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The Beginning of Metallurgic Production and the Socioeconomic Transformations of the Sardinian Eneolithic

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Introduction (MGM)

Understanding dynamics of socioeconomic transformations which mark the transition from the Neolithic to the first Copper Age and the development of the Eneolithic in Sardinia requires an analysis of the cultural evolution of the Ozieri phenomenon across its main phases: the Ancient (San Ciriaco), the Middle (Su Tintirriolu), the Recent (Pranu Mutteddu?) and the final (Sub-Ozieri) one (Melis *et al*., 2007).

Especially between the recent phase and the final one, elements of innovations can be noticed. This will produce a gradual change in the Neolithic substrate even if settling strategies and funerary rituals appears to remain largely unchanged.

In terms of chronology this transition takes place in the centuries between the two halves of the IV millennium (cal. BC). However, radiocarbon data – still too few – show a lack of homogeneity between the North and the South of the island. An important element of innovation, which concerns religious ideology, is represented by the monument of Monte d'Accoddi (Sassari), built during the final phase

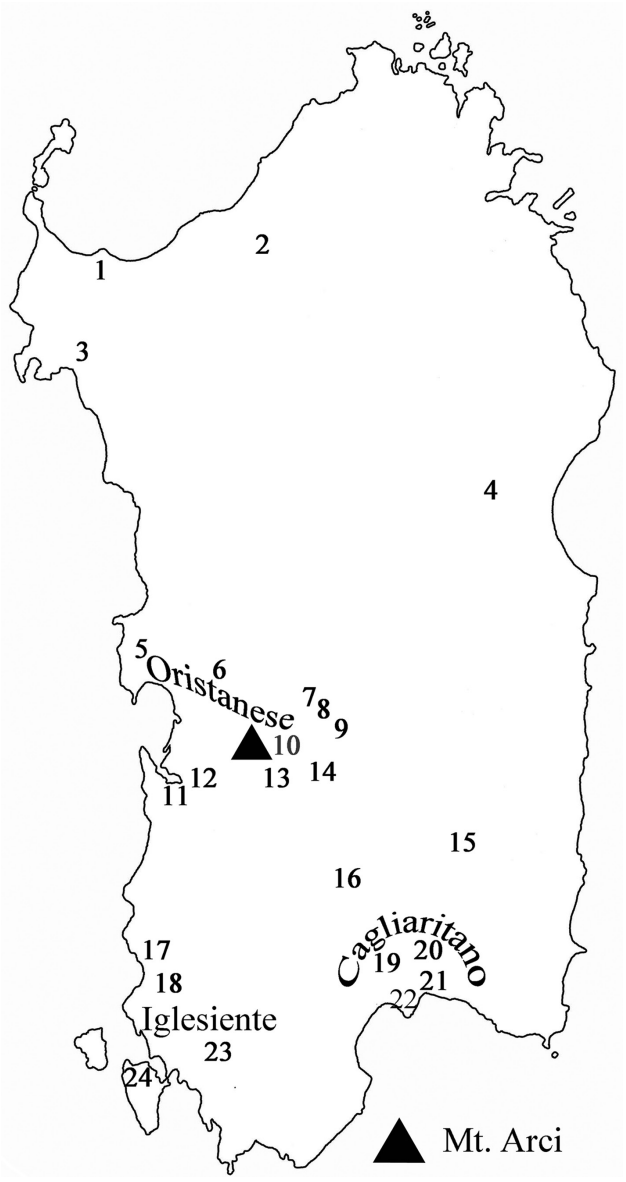

Figure 1: Map of distribution of the sites quoted in the text: 1, Monte d'Accoddi-Sassari; 2, Contraguda-Perfugas; 3, Anghelu Ruiu-Alghero; 4, Biriai-Oliena; 5, Isca Maiori-Riola Sardo; 6, Su Cungiau de Is Fundamentas–Simaxis; 7, Piscina' e Sali-Laconi; 8, Corte Noa-Laconi; 9, Tamadili-Laconi; 10, Bingia 'e Monti-Gonnostramatza; 11, San Giovanni-Terralba; 12, Murera-Terralba; 13, Enna Pruna-Mogoro; 14, Scaba 'e Arrius-Siddi; 15, Pranu Mutteddu-Goni; 16, Serra Cannigas-Villagreca; 17, San Benedetto-Iglesias; 18, Tanì–Iglesias; 19, Craviole Paderi-Sestu; 20, Is Calitas-Soleminis; 21, Su Coddu/Canelles-Selargius; 22, Capo Sant'Elia-Cagliari; 23, Cungiau Su Tuttui-Piscinas; 24, Campu Scià Maìn /Tupei-Calasetta.

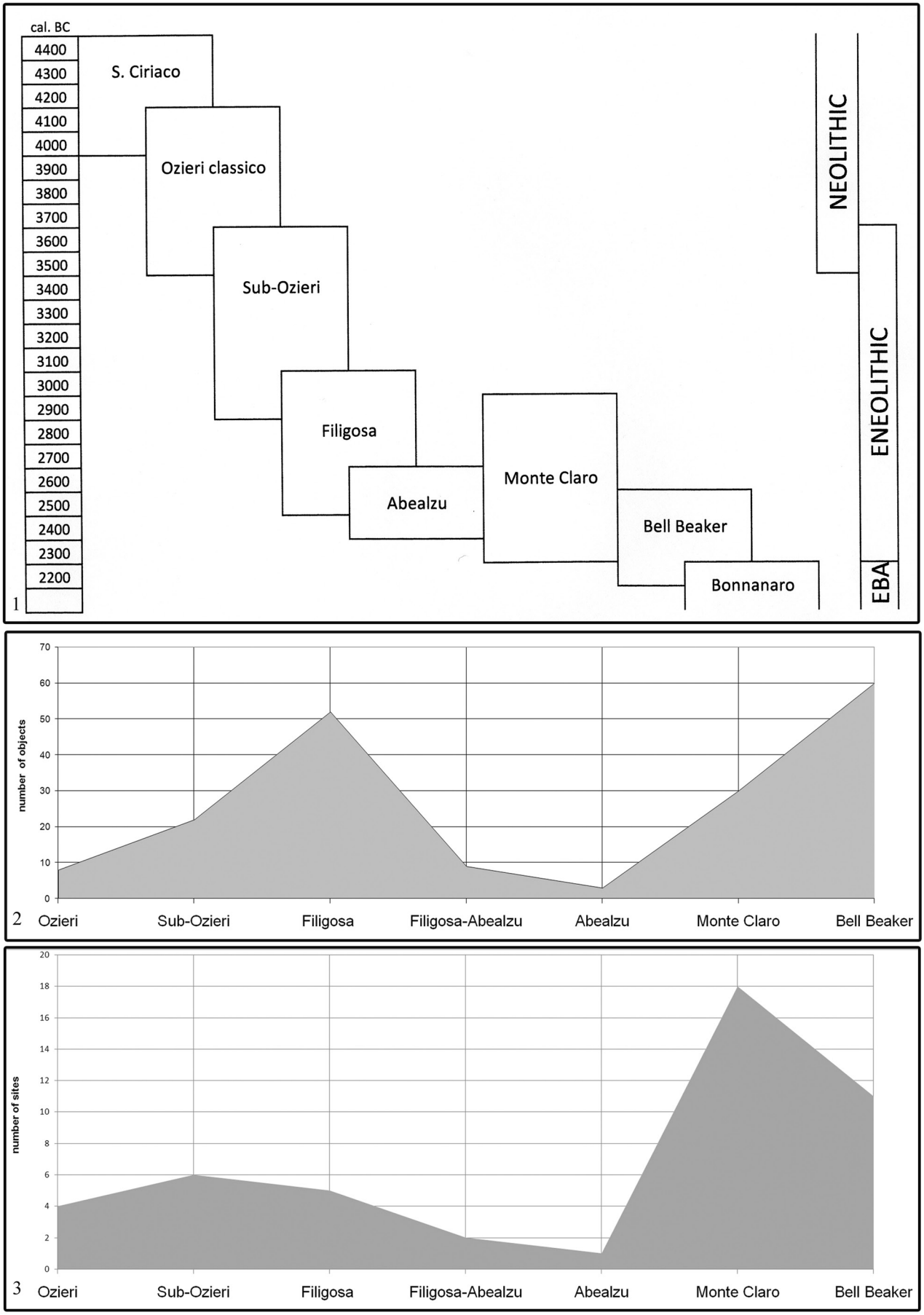

Figure 2: 1, Chronological table of Sardinian Late Neolithic and Eneolithic; 2, diffusion of metal tools in final Neolithic and Eneolithic; 3, distribution of sites with metal finds in Final Neolithic and Eneolithic.

of the Ozieri period on a previous place of worship and dwelling-site referred to the Ancient, Middle and Recent phases of the same culture. A gradual transformation of the socioeconomic organization of late Neolithic and a development of early Eneolithic are perceived thanks to morphological (Melis 2000), technological and functional analyses of craft production, with particular references to interactions among activities related to different raw materials (metals, stones, hard animal materials and pottery). In this sense an important contribution is offered by unpublished data from the excavations in the dwelling-site of Su Coddu-Canelles (Selargius) (Melis *et al*., 2007). There, an opportunistic production in lithic, ceramic and hard animal materials seems to have been adopted, as the following paragraphs will show in a more detailed way[1].

In the classical Ozieri period the objects are characterized by a low standard of technology, or by rough decorations.

It is amazing, for instance, the disappearance of rich decorations on pottery and, at the same time, the experimentation of a new technique peculiar of the Sub-Ozieri: the vase painting.

It is important to underline that such a change is not tied to the loss of a technical know-how, since it persists in such precious objects as *sub-figulina* pottery or bone beads. Other factors may have determined a change in the rhythms of life, thus reducing the time dedicated to the creation of objects and modifying the ways of raw materials procurement. This "opportunistic" aspect may depend on a new social organization with the rise of a specialized agriculture, as suggested in Selargius by different indirect elements (*eg*., village expansion, presence of *silos* and *dolia* for the food storage[2]). Does the beginning of metallurgy play any role in such a change?

Metal tools, made up of copper and silver; appear in the recent phase of the Ozieri period (Figure 3; Figure 4, 1). Like necklace beads as those of Pranu Mutteddu (Goni) (Figure 4,1a) and awls, among which an unpublished sample from Monte d'Accoddi (Figure 4, 1b).

The studies on the first metallurgic activities in Sardinia are still rather inadequate: even if on the whole the findings in the last few years have grown richer if compared to the pioneering work by Lo Schiavo (Lo Schiavo 1989) [3]. Metallurgic analyses are scanty, and only a few findings have been subdued to analyses to recognize

	Ozieri	*Sub-Ozieri*	*Filigosa*	*Filigosa-Abealzu*	*Abealzu*	*Monte Claro*	*Bell Beaker*
awls, pins	X	X	X		X	X	X
beads	X	X	X	X		X	X
axes		X	X			X	X
blades		X				X	
dagger blades		X	X			X	X
crucibles		X	X			X	
rings		X	X	X			X
bracelets			X				X
clamps of restoration						X	
tuyeres						X	?
arrowheads							X
necklace (*torques*)							X
mirrors							X

Figure 3: Metal items from the Sardinian Eneolithic

their components, melting techniques and origin of raw materials (Lo Schiavo *et al*., 2005).Therefore all valuations, conditioned by such a lack of investigation, will exclusively refer to numerical data and to the their original contexts.

First of all, it is important to underline that metal artefacts are equally distributed in living, religious and funerary contexts since their first appearance. During the transition to the Sub-Ozieri no change is recorded except for a strong increase of human presences in living contexts. In the subsequent phases of Eneolithic metal acquires a fundamental role in the composition of funerary equipments, sometimes substituting almost completely lithic artefacts. It seems therefore that during the first metallurgic phases (Ozieri and Sub-Ozieri) metal tools played a role in daily life but only in a second time they acquired the value of status symbols. The data from Su Coddu-Canelles support this hypothesis. That settlement gives us 12 metal objects related to the Sub-Ozieri phase (Figure 4, 2), but one object from an Ozieri hut. The finding of a crucible is the evidence of some kind of metallurgic activity *in situ* (Manunza 2005). Ugas identified some slags in Ozieri and Sub-Ozieri structures, although no chemical analysis have been carried out so far (Ugas *et al*., 1985),

[1] Our team, co-ordinated by the writer and made up of the authors of the present article, intends to apply a functional morpho-technonolgical approach to the study of crafts in the first phases of Sardinian Eneolithic, pointing out the role and the possible interaction among the activities. This is the first time that such a kind of approach is adopted in Sardinian prehistory.

[2] The great importance of agriculture in the early Copper Age compared with the Neolithic is moreover confirmed from anthropological analyses that underline a food diet based more on vegetables than on animal products (Lai *et al*., 2007).

[3] Neolithic and Eneolithic Sardinian artefacts listed there are about one hundred. Now 234 elements are known - also including objects that indicate metallurgic activities as crucibles and *tuyères* – 195 of which of a clear cultural attribution. Apart from published findings, some unpublished artefacts from Monte d'Accoddi and Su Coddu are included here. The findings considered are mainly from funerary contexts (77%), less frequently from dwelling-site (14%) and places of worship (9%).

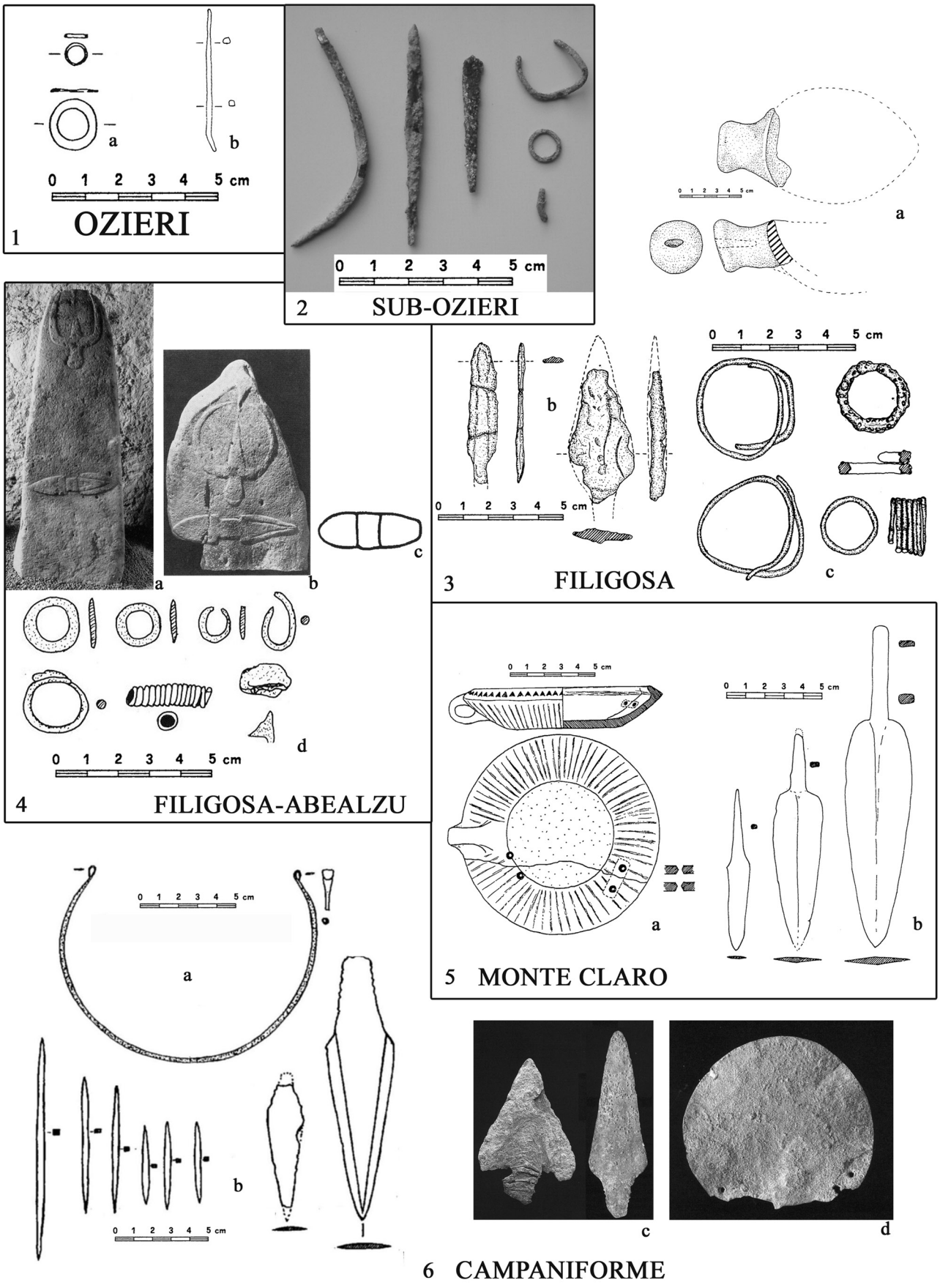

Figure 4: Metal items and indicators of metallurgical activity from different areas of Sardinia.

while the analysis of some slags from the sector of Canelles exclude a correlation metallurgic activities (Melis 2005)[4].

Awls without bone handles, which live together with bone point tools, are the best represented artefacts. Rare in the Filigosa, Abealzu and Monte Claro periods, they become particularly frequent in the Bell Beaker one (31 elements; Figure 4, 6b); in this case, too, they do not replace bone tools similar in shape, which continue to be used.

Daggers - which are present since the Sub-Ozieri, too – from the Filigosa period become an important element in funerary equipments and their symbolic value is mirrored in the so-called *statue menhir* (Figure 4, 4a-b). These ones show us handled daggers whose formal typology is quite homogeneous. Some authors interpret the element opposing the blade as another blade rather than as a knob-handle. As a matter of fact, the two parts are never equal in terms of dimensions and only in one of them a sort of 'V' is sometimes present, representing the flattening of the blade's margin[5]. As for the handle, which is particularly well defined in the *statua menhir* Piscina' e Sali I (Laconi) (Figure 4, 4a), we have no archaeological evidence. A third hypothesis is based on the idea of a portrayal of a metal dagger and a stone mutually opposed and bound to the same central handle (Atzeni 1998). In such a case a lithic object and its metal equivalent may play the same symbolic role. It is important to remember that several *statue menhir* from Laconi are to be connected with the grave of Corte Noa (Laconi), whose equipment is composed of ornamental metal objects, various excellently manufactured obsidian tanged arrowheads and no copper dagger (Figure 4, 4d; Figure 10, 4). On the contrary, in the equipment from Cungiau Su Tuttui (Piscinas) (Figure 4, 3b-c) – quite far from Monte Arci obsidian sources but not from the mineral sources of Iglesiente – five metal daggers are present. In some *statue menhir* there are some important represented objects like the one found in Tamadili (Laconi) where (Figure 4, 4c) – the stylized representation of the dagger evokes the shape of the statue itself. We find a similar example in Lunigiana. At Monte d'Accoddi the considerable presence of metal tools along with that of crucibles (Figure 4, 3a) and other objects referable to a metallurgic activity would suggest that metallurgy was particularly related to the sanctuary's rites, just like spinning and weaving. Moreover, three crucibles represent an important finding considering that in the rest of the island only a crucible from a village Monte Claro and another one from a Sub-Ozieri context are known.

The number of metal tools gradually increases during the Eneolithic, thus witnessing the increase of metallurgic activities that probably, yet slowly; influence the choice of dwelling-sites: as a matter of fact, between the ancient Eneolithic and the recent one a gradual decrease in site distances from the metallogenic areas is registered.

The graph at Figure 2, 2, showing the distribution of objects in each cultural phase, points out a particular concentration in the Filigosa and Bell Beaker ones; nevertheless, in the Filigosa this trend is conditioned by the extraordinary grave findings of Cungiau Su Tuttui (20 artefacts; Figure 4, 3b-c) and Serra Cannigas (Villagreca) (18 artefacts) (Usai 2000; Atzeni 1985). In fact, the curve related to the sites of findings (Figure 2, 3) shows a reduced quantity of locations in the first phase of Eneolithic and a larger distribution in the Monte Claro contexts. In this case the use of lead-clamps for the restoration of ceramic artefacts is recorded (Figure 4, 5a).

During the Bell Beaker phase the metallurgic production reaches its top, even if limited to funerary contexts (Figure 4, 6). Awls and daggers prevail, while the range of *parures* includes small amounts of metal objects as opposed to bone and stone made objects. However, it is exactly in the ornamental category of objects that gold appears for the first time (Figure 4, 6a): a golden and silvery torque comes from the rich grave goods from Bingia 'e Monti (Gonnostramatza) (Atzeni 1998a).

Pottery (SP)

In Sardinian prehistory the beginning of metallurgy is accompanied by a regression phase in the pottery production. These evidences may not necessarily be mutually related, but they both took place during the same period of social, economic and technological mutations. Just like the cycles of different raw materials, the activities put in motion inside a community, too, are not mutually independent: they may share technological advances or similar working procedures. The product and the waste products may be used in another process; the energy needed in one activity is inevitably detracted from another one; the efficacy of a new technology may take the place of an outdated one, etc…for these reasons it is essential to study them as a whole.

As for pottery, in Sardinia no technological study seems to have been systematically applied – not even at a macroscopic level − to any prehistoric artefacts (*i.e.*, on the one hand, the analysis of raw materials, of marks produced during moulding and finishing phases or due to the use of special tools during the working process and, on the other hand, analysis of the relationship between these aspects and vase forms destined to different functions).

As a consequence, little can be said about the activities related to these artefacts and their socio-economic background without ethno-archaeological comparisons, archaeometrical analysis and reproduction experiments.

Nevertheless, using an iconographical repertory from literature as a sort of 'touchstone collection' about it,

[4] Recent experiments have reproduced chemical-physical alterations similar to those found in Selargius by M. R. Manunza: they are compatible with temperatures of about 1000°-1200° and can be referable to metallurgic activities (Manunza *et al*., 2005-2006).

[5] That is typical of Bell Beaker daggers.

we could analyse a small amount of ceramics belonging to the Sub-Ozieri phase recorded in the village of Su Coddu-Canelles[6]. The same technological approach has been adopted in the study of hard animal materials and obsidian-made artefacts. Macroscopic detected marks are the result of a variety of moulding technologies, while imperfections and anomalies reveal the work of a 'clumsy' craftsman, incapable or careless about executing properly all the operations needed.

Most artefacts show also surfaces made irregular by particles of degreasing materials, crevices and harshness, all of which witness incomplete or hasty operations. Only a relatively small number of samples let us hypothesize that such an accurate smoothing and polishing of surfaces was intended to give these pieces an undoubted functional and aesthetic value.

Marks related to finishing operations reveal interventions at different times: on a still completely wet paste or at a more or less advanced stage of its drying process; by means of tools with different consistency; after wetting surfaces again or without wetting them at all.

Chromatic differences on surfaces and in sections lead us to hypothesize the use of simple furnaces in the open air, as suggested by burnt vegetable particles in pastes, probable baking accidents and chromatic variations due to post-depositional events. Rare decorated artefacts[7] present a low standard of complexity.

The Sub-Ozieri pottery from Su Coddu-Canelles could be defined an "opportunistic" one because is practical and without any trace of aesthetic care.

It is striking the contrast with the pottery of the previous Ozieri period, which, although lacking detailed technological studies, was extraordinarily refined, rich and various is, as resulting from a high investment in terms of time and work needed. Forms are elegant and geometrically regular and surfaces accurately refined, while homogeneous hues on both inner and outer surfaces denote the mastery of oxidizing and/or reducing baking systems. Decorations obtained by means of a wide variety of techniques and tools characterize a high percentage of artefacts. Sometimes we find decorations covering both the inner and outer faces of a vase, including its bottom, or even spindle whorls and loom-weights. The use of colours (red and yellow ochre, white pastes) for encrustations implies the adoption of a sub-operational sequence based on the procurement of raw materials for pigments, their carrying, transformation and application to obtain a resistant decoration.

All technological, ornamental and symbolic refinements that affected the Ozieri pottery disappear during the first phases of the Copper Age; on the contrary, a continuity remains in the forms of vases (Melis 2000) (we do not know yet if some kind of continuity affects also the choice of materials and the work sequences) in terms of a gradual evolution: that is why we find it difficult to hypothesize the disappearance of a technical ability (Figure 5).

The results of archaeometrical analysis (mostly published in preliminary studies) concerning the phase of raw material procurement have made it possible to state the dynamics and importance of some regions' exploitation and the relations among the communities that populated them. For instance, the ceramic production from some sites in the Oristanese area is exclusively based on the use of local clays (Bertorino *et al*., 2000), while a local production also results from the analysis of the ceramics found in Is Calitas (Soleminis) and Su Coddu-Canelles (Cara and Manunza 2005: 34-35), both in the Cagliaritano area.

Nevertheless, the preliminary results from the analysis in course on Su Coddu-Canelles' pieces show a certain variety of pastes and, beside strictly local or sub-local raw materials, other pastes with an allochthonous origin. They characterise some pieces selected on the basis of their anomaly[8].

An "opportunistic" exploitation of local resources is confirmed, but a wider mobility is proved: in such a context ceramic containers witness the introduction of technological or aesthetic 'exotic' products.

Perhaps such mobility is due to the procurement of raw materials (lithic resources, ochre, minerals…) or of other goods whose nature is still unknown.

The ceramics is a material and enduring good whose manufacture is traditionally, as the weaving and the plaiting, a women activity used in a domestic context[9]. The last ones, except for the collection and the preparation of raw materials, can be interrupted and started again (Atzori 1980). On the contrary moulding, finishing and decoring pots require well defined operations at definite stages of the material's plasticity and drying process, so as to obtain the best result. Such carefulness has not been found in the examined repertory.

So why women seem not to have enough time nor care to dedicate to pottery making? What activity absorbs the

[6] The examined materials come from the stratigraphical excavation of structures 39, 40, 47 and 48 located in the area of Su Coddu-Canelles investigated under the scientific direction of Maria Grazia Melis.

[7] The rate of decorated artefacts relating to the first phases of the Copper Age (Sub-Ozieri, Filigosa and Abealzu) is estimated 20% of the whole (Melis 2000: 43).

[8] Mineralogical petrographic analyses have been made by Paola Mameli at the Istituto di Scienze Geologico-Minerarie.

[9] The reference has to be consider for local ethnographical context: the weaving and the realization of basketry equipments destined to the domestic activities, are a female prerogative (treatment of cereals and flours, food maintenance); the male intervention pertains to other phases like supplying vegetable raw materials (seasonal activity) and the treatment of stronger fibres (olive, marshy reed). The ethnographical and the ethno-archaeological comparisons attribute the ceramic production to women in absence of lathe and furnace (characteristic of the eneolithic ceramic in Sardinia), while men would take over with the advent of such innovations and the overcoming of the domestic dimension of the production.

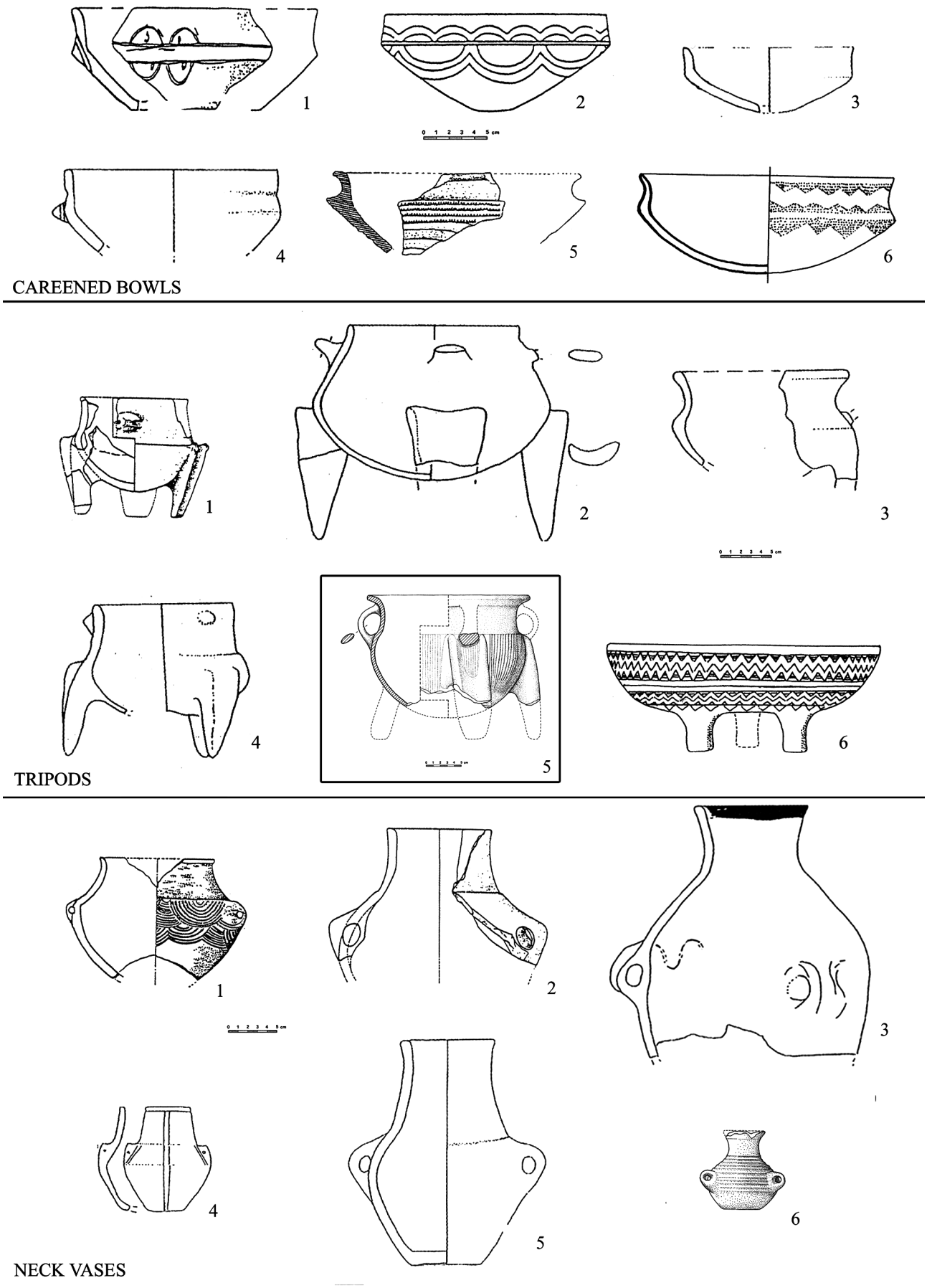

Figure 5: Some forms from Final Neolithic and Eneolithic Sardinian pottery. Careened Bowls: 1-2, Ozieri; 3, Sub-Ozieri; 4, Filigosa; 5, Monte Claro; 6, Bell Beaker. Tripods: 1, Ozieri; 2, Sub-Ozieri; 3, Filigosa; 4, Abealzu; 5, Monte Claro; 6, Bell Beaker. Neck vases: 1-2, Ozieri; 3, Sub-Ozieri; 4, Filigosa; 5, Filigosa-Abealzu; 6, Monte.

energy amount that had been previously employed in pottery making?

Perhaps farming is the answer, because the increasing development of its technology required the full-time presence of the community. Breeding (sheep breeding for wool, milk and its by-products, cattle breeding for drawing), require a wider communitarian engagement which is inevitably taken off from other sectors not directly connected to subsistence.

During the phases of ceramic moulding and finishing, a macroscopic analysis does not reveal any use of metal tools in the working sequence of pottery. Nevertheless, the site of Su Coddu-Canelles gives us a holder crossed by a hole with a square section (instead of a circular or elliptical one) that may have been produced by means of a metal tool. An occasional circumstance, though.

Finally, some reflections on the phase of baking are necessary. Human ability to control thermal energy (atmosphere and temperature) has been exercised in baking pottery, which implies observing and interpreting reactions, identifying their empirical reasons in relation to raw materials, types of furnaces, fuel and ventilation: in one word, experimenting. All of that experience is supposed to have converged in metallurgical activities, thus giving birth to a parallel branch of development.

Our data refer mainly to some ceramics' baking temperatures (*i.e.*, temperatures developed inside furnaces during the baking process) resulting from archaeometrical analysis and macroscopic observations concerning chromatic aspects of surfaces and sections. Temperatures of Sub-Ozieri ceramics from the Oristanese area reach the 650°; those of Filigosa ceramics from Santu Pedru (Alghero) vary between 650° and 750°, while those of Abealzu ceramics from Monte d'Accoddi between 550° and 750°. Analyses on Filigosa and Abealzu ceramics denote an extreme variability in temperatures and baking conditions, even inside the same batch and the same artefact. However, they are too few and have a geographical sporadic origin to use them to reconstruct an evolution of baking procedures.

Hard animal material (LM)

In Sardinian archaeological literature the artefacts produced in hard animal material have never been subject to an exhaustive analysis. Even if in the last years a step forward has been taken, nowadays the situation is still insufficient. As a matter of fact we lack morpho-typological studies identifying pieces and skeletal parts, employed shapes and working techniques. Furthermore, there are no techno-functional studies pointing out procurement strategies of raw materials, techniques, processes and methods of productions and use. Obviously, a reliable picture of prehistoric Sardinian exploitation of hard animal material will only arise from the filling of these gaps. This study intends to contribute to this field of research. We will try to identify categories of objects produced in Sardinia from the Ozieri period to the end of the Eneolithic one, when a development in the field of metallurgy is tangible, in order to investigate the possible effects of the introduction of metals. An important contribution will be supplied by the preliminary results of technological analysis of a sample coming from the site of Su Coddu (Selargius), in the area of Canelles[10].

The diffusion of artefacts: the final Neolithic and Eneolithic. Morphological data

The corpus collected takes into consideration the published artefacts produced in Sardinian prehistory, but also some unpublished ones from the dwelling-site of Su Coddu-Canelles. The data collected for each artefact censed affects the site of finding, context and cultural attribution, category, species and skeletal part employed.

The sample results to be statistically representative: it includes artefacts from dwelling-sites and necropolises located either in the North, the Centre and the South of the island (Figure 6).

Only a few findings can be surely attributed to the Ozieri period, since many sites have not been investigated using a stratigraphical method, by means of which chronological separate contexts can be identified. In addition, often no distinction was made between the Ozieri and the Sub-Ozieri levels (Sanna 1999, Figures 6, 6-7, 10; Usai 1987, Figure. 6, 8), since the latter has only recently been recognized. Awls made up of longitudinally rived bones or long bone flakes, small point tools and flat sharp objects are known. The list also includes elements for *parures* (Figure 7) – remarkable the pierced teeth of *canidae* (Foschi Nieddu 1984: 536), or the cylindrical necklace elements whose apex is pierced and pierced valves of *Cerastoderma edule/glaucum*, too (Usai 1990: 70).

The Sub-Ozieri phase includes all the categories described above: only the absence of flat sharp objects is recorded. Awls with a preserved epiphysis, arrowheads and bevelled objects are added. The preliminary results of a recent study concerning the artefacts from Su Coddu-Canelles (Figure 8, 1-5) contribute to characterize this cultural phase in a more detailed way. There, the most employed raw materials come from domestic animals: ovi-caprines and bovines. Among the first ones metapodials are mainly used (Figure 8, 3), even if the employment of tibias is also recorded. While among the second ones metapodials (Figure 7, 4), femurs and radius are exploited. Ornamental objects are made of valves of *Cerastoderma edule/glaucum* whose umboes or top surfaces are pierced (Figure 8, 5) and a small bone bead crosswise pierced.

[10] The artefacts taken in to consideration were discovered during the excavations directed by M. G. Melis (2001-2005) in structures 39, 40, 43, 47 and 48 in the area of Canelles (Melis *et al*., 2007, *ivi* bibliography). The analyzed findings represent the whole of materials from structures 39, 40 and 48; however all finished artefacts from the five structures mentioned above have been taken into consideration.

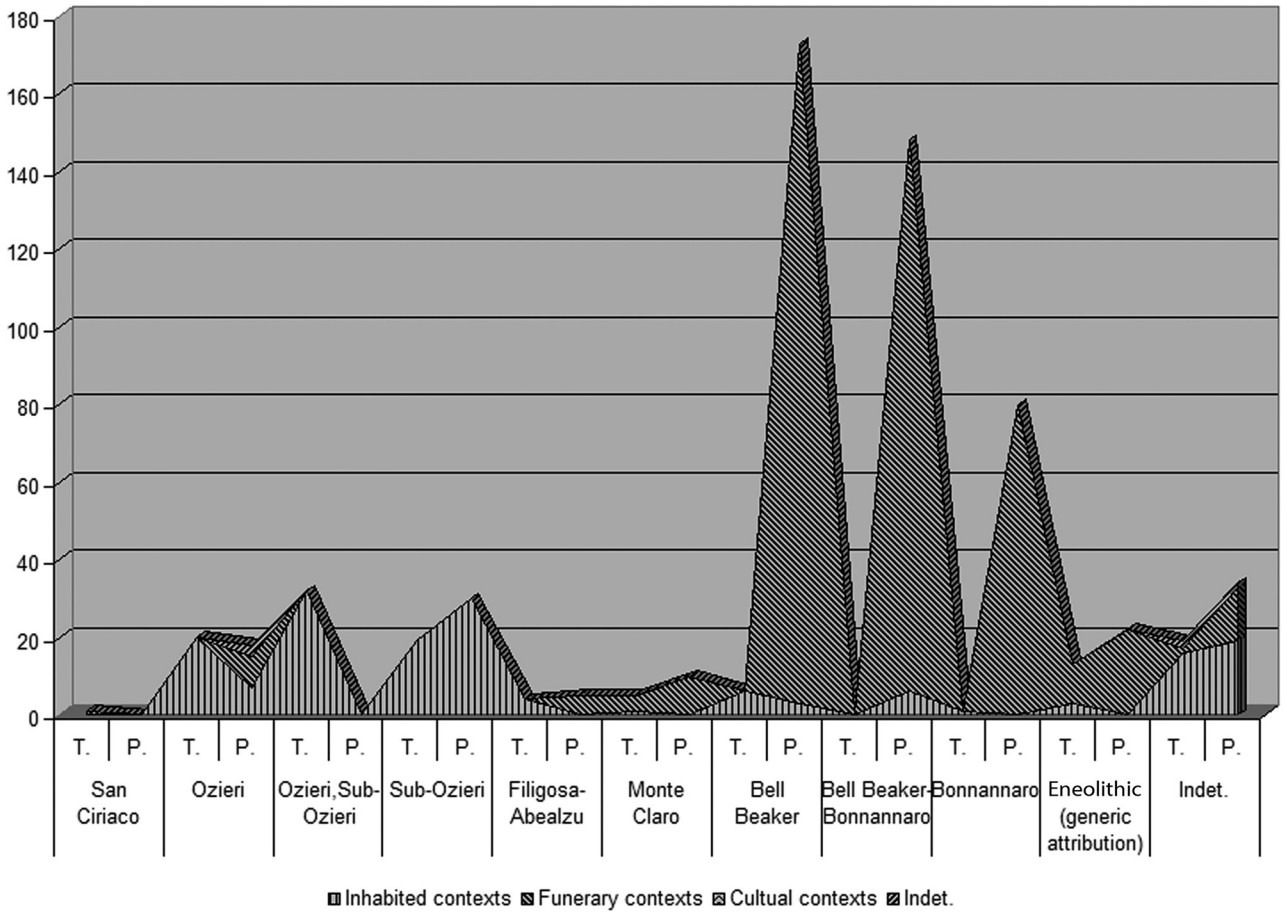

Figure 6: Diffusion of the hard animal material objects from Final Neolithic to Early Bronze age (T. = Tools; P: = Parure).

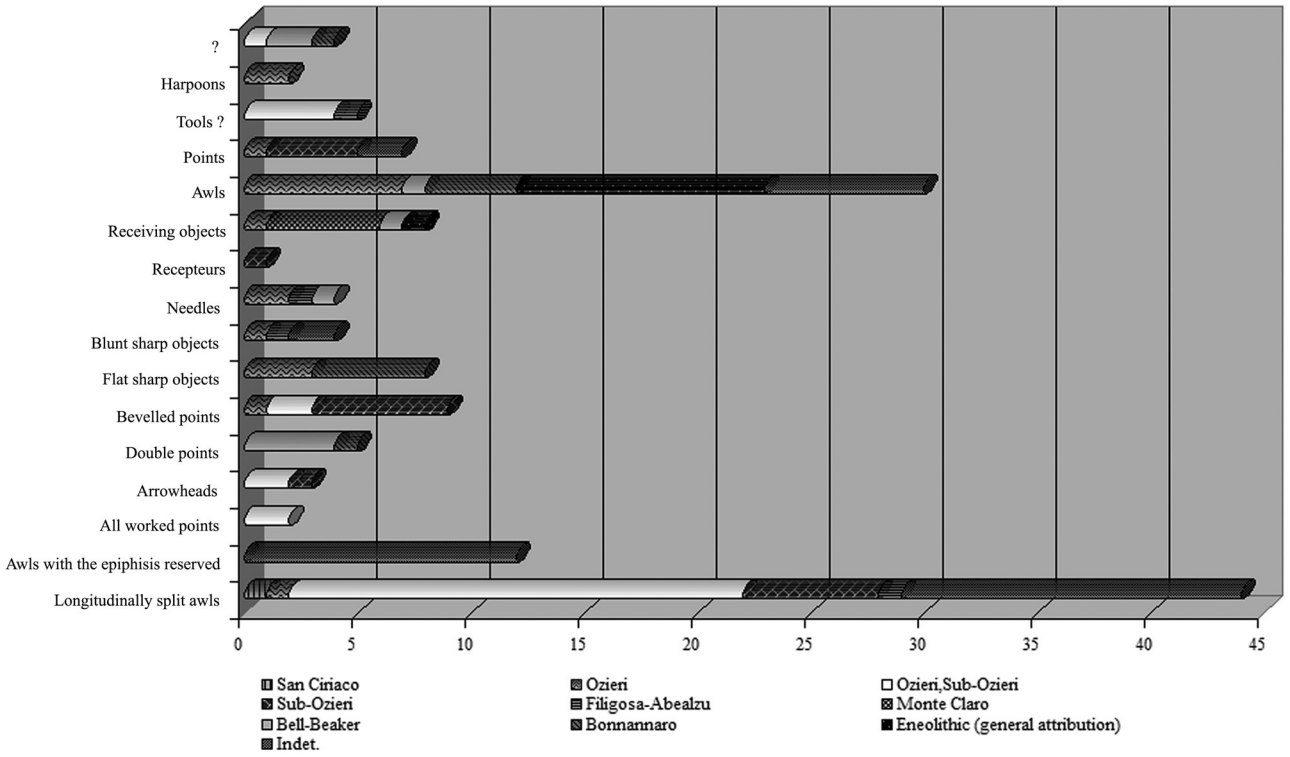

Figure 7: The tools categories of hard animal material and its diffusion from Final Neolithic to Early Bronze age.

Due to scanty evidence we will deal with the artefacts found in Filigosa and Abealzu contexts as a whole. They consist in full-worked points (Atzeni 1985: 30, tav. IV, 1; Melis 2000: 78, fig. 109, n. 35: 332), a point of worked bovine horn (Contu 1997: 309) and a tool made of a long bone diaphysis decorated with several parallel linear engravings[11].

As regards the Monte Claro period, new elements are registered: on one hand the production of tools decreases perceptibly, whereas the range of ornamental objects increases; on the other hand a new category of tools appears: the handled tools. These were employed to make the use of metal points [12] preserved easier and, probably, even the typical long tanged daggers (whose tangs have rectangular sections) had such kinds of handles. An example of that is a handle found at Su Cungiau de Is Fundamentas (Simaxis) (Figure 8,12) (Atzori 1959: tav. III); it was made out of a long bone decorated on both its top surface and edges with crosswise notches. Some portions of epiphyseal long bones, obtained by transversal cuts, have also been found and interpreted as necklace elements. Nevertheless, it is also possible to interpret them – the largest ones, at least – as handles[13].

During the Bell Beaker and the Bonnannaro periods the production of various elaborate elements for *parures* exceeds that of tools, represented by flat sharp objects and double points. The latter may be compared at a morphological level to copper awls. We can assume that: the production of double points, already recorded in ancient Neolithic does not decrease as a consequence of the production of similar copper tools.

In conclusion, a continuum in the employment of hard animal material for the tool production between the Recent Neolithic and the First Copper Age is confirmed, with a light decrease of tools in an advanced phase of the Copper Age.

In the Monte Claro phase the presence of artefacts used to handle copper tools and the decrease in the production of tools in general were observed; on the contrary, a sort of break between the production of Neolithic tradition and the Bell Beaker/Bonnannaro can be noticed, since then the use of hard animal materials has been almost exclusively restricted to the production of objects for *parure* (Figure 8, 13). The decrease in the production of some artefacts does not seem to be due to sudden changes caused by the introduction of metal tools; however, it witnesses a gradual loss of importance in daily activities.

The contribution of technological analysis to the study of hard animal material industry of Su Coddu-Canelles (Selargius)

The current study is important for two reasons: on one hand, it characterizes well the production of the Sub-Ozieri from a morpho-typological point of view, which has been only slightly represented until the present; in fact, materials come from a uncontaminated context. Moreover, this is the first technological analysis on Sardinian bone artefacts. The conditions of raw materials procurement and the techniques adopted to obtain tools will be pointed out by means of an attentive study of the typical technical stigmata and, sometimes, of experimental reproductions. About fifty findings – including waste, blanks and rough-out – and more than 1100 fragments of long bones come from structures 39, 40 and 43 of Su Coddu-Canelles. This study is therefore homogeneous and representative as a whole; moreover, it supplies techno-economical information concerning the community settled at Coddu-Canelles at the beginning of the Copper Age. All finished objects have been found in quite deep stratigraphical unities not upset by subsequent events. As regards the procurement strategies for the tool production, an almost exclusive use of domestic animals' skeletons is registered, except for one artefact obtained from a deer bone. Beads for *parures*, instead, are mainly extracted from *Cerastoderma edule/glaucum* that may have been collected not far from the settlement.

Two kinds of tools are recognizable: pointed objects (Averbouh and Cleyet-Merle 1995: 95)[14] and bevelled tools (Camps-Fabrer *et al*., 1998: 105), both having a wide range of applications in daily life.

Technologies applied are very simple, either in the phase of *débitage* or in the phase of roughing-out, and are adopted in the same tool when strictly necessary. As a matter of fact, in the phase of roughing-out, scraping is not used to regularize surfaces; it is used more often to eliminate the exceeding portions of raw material, instead: that is the case of points whose shaping has not been finished yet in the phase of *débitage*. A good example is a point used without finishing it and, even if not for a long time, used subsequently. As related to the main theme of the present writing, it is important to underline that no trace of metal tools have been found in any phase of the working sequence.

The whole production of the bone industry of Su Coddu-Canelles seems to have been conceived as a consequence of an urgent need. The production and use of plain tools and a

[11] Discovered in the anteroom of the *domu de iana* of Scaba 'e Arrius (Siddi) near a skull (US5) and interpreted as an object destined to adorn the area of the dead.

[12] In any case, in a cave at Capo Sant'Elia, Cagliari, a copper awl was found inside a long hollow bone used as a handle (Figure. 8, 11) (Pinza 1901: tav. III).Unfortunately its chronological references are uncertain even if generally attributed to the Eneolithic.

[13] To support this hypothesis we have to consider that the bone objects for *parure* are more elaborated. Buttons are formed by pierced plates and have long elliptic shapes whose ends are decorated with crosswise engravings; cylindrical artefacts are decorated with transversal notches forming some sort of small globes on surfaces. Instead, roughing-out cylindrical objects are found in contexts where copper points are present, too (copper oxidation traces can be noticed on one of the cylindrical artefacts found in sector *f* of the cave of Tanì (Iglesias) Ferarese Ceruti and Fonzo 1995: 110, 111 e fig. 6, 1-3).

[14] A point whose base is tapered could be associated to double points. These – handled at their base – are used as fishhooks by North-European populations. Nevertheless, ethnographical comparisons remind us that similar objects are used for bird hunting.

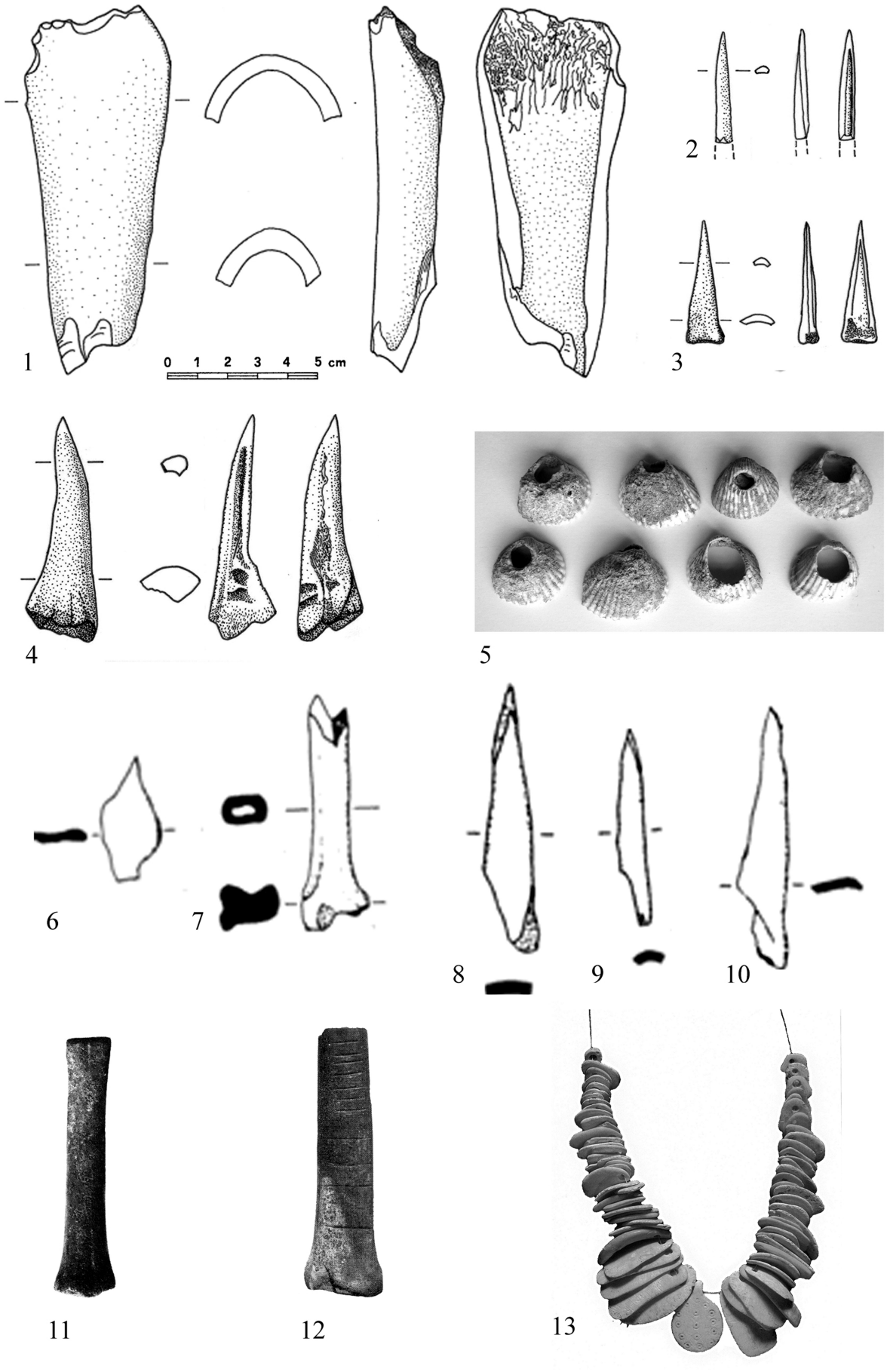

Figure 8: Hard animal material artefacts coming from different areas of Sardinia: 1-5, Su Coddu-Canelles (Selargius); 6, 7, 10, Is Arridelis (Uta); 8, Terramaini (Pirri); 11, Capo Sant'Elia (Cagliari); 12, Su Cungiàu de is Fundamentas (Simaxis); 13, Padru Jossu (Sanluri). The artefacts 11, 12 and 13 are without metric staircase.

sort of easiness are combined; which does not necessarily mean that the technical know-how was reduced: for instance, a bead found in structure 47 is the product of a more elaborated technical process.

Percussion, the most employed technique, often produces fracture surfaces with similar morphologies (i.e. the same angles extent produced by two convergent planes with the same inclination) evoking the idea of a deep knowledge of the effects produced on raw materials as a consequence of the same action. Moreover, the finding of only three blanks confirms the above mentioned hypothesis of a production conceived to meet urgent needs. The contexts where finished objects were found (structures 39 and 47) indicate that these tools were abandoned when still exploitable. The presence of blanks and waste is ascribable to the production of other smaller artefacts as awls or some point objects, since they can all be referred to the working of long bones of medium sized animals'. Unfortunately, no information is available concerning the working process needed to produce bevel-point tool, since we only have finished objects.

To sum up, we can assert that:

- in the site of Su Coddu-Canelles the transformation of hard animal material takes place by means of very simple techniques and quite unelaborated schemes of transformation;
- raw materials come almost exclusively from domestic animals;
- artefacts are characteristically basic for the absolute lack of finishing;
- almost all the artefacts have not been used for a long time and, in almost all cases, have been abandoned when still exploitable[15].

All these elements contribute to make us think of a rather standardized utilitarian production whose aim was not that of creating a certain amount of objects at a time or of saving raw material, which was always at hand.

The disuse of some tools, abandoned when still exploitable, might be explained with a need for more effectiveness as compared to new productive requirements or a functional inadequacy in comparison with other artefacts (metal tools?).

As for the daily activities performed at that time we can add that the production we found at Su Coddu-Canelles shows a community that, with certain exceptions and despite its elaborated technological heritage (deducible from the analysis of the bead *chaîne opératoire*), is no more interested in the creation of artefacts and ornamental objects.

A flourishing breeding of ovi-caprines was the basis for the procurement of meat, leather and hard animal material.

A broadening of studies concerning complete analyses of the findings from Su Coddu-Canelles will enrich the picture described above.

In order to understand if any direct contact has ever occurred between bone artefacts and similar products in copper (awls, small pointed artefacts and double points) we are planning an experimental program intended to reproduce and verify, comparing their chemical-physical properties and functionalities during the execution of different activities, the possible analogies and differences between the two.

Lithic industry (RC)

The stone tool assemblages

If every technique is the result of mental schemes tied to collective ways of seeing and realizing things, changes in techniques involve transformations in the inside dynamics of the society.

These changes can be regulated by different laws, according to the technological choices of a community within a limited series of alternatives: there exist, in fact, various ways of making the same thing and only the differences in the technical procedures can underline social differences. Because of this, the study of technology is important for the understanding of the phenomena of social interaction.

In Sardinia the lack in technological studies does not allow us to trace a general picture of the characteristics of the lithic industry based on the same methodology because of the nonhomogeneity of the data, on the one hand, and of the disparity in the contexts recovered on the other.

It has often been underlined that the moment of passage between Neolithic and Copper Age is characterized by a "contraction" in the use of stone tools evident by its smaller presence in archaeological data, a consequence of the increasing interest in metal, of which we start to have the first attestations. But in this moment the small recovery of metal tools and of manufactures directly involves in its production can't endorse this hypothesis. Moreover recent technological studies (Cappai 2007) on lithic industry have underlined a difference in human behaviours toward a raw material already known and used rather than a total abandonment of the same one.

In the Late Neolithic of Sardinia, despite the presence of few studies - and those that exist are directed above all to surface materials[16]- it is clear that the presence of "amorphous" flakes, with cortex or with big dimensions, not

[15] A tool, for example, with surfaces covered with evident scraping striae and a small blunt. This may imply that it was re-sharpened or even abandoned just a short time after being produced.

[16] It is to underline the analysis of Campu Scià Maìn – Tupei by G. Vacca in Melis and Vacca 2000 and the analysis of Craviole Paderi – Sestu in Cappai 2003, 2006.

yet exhausted cores, unworked blocks, and great quantity of supports and tools documents a strongly delimited tendency in the use of raw material.

The application of *chaîne opératoire* studies shows that the strategies of acquisition, production and consumption were for the greatest part organized in similar ways. The raw material reached the site in form of a raw block, here it was subject to cortex removal, roughing out the shape and then knapped for the production of usually standardized blanks. Examples in this sense are the materials collected in the site of Craviole Paderi (Sestu) (Figure 9, 1-14). The analysis of the lithic industry, exclusively in obsidian, has allowed the identification and chronological isolation in particular, of two different technological systems. While the second can be connected with the First Copper Age thanks to the comparisons with the materials of Su Coddu-Canelles (Selargius) the first one is a typical Final Neolithic assemblage: the presence of raw blocks and a still exploitable core of obsidian, a high percentage of cortex removal flakes, roughing out and resharpening elements, testifies that the raw material reached the site in the form of completely raw or semi-worked blocks.

The economy of the *débitage* includes the production of standardized blanks as blades or flakes, directly *in situ* in a diversity of ways. There is, in fact, great attention in the production of rather regular and straight blades and bladelets with a planed or facetted butt, probably extracted by indirect percussion, without excluding the possibility that pressure-flaking was used, as testified to by a small overshoot blade. For the first phases of reduction, however, the use of the direct percussion with a tender hammerstone can be supposed, indicated by the recovery of a partially exploited blades core and the presence in the assemblage, of characteristic elements like the absence of a well defined contour in the posterior part of the butt, that isolates the impact point, characteristic bulb scars and the presence of very closed hackles (Pelegrin 2000) These supports have rarely been transformed completely.

No difference in the economy of raw material is found. Obsidian, represented by different type naked eyed distinguished by their visual characteristics, is the exclusive raw material present. This fact is fairly tied up by factors such as the criteria of surface's collection and by the geographical position of the site that allowed easy access to the sources. Obsidian in this chronological moment is, in fact, prevalent in the sites of the centre-south of Sardinia while flint is more regularly exploited to the north, both accompanied by secondary raw materials such as jasper, chalcedony or quartz.

In general, in the raw material economy, a tendency to realize short blades, arrowheads and bifacial shaping pieces, as well as non-formal tools (with irregular side removals) in obsidian – because this is the most important material – is evident, while the flint, whether of local origin or not, is preferred for the creation of longer blades often retouched along the whole profile. This dichotomy is present in several contexts of Sardinia and is often accompanied by the presence of waste of obsidian knapping, while the flint is generally recovered in the form of finished objects.

Because of the absence of technological studies of these contexts[17] today it is impossible to speak about an economy of the raw material; nevertheless some signs can direct us in the formulation of a hypothesis. In the site of Contraguda (Perfugas), recent studies have put in evidence the presence of a probable workshop of good quality local flint for the production of long blades with high technical investment (Figure 10, 1), not found in the site, whose cores were reused for shorter blades and flakes then used in the same site. It is for this reason that the authors hypothesize that these could be produced on the place to be carried to other sites. The know-how and the technical investment testify, without any doubt, to the extrafunctional and prestigious value granted to these blades (Costa and Pelegrin 2004). In fact, it is often in burial contexts that we can find this kind of objects. Known in all phases of Sardinian Eneolithic, tombs are key contexts to understand variation in the management of the raw material or the presence of symbolic objects. More direct examples of this are the grave II of the necropolis of St. Benedetto in Iglesias (Figure 10, 3) and the necropolis of Pranu Mutteddu in Goni (Figure 10, 2). Chronologically related to the later phases of the Ozieri phenomenon, the two graves have returned burial equipments rich in symbolic elements[18]. The management of the raw material underlines the presence of long blades made exclusively in flint (the size is compatible with the blade product in Contraguda[19]) instead the arrowheads, partly very accurate, are exclusively in obsidian. A small dagger blade and a stiletto, made in flint too, emphasize the particular character of the equipment.

This panorama changes with the first phases of the Copper Age. In close relationship to elements of continuity, new ones witness a deep change. In Su Coddu-Canelles settlement the preliminary study done on the material coming from some structures (Cappai 2007) and belonging exclusively to the Sub-Ozieri phase, shows deep changes in the production and management of raw material in comparison to the preceding period (Figure 9, 15-23). The assemblage is made up exclusively of obsidian (only a fragment of bladelet is in flint) but at the moment we cannot establish the original state in which it was introduced to the

[17] It is important to highlight that this study is based on the analysis of several contexts by the author (Cappai 2003, 2003a, 2006, 2007; Cappai and Melis 2006) and of a new lecture of just published assemblages.

[18] For the tomb of San Benedetto refer to Atzeni 2001. Besides the presence of blades and arrowheads, there are a small polished axe in green stone, a polish-pierced knob and a necklace made of stone bead. For the tomb of Pranu Muteddu refer to Atzeni and Cocco 1989. The rich equipment in knapped lithic industry is accompanied to a polish-pierced knob, a small polished axe and two circular elements in silver, among the first metal items present in Sardinian Neolithic.

[19] This affirmation intends to underline only the probable existence of a circuit related to this kind of objects made in a particular raw material and not the connection between the settlement of Contaguda and the two necropolises. In fact, there are not technological studies and provenance analyses on the raw material that can establish s direct relationship.

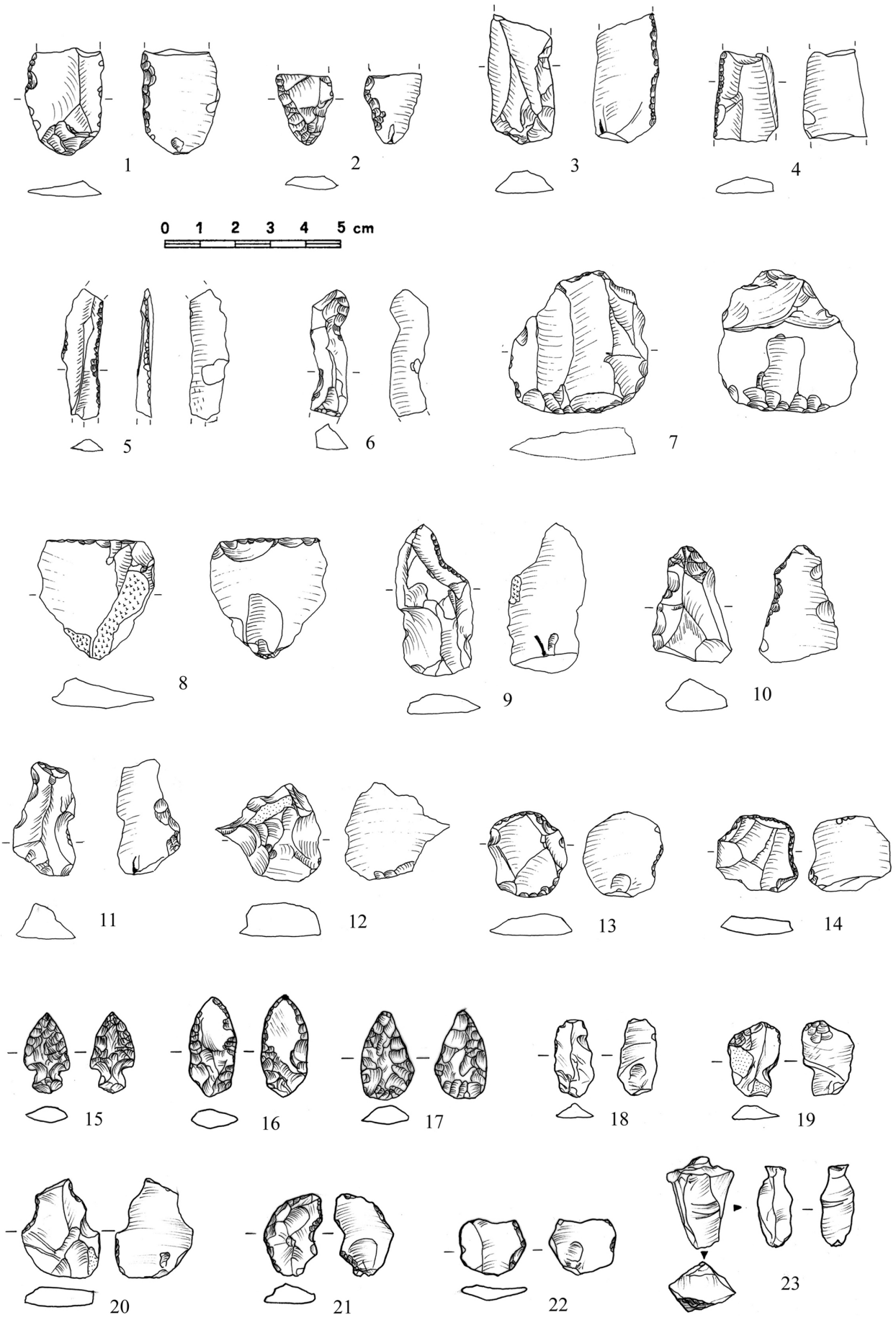

Figure 9: Some examples of lithic tools: 1-14, Craviole Paderi (Sestu); 15-23, Su Coddu-Canelles (Selargius).

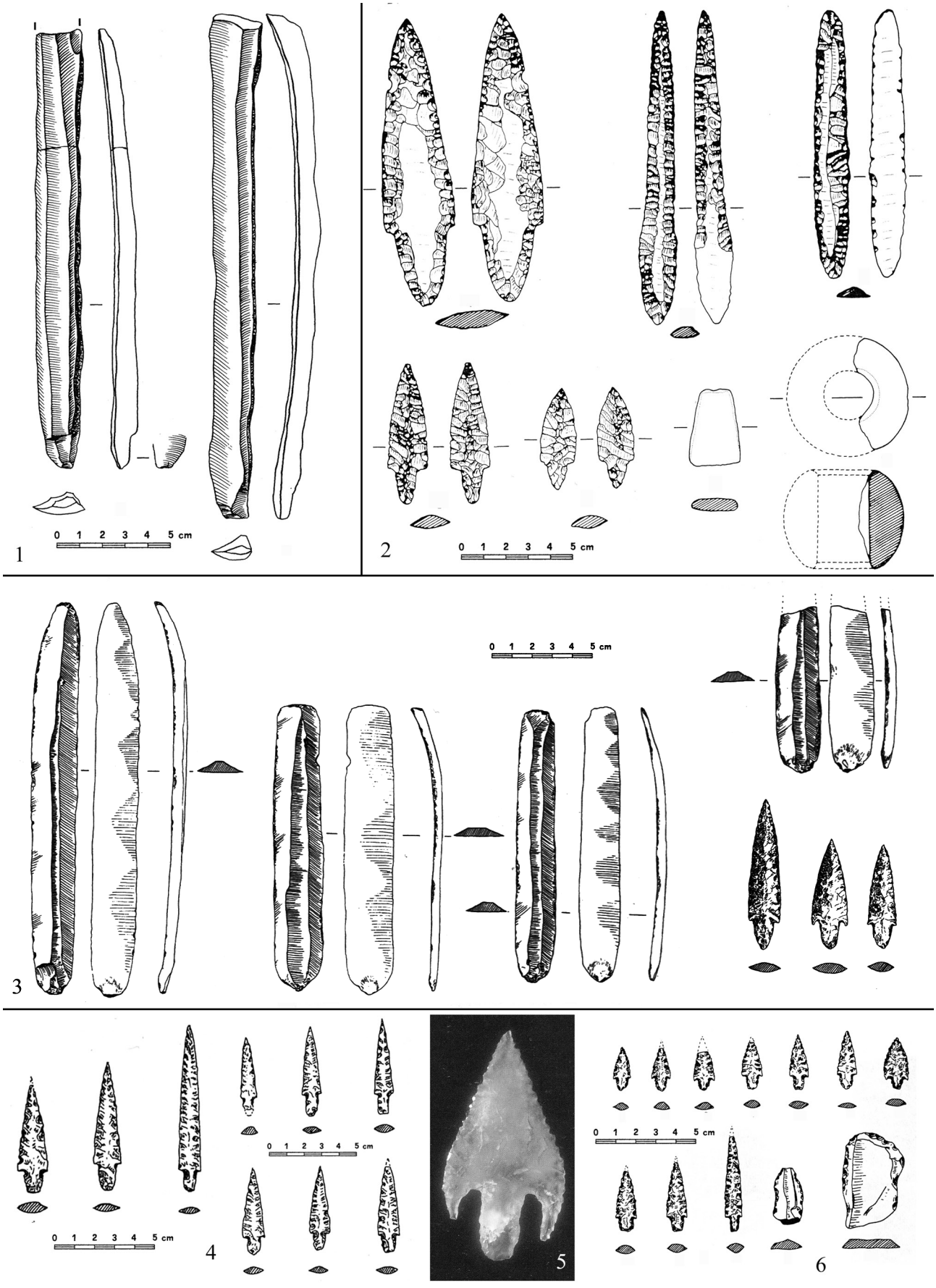

Figure 10: 1, Long blades from Contraguda (Perfugas); Examples of lithic tools from some funerary equipments: 2, Pranu Mutteddu (Goni); 3, San Benedetto (Iglesias); 4, Corte Noa (Laconi); 5, Anghelu Ruiu (Alghero); 6, Serra Cannigas (Villagreca).

site. Even if not predominant, materials with cortex are also present. The cortex can be like a thin patina, a middle or well-developed cortex depending on the distance from the mother rock. These characteristics, in fact, are indicative of different procurement strategies that provide for the collection directly either from the primary and sub-primary source or from secondary sources (Luglié, Le Bourdonnec *et al*., 2006). On one side the reduced dimensions of the tool assemblage and the presence of residual cores, bring us a strategic picture in which also the small nodules of raw material are exploited for knapping, from the other we cannot exclude the possibility of exploitation of greater blocks for the presence of shaping out and resharpening flakes of great dimensions. In the first case, experimental tests (unpublished personal researches) show that reduction sequences can also be realized from small rounded pebbles or more geometric nodules of small dimensions (7-10 cm). In this case, the nearly complete removal of the well-developed cortex is necessary.

The laminar production is poor and without high technical investment, only indirect elements confirm a well-organized *débitage* that contrasts with a non-negligible percentage of bipolar percussion artefacts that first was recognized in Sardinian assemblage (Cappai, in press). This regards the production of flake or laminar flake like in small residual cores as is testified to by a refitting effected in the structure n. 40 (Figure 9, 23). The most representative blanks are, in all cases, small and middle-sized flakes, a lot of which are fragmentary.

The present stigmata on the other materials, testify reduction probably by direct percussion. The knapping accidents point out, in fact, the non homogeneous propagation of the ripples because of the way of striking with either excessive or a lack of force, causing big irregularities on the inferior surface. A single "Siret" accident directs us on this thesis, while the various fractures in the distal ends, can also be caused by the use of other techniques. The presence of hinge terminations can be partly tied to the use of a hammerstone too light in weight or to the fact that it was applied with too little force (Sollberger 1994). Also the toolkit is non-formalized, often of microlithic size and on flakes that have preserved their original morphology. Only the arrowheads and the ogives introduce an intrusive and sometimes covering retouch that implies a high technical investment.

In general this behaviour is observed also in other contemporary contexts as Craviole Paderi from a side, that, not away from Su Coddu-Canelles, proposes some similar schemes: tendency to microlithisme with the exploitation of raw material up to its total exhaustion, reutilisation, low technical investment and Isca Maiori (Riola Sardo) (Depalmas 1989) from the other whose industry appears rather poor, essentially on flakes with prevalence of scrapers while the presence of bifacial shaping pieces is very limited. For the Oristanese area, the phase of passage is for instance documented from the lithic industry of Murera (Terralba) (Cossu 1996) On one side this site notices a substantial maintenance of the formal typologies found in the Recent Neolithic site of S. Giovanni (Terralba) (Cossu 1996). In comparison with this moment the flint toolkits almost entirely disappear and above all the blades, present instead to S. Giovanni, while the size of the production is rather reduced. The curated shaping is entirely reserved to arrowhead and bifacial pieces.

As a rule, the Sub-Ozieri lithic industry underlined a tendency in the microlithisme: low investment in the production of formal blanks, with very simple and non-formalised *chaînes opératoires* for the production of expedient tools that introduces the bipolar technique too. Only the arrowhead production detaches notably from the whole industry betraying *savoir-faire* and a very important investment of labor.

Bearing in mind the attestations of Contraguda and the data presented here, is there an implication for the presence of specialized groups in the production of formal tools? Or as the ethnographic data show, was it decided to devote more time to the manufacture of stone tools destined to more important and intense activity and that implied a greater risk of failure (Khun 1989; Tomka 2001)? Or, is the opportunistic attitude for the production of the greatest part of the tool assemblage, tied up to the dispersion of the work force in other activities (experimentation in metal production)?

These are working hypotheses for a future research because of the lack of current data and the nonhomogeneity of the contexts of recovery. In fact, except for Monte Claro, for the most part of the Copper Age the greatest part of the material originates from funeral contexts. The grave of Scaba 'e Arriu (Siddi) (Ragucci and Usai 1999), for example, has returned material belonging to various phases, from the Recent Neolithic to the Late Copper Age. With the heavy presence of obsidian arrowheads related to various periods that is typical of Sardinian funeral equipment, it is evident the presence of flint blades in the sub-Ozieri, Filigosa, Abealzu and Monte Claro levels. This witnesses the prolongation in the use of flint blades that are just disappeared by the contemporary villages (the data are related to Sub-Ozieri and Monte Claro phases). In this case we cannot exclude the practise of reutilisation of more ancient objects just present in the grave, which would explain the absence both in other funeral contexts and in the inhabited areas.

The data coming from the funeral contexts, unfortunately often fragmentary, do nothing but guarantee the hypotheses already advanced: great care in the production of particular tools as arrowheads, often in obsidian or in other specific materials such as that in chalcedony of Anghelu Ruiu (Alghero)(Demartis 1998) (Figure 10, 5), use or reutilisation of flint also for the following periods to testify a long symbolic duration of these materials. The «crisis» of stone tools could have been before, then reinterpreted in terms of a change in the approach to the procurement strategies,

with a consequent opportunistic attitude in the production of common use tools, low technical investment for the production of the greatest part of the tools assemblage, with the exception of the arrowhead. The use wear analysis, still in progress, can also clarify the operation and functionality of such stone tools [20]. Also during the Monte Claro, in fact, this scheme is repeated. Despite of the few presence of stone tool, both in Biriai (Oliena) (Castaldi 2000), but even more in Enna Pruna (Mogoro) (Lilliu and Ferrarese Ceruti 1960.), the same mental schemes are represented but the lithic industry continues to be attested to and used both in dwelling and funeral contexts.

Lithic industry and metal: opposition or coexistence?

Even if we cannot talk about a "crisis" of the lithic industry, it is clear that metal has played an important role in the communities of the Copper Age even if, according to the current studies, we cannot think of a real utilisation for the production of common use tools, both for their absence in housing contexts, and for the difficulty to imagine such a rapid acquisition of its technology.

While its value is attested by the recoveries in burial contexts, it is difficult to understand if has had a certain part in the realization of manufactured articles in stone. In the first case, to quote only two examples belonging to different moments of Sardinia Eneolithic[21], the grave A of Serra Cannigas (Villagreca) (Atzeni 1985) (Figure 10, 6) or that of Corte Noa (Laconi) (Atzeni 1988) (Figure 10, 4). The two graves have returned a rich equipment of obsidian arrowheads: about ten those preserved during the excavation for the first one and about forty the second. These are connected in a different way with metal tools: with dagger blades and ringlets in copper the grave of Serra Cannigas, ringlets and spirals in copper and silver the second. Are we perhaps in a moment in which the symbolism addressed again by objects connected with certain activities is somehow interchangeable? To the same moment of Serra Cannigas, belongs the grave 2 of Cungiau Su Tuttui (Piscinas) (Usai 2000) in which this proportion is completely distorted: the assemblage contains above all metal tools, both related to objects of ornament but above all tied to copper weapons. The reduced dimensions and the very thin size of this kind of objects betray an extreme brittleness for practical use, a characteristic that has led the author to think that they could be the miniatures exemplary of those of common use, nevertheless not testify. It is remarkable, however, to underline the absolute lack, in this context, of lithic arrowheads while the lithic industry is represented only by some flakes. Can we hypothesize therefore a continuation of the same ritual practices in which old symbols overlap to new materials? Is this the meaning of metal and stone daggers mutually opposed and bound to the same central handle portrayed in *statue menhir* (Atzeni 1998)? What is evident is the absolute call of the little dagger of this grave to arrowheads attested in other contexts. And how can we consider the copper arrowheads in Bell Beaker graves that follow the similar stone models?

Regarding the use of the metal in the production of lithic tools, the data we have are still fragmentary. If for Italy the use of the copper retoucher has been hypothesized for the ligurian arrowheads (Leonardi and Arnoboldi 1998) and the bifacial shaping pieces of the Lessinia (Isotta and Longo 2004), in Sardinia it has been verified only for the case of Contraguda. In fact, the formal typology of the blades produced in an area of the site and its stigmata, justify the use of pressure with a lever fitted with a copper point. It is not possible, for the moment, to understand if other flint blades were realized with this technique or if this technique was reserved only to this material/product. Nevertheless if the theory of the authors is correct, their extrafunctional value would connect them with ritual-funeral contexts, a privileged domain for which these products were very probably destined. Some reflections can be made on the arrowheads. While some do not reveal any indications in this sense and in general it is not always simple to distinguish pressure using horn from that of a copper point, from the experimental data furnished by other contexts (Isotta and Longo 2004) there are Sardinian examples that recall that type of laminar retouch, regulate, oblique and continuous. These are in particular some stone tool discoveries in the site of Murera, in a context of the First Copper Age, realized in obsidian and quite surprisingly, of some precedent recovered in that of S. Giovanni realized both in obsidian and in chalcedony. Non-valuables include the arrowheads, also very accurate, recovered from Serra Cannigas and Corte Noa.

In light of these data, unfortunately fragmentary because of the state of the research and type of approach, it is possible to return to the question of precise technological choices in the so-called "crisis" of the lithic industry that, at least for the whole Copper Age remains, like that of the hard animals' tools, an important material of the prehistoric communities. Metal, perhaps still in a phase of experimentation and not fully approved for daily activities on which the maintenance of a community depended, does not enter this circuit if not as a symbolic element and very probably only in the production of certain typologies of tools.

Conclusions (MGM)

The whole picture of Sardinian Copper Age[22] as it emerges from the present study is characterized by a slow and gradual evolution through which the Late Neolithic socioeconomic organization undergoes transformations due to technological innovations and new trends in religious ideology.

A discrepancy takes place between a sort of technological

[20] Cappai PhD in progress.

[21] We can chronologically insert the grave of Serra Cannigas in the Filigosa phase and the grave of Corte Noa in the later phase of Filigosa-Abealzu; Melis 2000.

[22] For further deepening on the various aspects of the Sardinian Eneolithic see Melis 2000, *ivi* previous bibliography.

decadence (or, more precisely, a restriction in the use of a certain technical know-how) in the pottery field, in the lithic and hard animal material industries on the one hand and, on the other hand, the development of metallurgy, building techniques (Monte d'Accoddi) and agriculture.

As for metallurgy it is important to underline as the awareness of the intrinsic and symbolic power of metal comes only later: in fact, the first evidences in the Ozieri and in the Sub-Ozieri phases mainly refer to dwelling-sites. From the Filigosa phase metal tools become important elements in funerary equipments. The symbolic value of daggers is particularly emphasized by their being represented in the *statue menhir*.

In the transition from the Ozieri to the Sub-Ozieri ceramics show elements of tradition in terms of morphology, but also a radical change in decoration which betrays a reduction in manufacturing times. On the contrary, archaeometric analyses on materials from Su Coddu-Canelles suggest us that the origin of raw materials is to be localized in places halfway between the Cagliaritano area and the mining basin of Iglesiente and/or other sources of raw materials used in the site.

At the beginning of the Copper Age the hard animal industry does not seem to have been conditioned by the introduction of metals, which, in fact, do not play any role in the different phases of the *chaînes opératoires* of Su Coddu-Canelles' tools.

As for the lithic industry, in the Sub-Ozieri a reduction in the presence of lithic elements is always perceivable; this shows changes in the procurement of raw materials. In the Filigosa an equivalent presence of prestigious stone and metal tools in funeral equipments has got a double meaning: on the one hand the use of lithic tools is going to fade, whereas more sophisticated technologies are almost always adopted for grave precious goods; on the other hand, the use of metal is going to spread out starting from a phase of experimentation and use in domestic contexts up to the introduction in funeral equipments as status symbols in the non-egalitarian societies of late Eneolithic. But, the composition of equipments seems to be still conditioned by the distance variable from the sources of raw materials procurement. This explains the absence of copper daggers and the presence of beautiful obsidian arrowheads in Corte Noa, not very far from Monte Arci; besides, it also explains the absence of obsidian arrowheads and the presence of 5 daggers out of 20 metal tools from the grave of Piscinas in the mining basin of Iglesiente. Even if a large amount of data referring to the Bell Beaker documents a widespread use of metal tools, it offers a vision exclusively limited to burial contexts. Nevertheless, the higher homogeneity of documents dating back to the Monte Claro allows us to evoke a picture of late Eneolithic where metallurgy does not seem to be exclusively destined to symbolic and funeral aims, since it takes part in daily life interacting with other activities, as witnessed by metal cramps for restoring ceramics and bone handles for metal objects.

In conclusion it can be affirmed that the introduction of metal doesn't seem to have conditioned the handicraft production and the socioeconomic order in the first phases of the Eneolithic. The transformations, at the end of the Neolithic, seem to be tied up rather to an increasing development of agriculture. Beginning from the Filigosa burial equipments metal assumes an undoubted symbolic role and with the Monte Claro we assist to the spread of metal and its interaction with the other handicraft activities is confirmed.

The continuation of researches through integrated analyses (*e.g.*, archaeozoological, archaeobotanic ones, etc.) on the materials from su Coddu-Canelles will offer more exhaustive answers to a subject that is still strongly conditioned by an heterogeneity of data and a lack of radiocarbon dating.

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