

CRAFTING BONE – SKELETAL TECHNOLOGIES THROUGH TIME AND SPACE

Proceedings of the 2nd meeting of the (ICAZ) Worked Bone Research Group

Editors

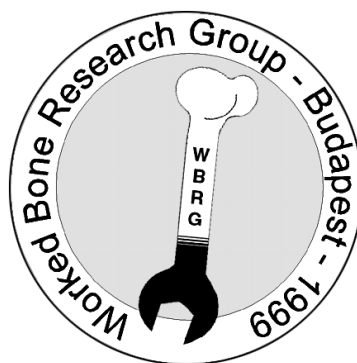
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Participants in the WBRG 1999 Budapest conference (left to right): Ülle Tamla, Elisabeth Brynja, Tina Tuohy, Liina Maldre, Karlheinz Steppan, Heidi Luik, Gitte Jensen, John Chapman, Alice Choyke, Janet Griffiths, Andreas Northe, Noëlle Provenzano, Jörg Schibler, Nerissa Russell, Colleen Batey, Lyuba Smirnova, László Daróczy-Szabó, Daniella Ciugudean, Mária Biró, Kordula Gostenčnik, Eszter Kovács, Christopher Morris, Sabine Deschler-Erb, Ans Nieuwenberg-Bron, Katalin Simán, Isabelle Sidéra, Mickie Zhilin

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Introduction

Archaeologists and Archeozoologists, both study worked osseous materials (bone, antler and tooth, including ivory, in short all referred to as “bone”). Such reports, however, are often buried at the very back of faunal analyses appended to site reports. Furthermore, the two groups of specialists have had little chance to interact, even within Europe since they tend to attend different conferences and write for different fora.

At the root of this problem lay the arbitrary, largely institutional division between pre- and proto-historians, often imposed on bone manufacturing experts by nothing but formalism in research tradition. The most exemplary series of studies in this field is entitled: “*Industrie de l’os neolithique et de l’age de metaux*” (Bone industry from the Neolithic and Metal Ages). Another classic, a book, is sub-titled “The Technology of Skeletal Materials *since the Roman Period*”. In very early prehistoric assemblages, attention is often focused on the question of whether a particular piece of bone was worked or not. In later assemblages, it is the intensity of manufacturing that often renders objects zoologically non-identifiable, so that important aspects of raw material procurement, including long distance trade, remain intangible.

The history of raw material use, however, is continuous and many of the constraints and possibilities inherent in skeletal materials are the same whether one is dealing with Paleolithic or Medieval artifacts. Indubitably, the organization of manufacture, the function and value of bone artifacts (as well as some technological innovations such as the regular use of metal tools or lathes), differ substantially between simple and complex societies through time. On the other hand, fundamental questions of tensile characteristics, procurement strategies, style and certain technological requirements are not only similar diachronically, but also open up new vistas when apparently unrelated periods are compared. The function of these objects as social markers, for example, remains remarkably constant through time, even if details vary. The papers in this volume reflect these conceptual similarities and differences as did the papers delivered at the conference itself.

The first meeting of what was to become the Worked Bone Research Group (WBRG) was organized by Dr. Ian Riddler in the **British Museum, London, in January 1997**. The commitment and enthusiasm of that first workshop has greatly inspired subsequent efforts in recruiting a wide range of bone specialists, capable of contributing to discussions concerning bone manufacturing.

In keeping with the aims of the Worked Bone Research Group, since 2000 an official working group of the International Council for Archaeozoology (ICAZ), an effort was made to present these papers on the basis of what *connects* them rather than segregating them by archaeological period or region. Contributions mostly include articles based on papers delivered in September 1999 at the second Worked Bone Research Group meeting in Budapest, organized by the editors with the unfailing support of the Aquincum Museum (Budapest) and its staff. Several people who were unable to be present at this conference were also asked to contribute papers. Finally, five of the studies in this volume, originally delivered at a symposium on bone tools organized by Dr. Kitty Emery and Dr. Tom Wake, entitled “*Technology of Skeletal Materials: Considerations of Production, Method and Scale*”, at the 64th Annual Meeting of the Society for American Archaeology (Chicago 1999), were added thereby expanding the academic spectrum both in terms of research tradition and geographic scope.

There are a total of 36 papers in this volume. Research was carried out on materials from Central and North America to various regions of Europe and Southwest Asia. The authors represent scientific traditions from Estonia, Hungary, Romania, and Russia, European countries in which, until recently, ideas developed in relative isolation. Other European countries represented include Austria, Denmark, France, Germany, Great Britain, Greece, and Switzerland. Last but not least, the North American scholarly approach is also represented here.

Schools of thought may be said to be exemplified by what used to be Soviet research, well known for pioneering works on taphonomy, experimentation and traceology. Bone manufacturing was first brought to the attention of Western scholars by the publication in 1964 of the translation of S. A. Semenov’s *Prehistoric Technology*, published originally in 1957. Scholars in France have also carried out decades of co-ordinated work on operational chains in the manufacturing process from the selection

of raw materials to finished products, with special emphasis on prehistoric modified bone. An entire working group, “Unspecialized Bone Industries/Bone Modification”, is directed by Marylene Patou-Mathis. This working group itself is part of a larger research program on bone industry “*La Commission de Nomenclature sur l’Industrie de l’Os Préhistorique*” headed by Mme. H. Camps-Fabrer. Several specialists such as Jörg Schibler in Switzerland, have created laboratories where ground laying work has been carried out for years on worked osseous materials, especially from Swiss Neolithic Lake Dwellings and Roman Period sites. Language barriers have often prevented these important bodies of work from being as widely disseminated as they deserve. Arthur MacGregor in England, writing in English, has had a decisive influence on specialists working on more recent Roman and Medieval worked bone assemblages in Europe.

The work of all of these groups as well as certain individual scholars is well known within limited circles. Otherwise, however, the overwhelming experience of most researchers on worked bone have been feelings of isolation and alienation from most archaeological or archaeozoological work related, most importantly, to the absence of an international forum where their often specialized work can be presented and problems discussed.

In spite of the fact that there have been many practical obstacles to information flow between specialists in this field, there are really remarkable similarities of approach which should ultimately lead to the development of more compatible paradigms in research. Agreement on methodologies will have a positive feedback on communications, helping the field to grow and develop properly.

It seems that, at last, archaeologists and archaeozoologists and other specialists are talking to each other and sharing methodological points of view. One striking example of this can be seen in the emphasis on raw materials studied in parallel to types found in the majority of papers in this volume. Previously studies often concentrated on typo-chronological questions, ignoring the questions of raw material morphology and availability. The series published by the *Centre National de la Recherche Scientifique*, edited by Mme. Henriette Camps-Fabrer in France is largely to be credited for beginning this new trend. It contains many papers concentrating on understanding manufacturing sequences and, indeed, from Europe to North America there are papers which explicitly deal with manufacturing sequences in individual assemblages.

There is also a consistent emphasis on experiment and manufacturing techniques present in much of the work in this volume. The related but fraught question of function continues to tantalize and frustrate most specialists. A number of articles attempt to apply techniques of hard science, such as scanning electron microscopy or light microscopy, together with experiment to get objective, “processual” answers to this important group of questions. Other researchers rely deductively on analogy, archaeological context, gross morphology, and textual sources as they try understanding how these objects were used.

When editing the volume, we tried to concentrate on the underlying main concepts represented by each paper rather than grouping them diachronically or by geographical region. As a result, contributions follow a line from the theoretical through the problems of raw material selection, manufacturing techniques, experimental work, technical function and socio-cultural interpretations. Obviously many of these papers deal with several of these aspects simultaneously. Finally, analyses of assemblages are grouped to show the current state of general application of these principles as illustrated in papers in the rest of the volume. Reports on bone tool types will ultimately benefit from more unified typologies and also provide researchers with comparative databases from regions beyond their own.

Finally, a word on the organization of papers in this volume. Although the editors have tried to group these papers by what they see as the main theoretical and methodological thrust of the authors it should be understood that most papers, to a greater or lesser extent, overlap between these artificial sub-titles. Happily, almost all these works include considerations of raw material exploitation, manufacturing and functional analyses and all make some attempt to consider the social context from which these artifacts emerged. It is exactly this cross-cutting of boundaries which allows us to hope that the study of worked osseous materials is well on the way to developing into a discipline in its own right.

In addition to the generous support given by our sponsors and technical editors for this volume, organizing the conference would not have been possible without the active help of numerous colleagues. Special thanks are due to Paula Zsidy, Director of the Aquincum Museum, Katalin Simán, archaeologist and two students from the Institute of Archaeological Sciences (ELTE, Budapest): László Daróczi-Szabó and András Markó. The Hotel Wien, Budapest and its efficient manager provided a comfortable setting for our discussions at a reasonable price. Last but not least, help with abstract translations by Cornelia Becker, Noelle Provenzano as well as Marjan Mashkour and Turit Wilroy should also be acknowledged here.

DO-IT-YOURSELF MANUFACTURING OF BONE AND ANTLER IN TWO VILLAS IN ROMAN SWITZERLAND

Sabine Deschler-Erb

Abstract: Differences between the bone artifacts from two villas and two cities in Roman Switzerland are analyzed. The typology of the bone artifacts seems to depend on the social status of the site whereas the selection of the raw material is connected to the animal husbandry system.

Keywords: Roman bone artifacts, bone and antler manufacturing, villas

Résumé: Cet article analyse les différences entre les outils en os de deux *villae* et de deux cités de la Suisse romaine. La typologie des artefacts osseux semble dépendre du statut social des sites tandis que la sélection des matières premières est à relier au système d'élevage.

Mots-clés: tabletterie romaine, technologie de l'os et du bois de cervidé, *villa*

Zusammenfassung: Es werden Unterschiede zwischen Knochenartefakten aus zwei römerzeitlichen Villen und zwei römischen Städten auf Schweizer Gebiet analysiert. Das Spektrum der Artefakttypen scheint sich an der sozialen Bedeutung des jeweiligen Fundplatzes zu orientieren, während die Auswahl des Rohmaterials mit dem System der Haustierhaltung zusammenhängt.

Schlüsselworte: Römische Knochenartefakte, Verarbeitung von Knochen und Geweih, Villas

Over the last 20 years, research on Roman bone artifacts has greatly intensified after a time of stagnation. The trend began with the publications of Jean-Claude Béal (Béal 1983) on French and Arthur MacGregor (MacGregor 1985) and others on English assemblages. In the following years important finds from Roman cities were also published in German speaking and more eastern countries. At most of these sites, waste objects and semi-finished products from bone manufacturing have been found which display evidence of local production.

The analysis of the 6000 bone artifacts from Augusta Raurica/ Switzerland (Deschler-Erb 1998) has shown that only some of the types found here were also produced locally. Metrical tests have demonstrated that the 300 hinges found in excavations there were made from bone compacta with a higher average thickness than that measured on the cattle long bone remains found locally (Deschler-Erb 1997; Deschler-Erb 1998: 80). This means that these hinges were made elsewhere, where there was a population of bigger cattle, probably in Gaul. Moreover, there is no indication that complex objects such as other furniture parts, small rectangular boxes or chapes, which are made from several pieces or are combined with metal or wood, were produced in Augusta Raurica (Deschler-Erb 1998: 204). Obviously, the production of these objects demanded a good technical know-how and in a smaller provincial town like Augusta Raurica the market was not large enough to support specialists. In this case, it was easier to import the products. Only simple and bulk objects such as hairpins, spoons and counters were produced locally. A special case is a small workshop where military objects were repaired at the beginning of the second century (Deschler-Erb 1998: 274; Deschler-Erb 1999: 86).

From the cities we turn now to the Roman villas. To simplify matters it can be said that the villas were specialised in the production of surplus agricultural goods for the city markets. On the other hand, the villa inhabitants customarily bought goods at the market which were not always produced at the villa itself, for instance special ceramics or metal objects. There was thus, an interdependence between the town and villas. The villas were therefore conveniently situated in relation to transport facilities.

For the following discussion we will concentrate on two villas discovered in Switzerland (fig. 1) where fortunately both archaeological and archaeozoological investigations have been carried out. The first is the villa of Neftenbach (Rychener et al. 1999) in the eastern part of Switzerland. The nearest large settlement is the *vicus* of Vitudurum, 8.5 km away. The villa of Neftenbach is relatively out-of-the-way because there was probably only one small road leading to the next *vicus* which ended at the villa (Rychener et al 1999: 438). The archaeological material found at the villa dates from the 1st to the 3rd century A.D. and can be compared with the material found in Vitudurum which has been analysed as well (Martin-Kilcher 1991).

The second villa presented here is the villa of Biberist (Schucany 1995). It is situated in the Swiss midlands which are relatively flat and fertile and were already densely populated in Roman times (Schucany 1999). The villa also dates from the 1st to the 3rd century. This villa may have been slightly smaller than the Neftenbach villa (Rychener et al. 1999: 446). Unfortunately, only the *pars rustica* of the Biberist villa has been excavated. Furthermore, the bone artifacts from the nearby *vicus* of Salodurum have not been

published, therefore a comparison between the material of the city and the villa is here not yet possible. However, the results of the analysis of the bone artifacts from the Colonia Augusta Raurica (Deschler-Erb 1998) will be included in the following discussion.

What can be said about the bone artifacts found in the villas? At first sight the frequency of bone artifacts seems to depend on both the size and the importance of the site (fig. 2). That means that only a few bone artifacts were found in the villas, 65 in Neftenbach and 42 in Biberist while 89 worked pieces were discovered in the vicus of Vitudurum. In the colonial town of Augusta Raurica nearly 6000 objects have been found, which is one of the largest existing collections of Roman worked bone anywhere. The reason is that Augusta Raurica was a relatively large administrative and trade centre with about 15,000 inhabitants. Furthermore, the site has been excavated thoroughly for some one hundred years. Thus, the amount of excavated bone artifacts is not surprising.

Looking at the distribution of the bone artifacts inside the Biberist villa (fig. 3), a high concentration of bone artifacts is recognizable in the southeastern section where the custodian of the farm and his family lived. As will be demonstrated later, many of the bone artifacts were objects for personal use. Therefore, it is not surprising that they were found in the living area rather than in the barns or stables.

Roughly the same impression can be obtained from the Neftenbach villa bone tool material (fig. 4): there are concentrations of artifacts in the excavated part of the pars urbana where the owner of the villa resided and also in the house of the custodian. A special case is house 25 which will be discussed later. A relatively large number of pieces of antler were found here.

From these two plans it can be concluded that the frequency of bone artifacts depends on which parts of the villa were excavated. Thus, we do not believe that villa people used fewer bone objects than city people did.

In the following, the types of bone artifacts which were excavated will be discussed. For the analysis of the Augusta Raurica material a system of 9 categories was created according to which the objects were classified (Deschler-Erb 1998: 120). These include: objects for daily use, objects associated with games, toiletry, jewellery, militaria, vessels/containers, parts of furniture, objects of unknown use, remains of manufacturing. The same system has now been used on the villa materials. Also, the material from the vicus of Vitudurum as the market for Neftenbach has been included. The database of each of these sites is quite small, a fact which has to be taken into consideration in the interpretation (fig. 5). But there are quite remarkable differences between the four sites. The highest proportion of objects associated with games, jewellery and parts of furniture has been found in Augusta Raurica. It is hardly surprising that objects of adornment and entertainment prevail among the worked bones in such a relatively big, rich

city. On the other hand, objects for daily use such as handles, spoons or tools for textile work are much more frequently found in the small vicus of Vitudurum than in the colonial town of Augusta Raurica.

Toiletry objects which are a sign of high romanisation were only found in Augusta Raurica and in the villa of Biberist. An ear spoon (fig. 6, 2342) and an ear probe which has probably been sharpened (fig. 6, 3279) were identified.

The relatively high proportion of hairpins which compose most of the jewellery category in this villa (fig. 5) also demonstrates that Biberist must have been more luxurious than Neftenbach although the pars urbana of Biberist has not yet been excavated.

However, it has to be said that the hairpin-types found in Biberist are quite simple (fig. 6, 2835-3394) compared to the elaborate objects from Augusta Raurica (fig. 8). In Biberist and also in Neftenbach only types with a straight or rounded head were found, whereas in Augusta Raurica there are hairpins with ornamented or figured heads too.

One interesting object from Biberist is a tag with no inscription (fig. 6, 3206). Comparable objects from Augusta Raurica have no inscription either (Deschler-Erb 1998: table 28, no. 1968-1973). There are similar objects with scratched inscriptions from Basel (Berger/Helmig 1991: 20) or the Magdalensberg (Egger 1958: 158). Perhaps the objects from Augusta Raurica and Biberist were written on with ink which has disappeared.

Another object reflecting the higher social status of Biberist is a completely carbonized die which was found in a cremation grave in the middle of the farm (fig. 6, 1496; Schucany 1995).

Militaria have only been found in the two cities. Actually, militaria made of bone are quite rare in Roman bone material (Deschler-Erb 1998: 173; Deschler-Erb 1999).

Unidentified objects were quite often found in the two villas. On the one hand, there is a large number of small rods which could be parts of hairpins as well as sewing-needles (fig. 6, 3398 and 7, 998.1000). On the other hand, some unique types were recovered which were not present in the huge material from Augusta Raurica. We call them "*ad hoc*"-objects because they were probably produced by the villa-people themselves in a quite clumsy way. They were made just for some special use on the farm which is not easy to reconstruct. The object on figure 7 found in Neftenbach looks like a huge nail made of antler (fig. 7, 3548). The other "*ad hoc*"-objects come from Biberist. Figure 6 (2661) is a fragment which may be the quite large head of a hairpin. The very thick disk (also fig. 6, 2724) is cut from the proximal end of a cattle humerus. This object may have been used as the bung for an amphora. A bone rod with a broadened end (fig. 6, 3349) has been polished by use. Another object (fig. 6, 450) is made from an antler base and could be a sort of textile tool because it was found in a fulling-mill.

Evidence for bone working in the two villas is not only shown by what we call “*ad hoc*”-objects but also by waste objects. These objects from Biberist are all made of bone and not of antler. One specimen is a cattle long bone which has been sawn crosswise (fig. 6, 1956). Another piece is a roughly worked rod (fig 6, 1099). The traces on one of them were caused by the breaking of a finished object which might have been a hairpin or a needle. That means that also some of the typical bone artifacts found elsewhere and not only the “*ad hoc*” -objects were produced in Biberist itself. In Biberist, only knives and saws were used in bone manufacturing with no work being carried out on a turning-lathe as in Augusta Raurica for instance (Deschler-Erb 1998: 98). That means that only the simplest techniques were known at the villa.

In Neftenbach, as opposed to Biberist, there was only antler working and no bone manufacturing. Antler manufacturing is shown by some pieces of sawn antler of red deer (fig. 7, 1641-2779). Semi-finished objects have not been found. This means that all objects found in Neftenbach that were made from bone were imported from a city market.

The pieces of sawn antler account for the high proportion of antler in the bone material of Neftenbach compared to that from Augusta Raurica and Biberist (fig. 9). In the material from the *vicus* of Vitudurum, however, the proportion of antler is the same as in Neftenbach. To find the reason for this we have to look at the unworked bone material. The archaeozoological analysis of some *vici* and *villae* in Switzerland has shown that the percentage of red deer is by far the highest (fig. 10) in Neftenbach. It seems that the villa of Neftenbach was specialised in hunting and the production of venison which was carried out in house 25 mentioned earlier (Rychener et al. 1999: 455). For that reason antler must have been, in a way, the by-product of organized hunting. This material was abundant and was used for “*ad hoc*”-objects.

It is interesting that in contrast to the food remains, among which very few red deer bones were found, the proportion of red deer antler is very high in Vitudurum (fig.9). Perhaps the red deer meat of Neftenbach was a too expensive luxury article for the people of Vitudurum. Only richer people in bigger towns could afford it. On the other hand, antler seems not to have been of great interest to the people of Neftenbach so that this raw material was sold cheaply to the bone workers in the next *vicus*.

Conclusions

In both villas presented here, bone artifacts were imported and produced. The imported bone products were fancier in Biberist than in Neftenbach. Biberist was a typical big and rich villa of the midlands. In Neftenbach, however, life was more frugal though the production of luxury food must have brought in some money. The raw material used in the villas depended on the availability of the material. In Biberist hunting was of little importance. So bone artifacts were made from the bones of domestic animals. In Neftenbach hunting was very important and antler was easy to come by.

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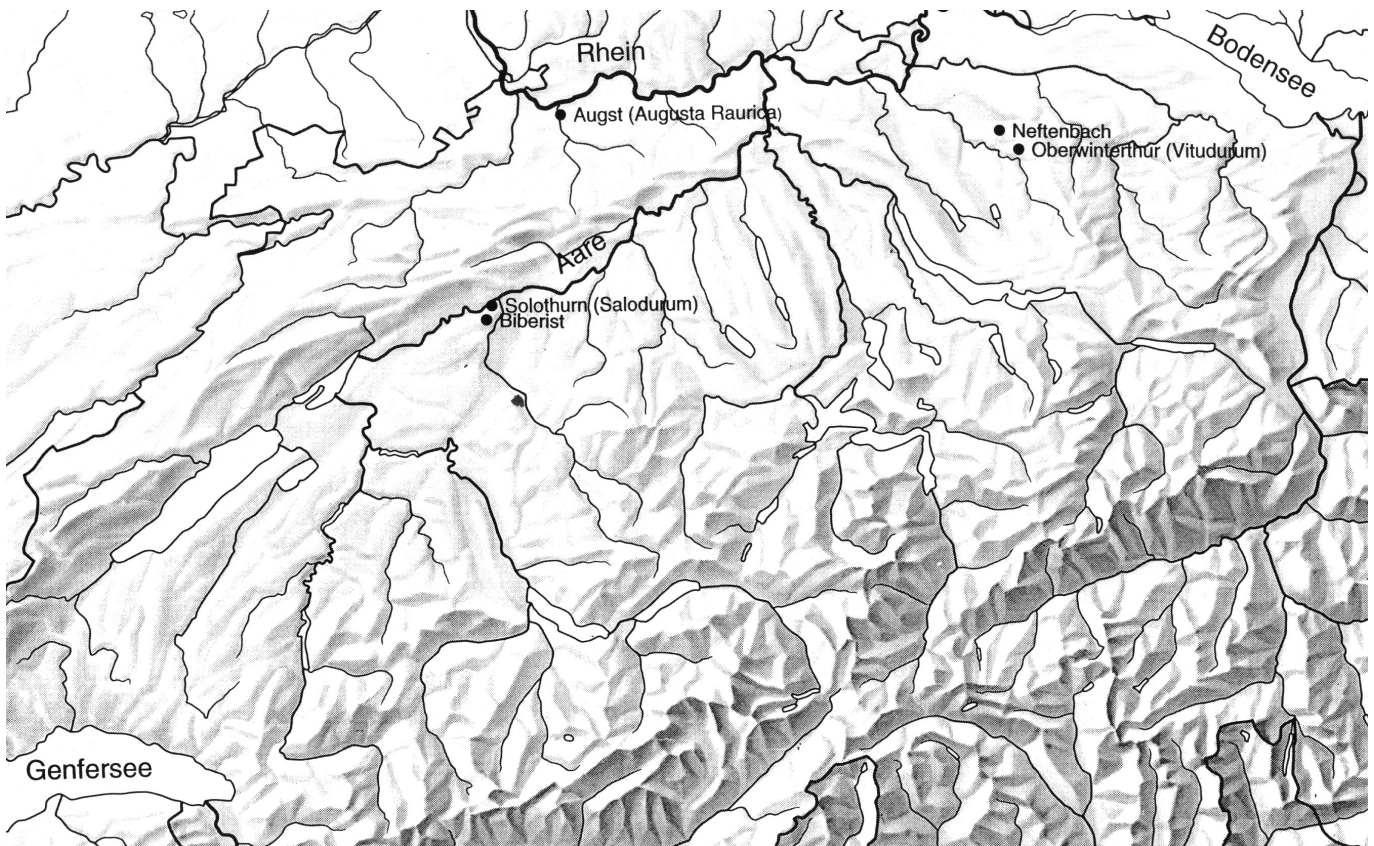


Fig. 1 Map of Switzerland with the Roman sites mentioned in this article

	n
Neftenbach	65
Vitodurum	89
Biberist	42
Augusta Raurica (excavated before 1991)	5902

Fig. 2 Number of bone artifacts from the Roman sites mentioned in this article

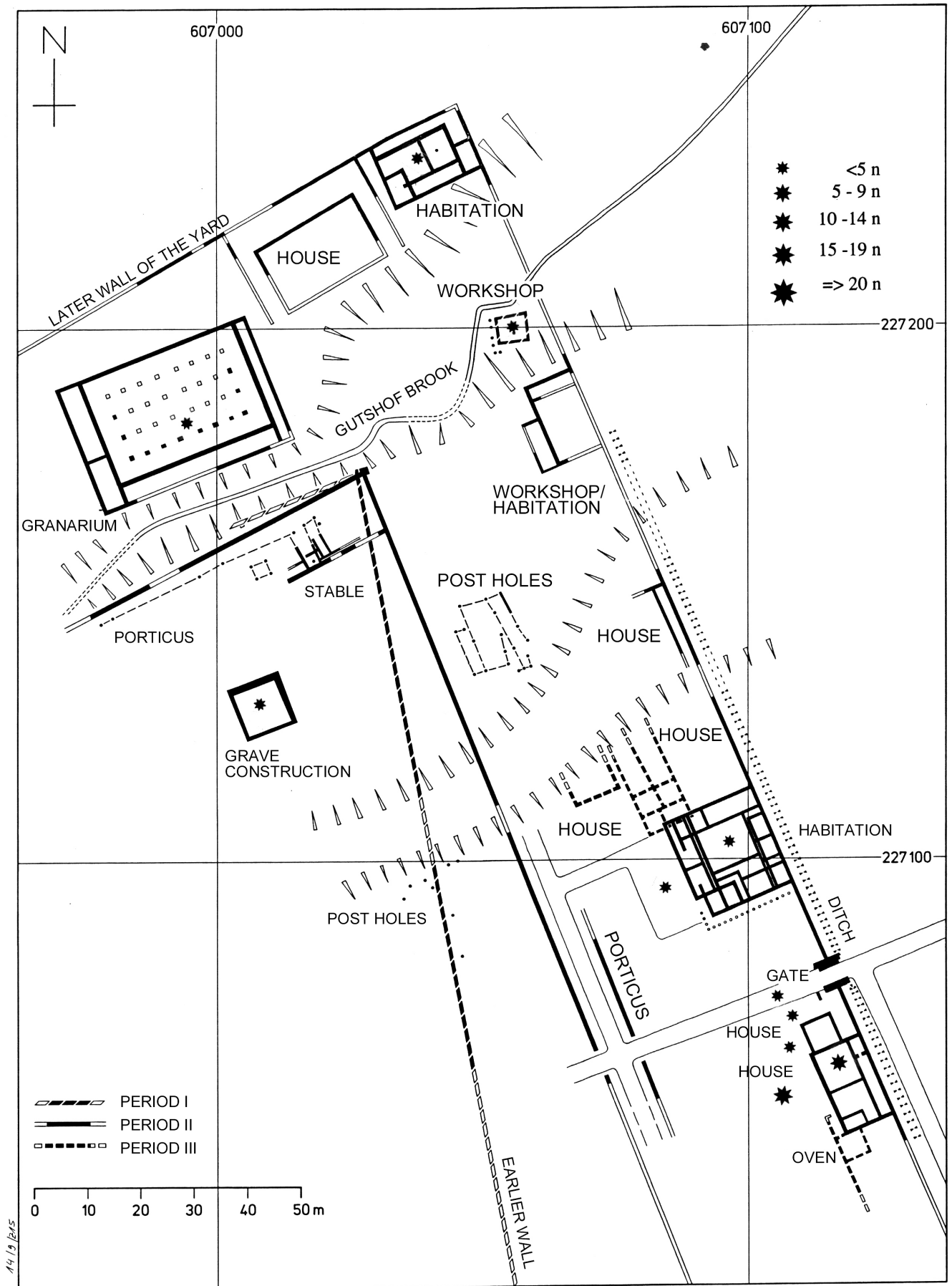


Fig. 3 Distribution map of the bone artifacts in the Roman villa of Biberist (Map Kantonsarchäologie Solothurn)

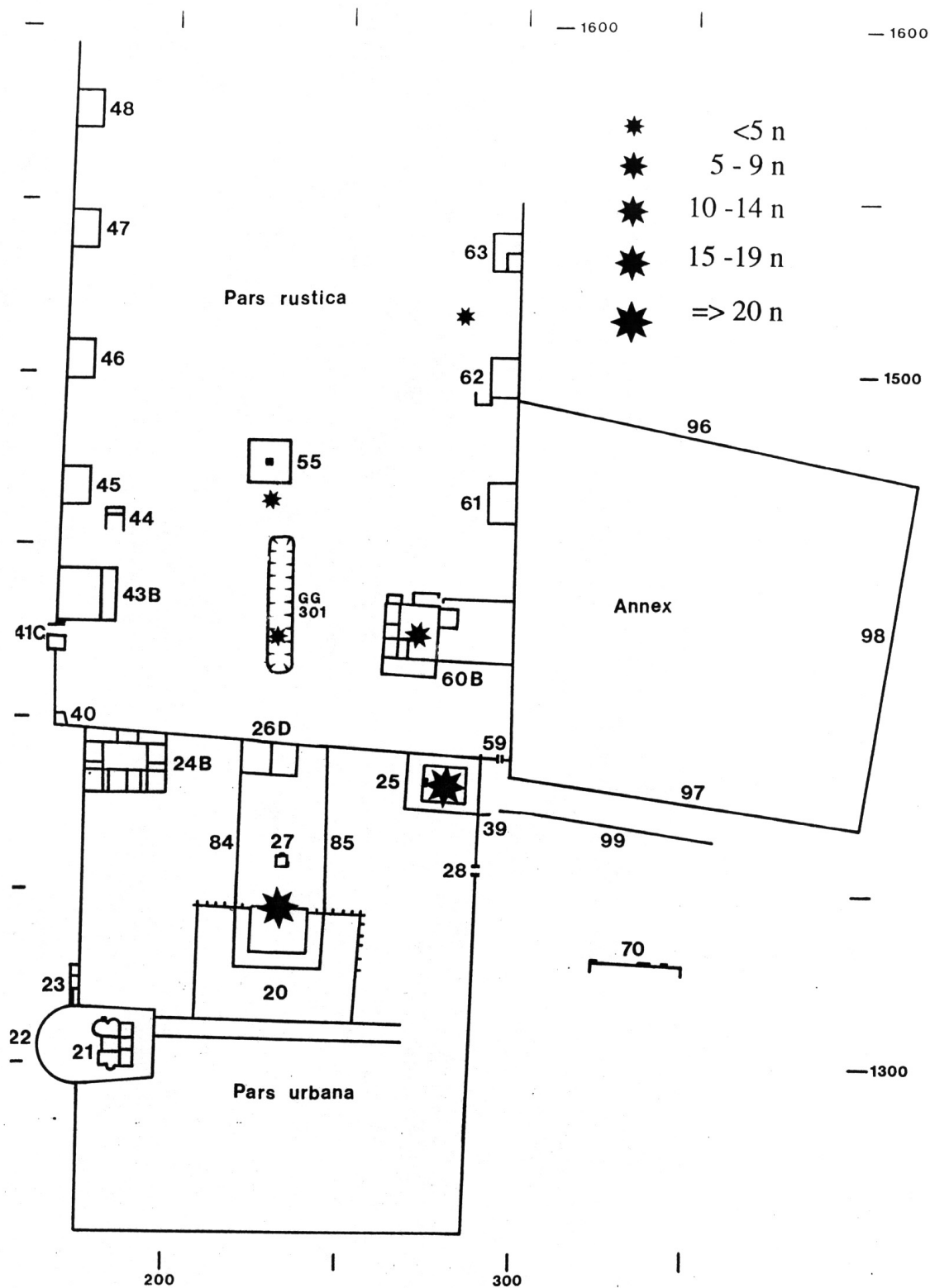


Fig. 4 Distribution map of the bone artifacts in the Roman villa of Neftenbach (Map Rychener et al. 199, 433 fig.771)

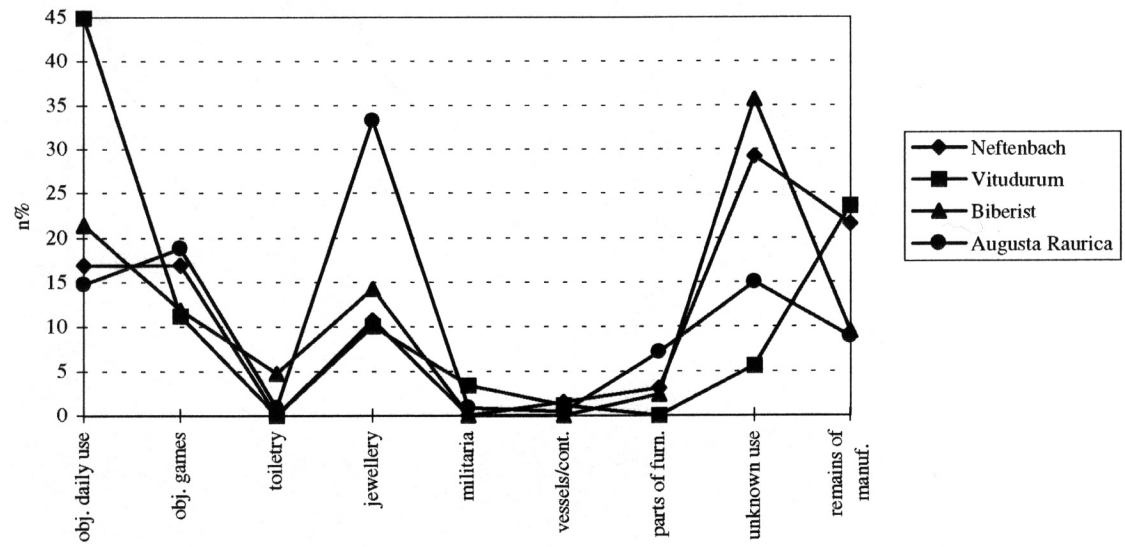


Fig. 5 Frequencies (n%) of the different categories among the bone artifacts in Biberist, Neftenbach, Augusta Raurica and Vitudurum

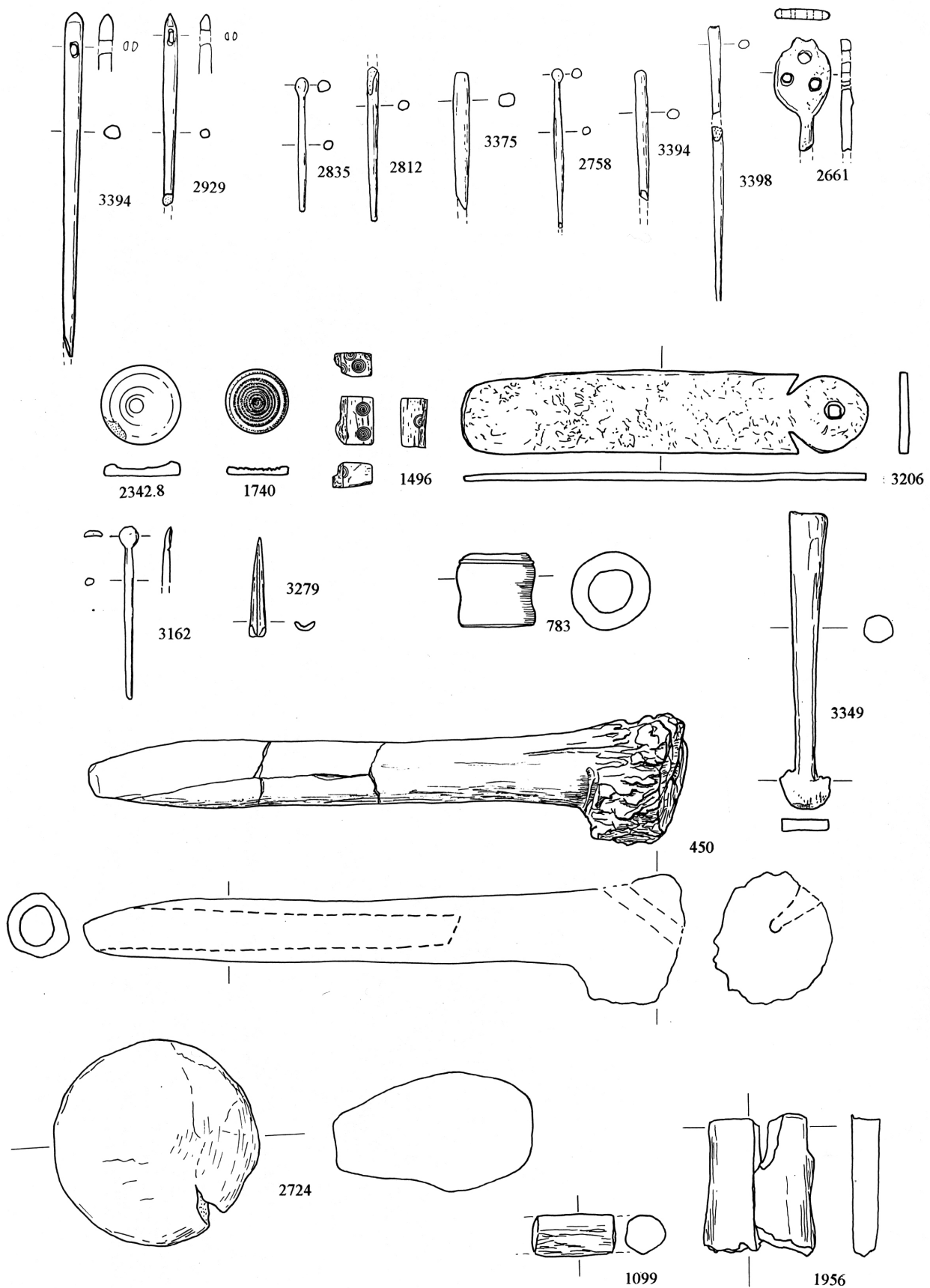


Fig. 6 A selection of the bone artifacts from the Roman villa of Biberist. (Figures by M. Krucker, Kantonsarchäologie Solothurn). Bone: 3394-2929: sewing needles; 2835-3394: hairpins; 3398 rod; 2661: hairpin (?); 2342.8.1740: counters; 1496: dice; 3206: tag; 3162: ear spoon; 3279: ear probe; 783: part of furniture; 3349.2724: unidentified objects; 1099.1956: remains of manufacturing. Antler: 450: unidentified object. (Scale 2:3)

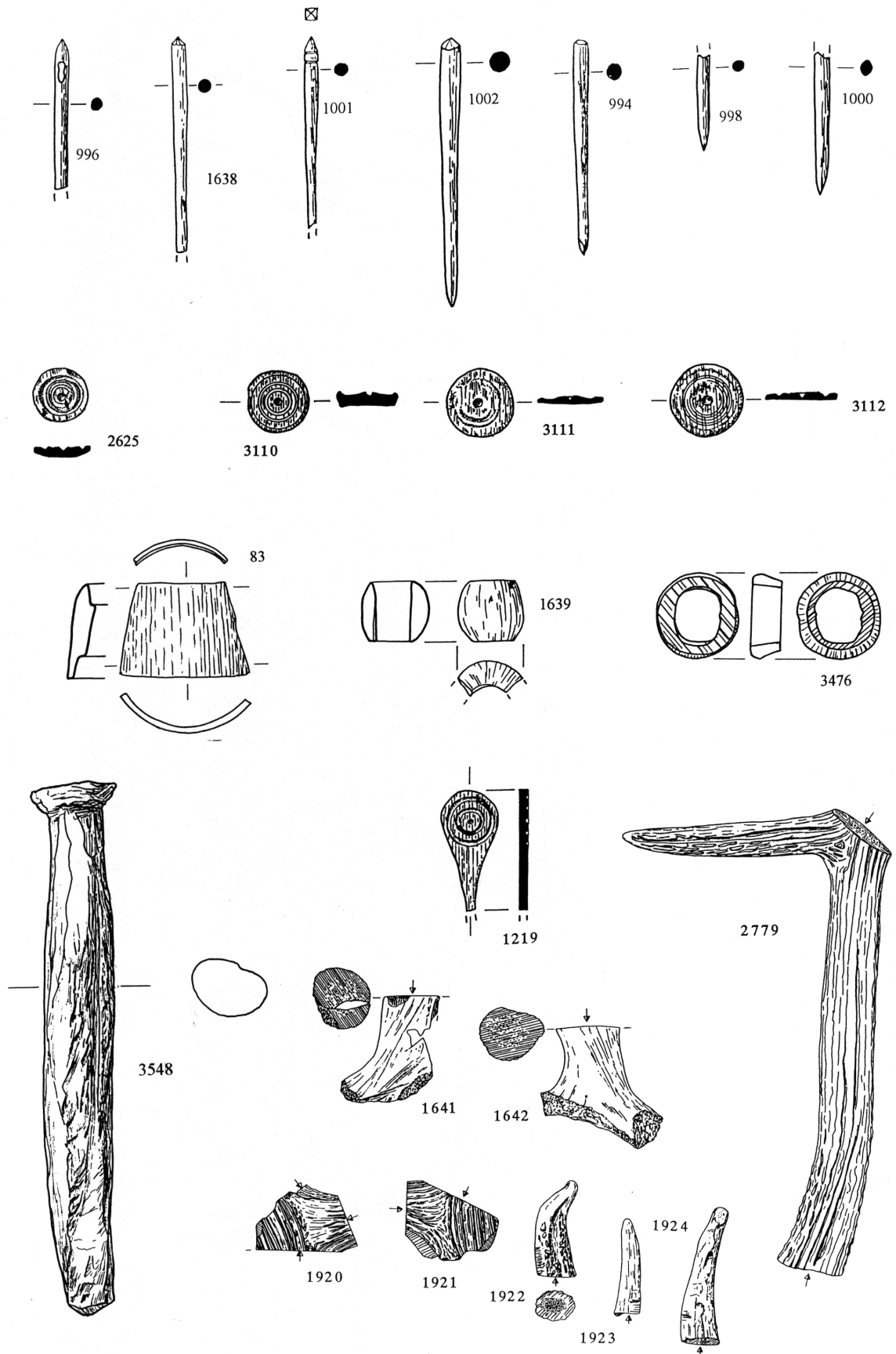


Fig. 7 A selection of the bone artifacts from the Roman villa of Neftenbach. (Figures from Rychener 1999; 3548 by M. Krucker). Bone: 996: sewing-needle; 1638, 1001, 1002, 994: hairpins; 998, 1000: rods; 2625, 3110, 3111, 3112: counters; 83, 1639, 3476: parts of furniture; 1219: unidentified object. Antler: 3548: unidentified object; 1641, 1642, 1920-1924, 2779: sawn antler pieces. (Scale 996-1219: 2:3; 1641-2779: 1:3)

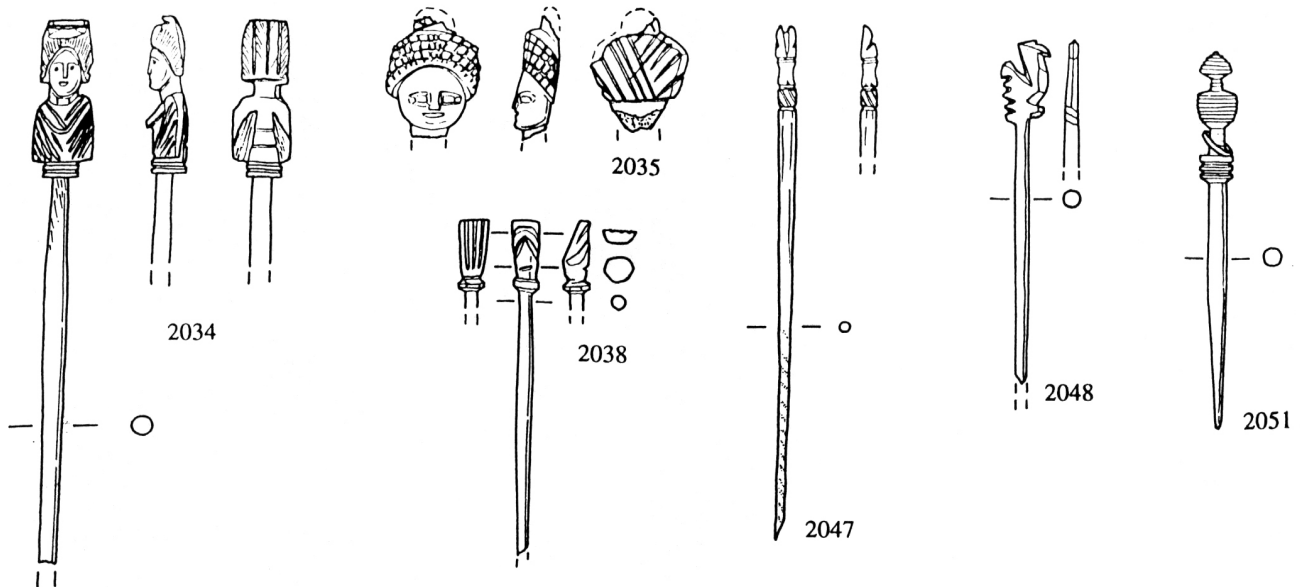


Fig. 8 Some bone hairpins of Augusta Raurica. (Figures from Deschler-Erb 1998: Scale 2:3)

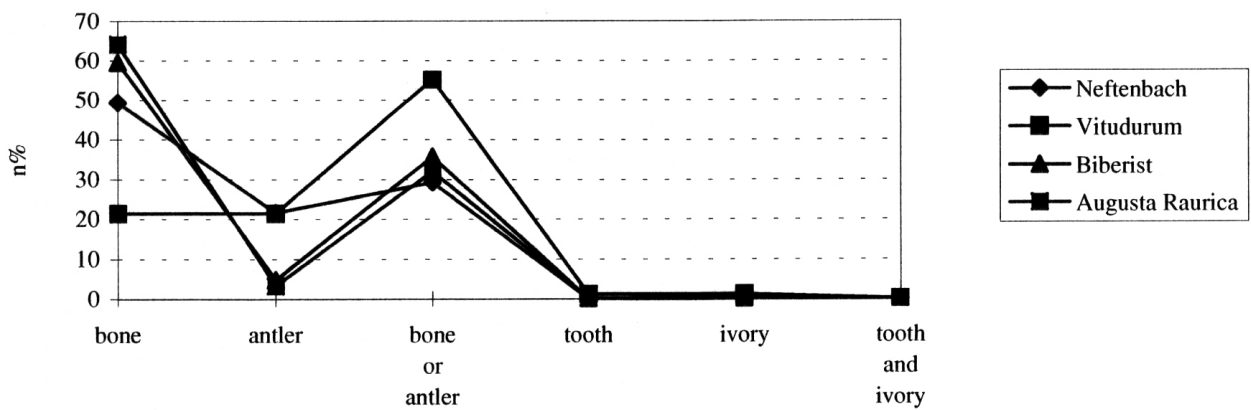


Fig. 9 Frequencies (n%) of the different raw materials among the bone artifacts in Biberist, Neftenbach, Augusta Raurica and Vitudurum

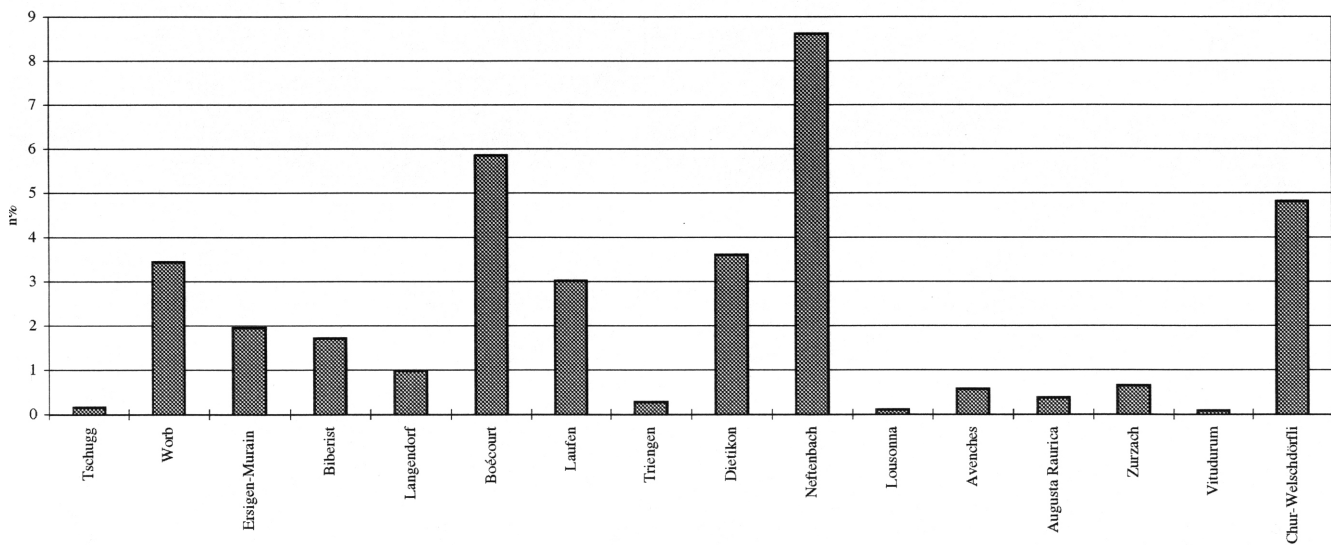


Fig. 10 Frequencies (n%) of unworked red deer bones at some Roman sites in Roman Switzerland (after Deschler-Erb, in print)