alba was indeed already frequented.

Table 2 The 1-σ calibrated age ranges of all the samples collected in Alba. The table also shows the C/N and $\delta^{13}C$ values.

ANSTO code	Description	C/N	$\delta^{13}C$ (PDB)	Conventional age	1σ cal age ranges	Relative probability
OZE027	Papillon	2.9	–21.0‰	4762 ± 53 BP	3638–3518 BC	100.0%
OZE028	Papillon	3.2	–21.3‰	4583 ± 62 BP	3499–3455 BC 3378–3314 BC 3229–3104 BC	21.2% 32.5% 46.3%
OZE029	L'Oasi	6.6	–21.7‰	3012 ± 47 BP	1370–1342 BC 1316–1192 BC 1139–1133 BC	14.7% 79.5% 5.8%
OZE030	Via Bubbio	4.1	–22.9‰	Too small sample		
OZE031	Ginestre	3.2	–20.3‰	Too small sample		
OZE032	San Cassiano	3.5	–21.4‰	9742 ± 49 BP	9253–9178 BC	100.00%
OZE033	Mokafè	3.6	–21.7‰	7091 ± 45 BP	6008–5969 BC 5953–5904 BC	42.4% 57.6%
OZE034	Mokafè	19.0	–24.9%	Not suitable for ^{14}C analysis		
OZE035	Fossano	5.0	–19.2‰	3820 ± 45 BP	2392–2390 BC 2338–2198 BC 2160–2150 BC	2.2% 93.0% 4.8%
OZE036	Borgo Moretta	3.5	–21.7‰	3346 ± 33 BP	1685–1604 BC 1556–1538 BC	84.3% 15.7%
OZE577	Ginestre	4.0	–20.8‰	3728 ± 29 BP	2196–2165 BC 2145–2125 BC 2085–2041 BC	34.7% 20.1% 45.2%

The peculiar monumental structure of the *Papillon* site and the collective interment situation, including the combination of different individuals and the presence of children, are signs of a fundamental cultural change. The dated samples (OZE027 and OZE028) show that this change occurred at the early stages of the Copper Age (mid IV millennium BC) in direct correlation with the first Indo-European migrations in the north Italian territory.

The calibrated age for sample OZE577 from *Le Ginestre* indicates a Bronze Age origin. However, the position of the body and the presence of objects such as the silver ring and the copper knife are reminiscent of the Copper Age. This supports the hypothesis that the passage from the Copper to the Bronze Age was a smooth process, probably induced by cross-cultural contacts with the well-known civilizations of the Rhone valley.

With sample OZE029 from the *Oasi* site, where a vase attributed to the middle Bronze Age (15th–14th century BC) was also discovered, additional important information was gained with respect to the change of the funeral customs from interment to cremation. It is believed that in Piedmont, this change took place during the first half of the 14th century BC. However, the dated sample shows that the interment was still in use during the 13th century BC. It is possible that for a certain period of time the two rites coexisted. Another hypothesis suggests that the change was induced by migrations and therefore was a relatively localized process, which took longer time to be completed on a regional scale.

CONCLUSION

Thanks to an extensive fieldwork and to a broad collaboration between different disciplines, we were able to provide a more reliable time scale to the cultural and ethnographic changes taking place during the Copper Age in northern Italy, specifically in the Alba region. In particular, it was possible to link changes of burial rituals to different cross-cultural contacts such as Indo-European migrations and interactions with neighbouring civilizations.

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