

# CRAFTING BONE – SKELETAL TECHNOLOGIES THROUGH TIME AND SPACE

Proceedings of the 2<sup>nd</sup> meeting of the (ICAZ) Worked Bone Research Group

## Editors

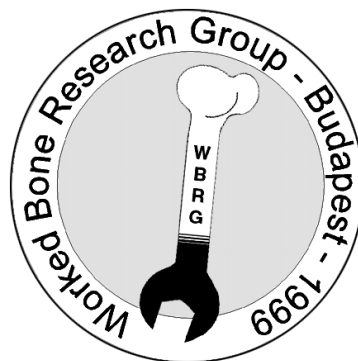
Alice M. Choyke & László Bartosiewicz

## Technical editors

Krisztián Kolozsvári  
Mrs. Katalin Kővágó - Szentirmai

## Infrastructural support by

The staff of the Roman Department of the Aquincum Museum



Worked Bone Research Group 2<sup>nd</sup> Meeting  
Budapest 31 August – 5 September 1999

**BAR International Series**

2001

# Table of Contents

<b>Introduction</b> .....	III-IV
 <b>General Theory</b>	
Genevieve LeMoine – <i>Skeletal Technology in Context: An Optimistic Overview</i> .....	1
 <b>Raw Material Exploitation</b>	
Lyuba Smirnova – <i>Utilization of Rare Bone Materials in Medieval Novgorod</i> .....	9
Liina Maldre – <i>Bone and Antler Artefacts from Otepää Hill-fort</i> .....	19
Sabine Deschler-Erb – <i>Do-it-yourself Manufacturing of Bone and Antler in Two Villas in Roman Switzerland</i> .....	31
Rosalia Christidou – <i>Study of Bone Tools at Three Late/Final Neolithic Sites from Northern Greece</i> .....	41
 <b>Manufacturing Technology</b>	
Jörg Schibler – <i>Experimental Production of Neolithic Bone and Antler Tools</i> .....	49
Daniella Ciugudean – <i>Workshops and Manufacturing Techniques at Apulum (AD 2<sup>nd</sup>-3<sup>rd</sup> Century)</i> .....	61
Kitty F. Emery – <i>The Economics of Bone Artifact Production in the Ancient Maya Lowlands</i> .....	73
Karlheinz Steppan – <i>Worked Shoulder Blades: Technotypological Analysis of Neolithic Bone Tools From Southwest Germany</i> .....	85
Noëlle Provenzano – <i>Worked Bone Assemblages from Northern Italian Terramare: A Technological Approach</i> .....	93
Aline Averbouh – <i>Methodological Specifics of the Techno-Economic Analysis of Worked Bone and Antler: Mental Refitting and Methods of Application</i> .....	111
 <b>Function</b>	
Mária Bíró – <i>A Round Bone Box Lid with a Mythological Representation</i> .....	123
Cornelia Becker – <i>Bone Points - No Longer a Mystery? Evidence from the Slavic Urban Fortification of Berlin-Spandau</i> .....	129
Mickle G. Zhilin – <i>Technology of the Manufacture of Mesolithic Bone and Antler Daggers on Upper Volga</i> .....	149
Tina Tuohy – <i>Bone and Antler Working on the Iron Age Sites of Glastonbury and Meare in Britain</i> .....	157
Gitte Jensen – <i>Macro Wear Patterns on Danish Late Mesolithic Antler Axes</i> .....	165
Yekaterina Antipina – <i>Bone Tools and Wares from the Site of Gorny (1690 - 1410 BC) in the Kargaly Mining Complex in the South Ural Part of the East European Steppe</i> .....	171
Andreas Northe – <i>Notched Implements made of Scapulae - Still a Problem</i> .....	179
Janet Griffiths – <i>Bone Tools from Los Pozos</i> .....	185
Sandra L. Olsen – <i>The Importance of Thong-Smoothers at Botai, Kazakhstan</i> .....	197
Janet Griffiths and Clive Bonsall – <i>Experimental Determination of the Function of Antler and Bone 'Bevel-Ended Tools' from Prehistoric Shell Middens in Western Scotland</i> .....	207
 <b>Social Context</b>	
Isabelle Sidéra – <i>Domestic and Funerary Bone, Antler and Tooth Objects in the Neolithic of Western Europe: a Comparison</i> .....	221
George Nash – <i>Altered States of Consciousness and the Afterlife: A Reappraisal on a Decorated Bone Piece from Ryemarksgaard, Central Zealand, Denmark</i> .....	231
Nerissa Russell – <i>The Social Life of Bone: A Preliminary Assessment of Bone Tool Manufacture and Discard at Çatalhöyük</i> .....	241
Alice M. Choyke – <i>Late Neolithic Red Deer Canine Beads and Their Imitations</i> .....	251
Colleen Batey – <i>Viking and Late Norse Combs in Scotland: An Update</i> .....	267
Nerissa Russell – <i>Neolithic Relations of Production: Insights from the Bone Tool Industry</i> .....	271

**Special Assemblages**

Péter Gróf and Dániel Gróh – *The Remains of Medieval Bone Carvings from Visegrád* . . . . . 281  
László Bartosiewicz – *Roman Period Equid Ilium Implement from Pannonia Superior (NW Hungary)* . . . . . 287  
E.E. Bulten and Anneke Clason – *The antler, bone and tooth tools of Swifterbant, The Netherlands (c. 5500 – 4000 cal. BC) compared with those from other Neolithic sites in the western Netherlands* . . . . . 297  
Heidi Luik – *Bone Combs from Medieval Tallinn, from the Excavations in Sauna Street* . . . . . 321  
Steven R. James – *Prehistoric Hohocam Bone Artifacts from Southern Arizona: Craft Specialization, Status and Gender* . . . . . 331  
Arthur MacGregor and Ailsa Mainman – *The Bone and Antler Industry in Anglo-Scandinavian York: the Evidence from Coppergate* . . . . . 343  
Ernestine Elster – *Middle Neolithic to Early Bronze Age Bone Tools from Sitagroi, Greece* . . . . . 355  
Ülle Tamla and Liina Maldre – *Artefacts of Bone, Antler and Canine Teeth among the Archaeological Finds from the Hill-Fort of Varbola* . . . . . 371  
Kordula Gostenčnik – *Pre- and Early Roman Bone and Antler Manufacturing in Kärnten, Austria* . . . . . 383  
*Index of Authors* . . . . . 399



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 Bíró, Kordula Gostenčnik, Eszter Kovács, Christopher Morris, Sabine Deschler-Erb, Ans Nieuwenberg-Bron, Katalin Simán, Isabelle Sidéra, Mickle Zhilin

## CRAFTING BONE - SKELETAL TECHNOLOGIES THROUGH TIME AND SPACE

### Proceedings of the 2<sup>nd</sup> meeting of the (ICAZ) Worked Bone Research Group

Budapest, September 1999

#### 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 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.

## **BONE AND ANTLER WORKING ON THE IRON AGE SITES OF GLASTONBURY AND MEARE IN BRITAIN**

Tina Tuohy

**Abstract:** This paper will focus on long handled combs made of antler and bone found at Glastonbury and Meare and considered by the excavators to be part of a flourishing textile industry. Study of their manufacture marks, wear patterns and distribution have suggested a different function for these tools and have also given some indication of how their production and use varied between the sites. A domestic function is proposed for Glastonbury whereas those at Meare present a more complex picture of comb manufacture for trade and exchange and for their use in other crafts. All reference numbers given for combs are taken from my own Catalogue (Tuohy 1999, II).

**Keywords:** Medieval, England, long handled combs, production, trade, function

**Résumé:** Cet article se concentrera sur l'étude des peignes à long manche en os et bois de cervidé mis au jour à Glastonbury et Meare et considérés par les fouilleurs comme les témoins d'une industrie textile florissante. L'étude de leurs traces de fabrication, de leurs stigmates d'utilisation et de leur distribution, a suggéré une autre fonction pour ces outils et a également fourni quelques indications sur les différences concernant leur production et leur utilisation dans les deux sites. Pour Glastonbury, nous proposons une fonction domestique tandis que pour Meare se dégage l'image plus complexe d'une fabrication à but de commerce et d'échange en liaison avec l'utilisation de ces objets dans d'autres activités artisanales. Toutes les références données pour les peignes sont issues de mon propre catalogue (Tuohy 1999, III).

**Mots-clés :** Moyen Age, Angleterre, peigne à long manche, production, commerce, fonction

**Zusammenfassung:** Dieser Beitrag konzentriert sich auf die Beschreibung von Griffkämmen, hergestellt aus Geweih und Knochen. Sie wurden in Glastonbury und Meare gefunden und von den Ausgräbern als Bestandteile einer florierenden Textilverarbeitung interpretiert. Die Untersuchung der Herstellungs- und Abnutzungsspuren sowie ihrer Verteilung läßt es jedoch plausibel erscheinen, daß sie verschiedene Funktionen besaßen und sowohl ihre Herstellung wie ihre Verwendung von Siedlung zu Siedlung variierte. Für Glastonbury wird eine Funktion im häuslichen Bereich angenommen, während die Funde aus Meare auf ein komplexes Netz der Kammproduktion für Handel und Tausch sowie deren Verwendung auch in anderen Handwerken hinweisen. Alle hier für die Käämme angegebenen Referenznummern sind meinem Fundkatalog entnommen (Tuohy 1999, II).

**Schlüsselworte:** Mittelalter, England, Griffkämme, Herstellung, Handel, Funktion

**Zusammenfassung:** Ausgrabungen in stratifizierten Moorsiedlungen, die von dem Autor während des vergangenen Jahres an der Oberen Wolga durchgeführt wurden, haben eine große Zahl verschiedener Typen an Knochenartefakten ans Licht gebracht, einschließlich zahlreicher Dolche und Jagdmesser. Rohstücke und halbfertiggestellte Dolche wurden zusammen mit Silexgeräten gefunden, die für die Knochenbearbeitung Verwendung fanden.

**Schlüsselworte:** Mesolithische Knochendolche, Obere Wolga, Technologie, Herstellung.

Arthur Bulleid and Harold St George Gray excavated the Iron Age sites of Glastonbury and Meare in the late 19th and early 20th century. The two sites were situated in what are now the Somerset Levels and were about 3km apart. The Glastonbury Lake Village (GLV) was a large man made island built into flooded swamp with a deep water channel running along one side and as such only accessible by water. The two Meare Lake Villages, known as Meare Village West (MVW) and Meare Village East, (MVE) were in fact built on raised bog and separated by a 75m area of wet lag or swampy ground. These sites were accessible by land in summer but vulnerable to heavy flooding in winter, and thus not suitable for all year round habitation. Occupation started in the 3rd century BC and continued until the end of the Millennium when all three

sites were abandoned due to adverse weather conditions. Subsequently the sites were overlaid by peat and sealed with clay until the 19th century when shrinkage caused by peat extraction led to their discovery. These overlying deposits of peat have meant that antler and bone were well preserved.

Bulleid and Gray envisaged a single-phase site of some 90 dwellings, which although undergoing repairs from time to time, remained in use throughout the length of occupation. Central to the discussion were the excavated 'Mounds' which they saw as dwellings. These mounds were thought to be the floors of circular houses. Excavations showed that the brushwood and rubble platform, on which the village stood, had been built on the surface of the marsh. On this surface clay

floors with central hearths had been laid. As wear and tear on these floors caused them to sink into the foundation new clay floors were superimposed, accompanied by further hearths. As a result artefacts sealed on any one particular floor could be said to be contemporary. However, in the excavation reports, whereas many of the artefacts when found were assigned to certain floors, others were assigned to the Mound only. As such they could have been in use over a period of 200 or more years, which makes assessment difficult.

In 1995 John Coles and Stephen Minnitt did a re-assessment of Glastonbury and obtained a series of radiocarbon dates. They showed that the site as one that was continually changing, expanding and contracting over time. They interpreted the Mounds as not only houses but also work floors of clay with open hearths, or work shelters. They proposed four main phases. Early, 250 – 225 BC, Middle, 225 – 175 BC, Late, 175 – 90 BC, and a Final Phase when the site was going out of use, 80 – 50 BC. This phasing has made a considerable difference to the interpretation of craft industries on the site.

Bulleid and Gray proposed the textile industries of Glastonbury and Meare on artefactual evidence. At Glastonbury they found 45 loom weights for use with warp weighted looms, 195 spindle whorls, scattered over the site, wooden frames, thought to be parts of a loom, bone bobbins and gouges, and most important, 89 long handled combs. Eighty-one of these were made of antler and the rest of bone. In addition to these, 130 were found in Meare West and another 90 at Meare East. Added together these combs totalled 309; half the known combs in Britain at the time of excavation and still a large proportion today. Their supposed association with textiles lead to them being known as Weaving combs. The combs have an average length of 150mm with an average width at the teeth of 30mm. They are dentated at one end and the butts can differ in shape. There are usually between 8 and 13 teeth. Length and shape varies and cannot be clearly estimated as many have been worn down or broken through use. Combs can be plain in appearance or decorated with linear designs or ring and dot patterns, or a mixture of both. Bone used originated from ox, horse or whale but the preferred material was antler. The beam of the antler was used after the tines had been removed. It was split down the centre or occasionally from the outside depending on the size and circumference of the beam. After this the teeth were cut to size and polished. Manufacture evidence is found at Glastonbury (Tuohy 1995) and also at Meare.

The combs were suggested for use with a warp weighted loom for beating up the weft during the making of cloth. My research, however, has shown that, as the main wear is found on the inner side of the outer teeth, eventually resulting in their breaking off from the inside outwards, they are more likely to have been used with narrow widths such as for the making of braids. Combs vary in size and weight as do spindle whorls for spinning different weights of yarn. Equally combs could have been used to make braids for anything from ribbons to halters for animals or carrying straps and

would have been in great demand on most settlements. (Tuohy 1999).

Bulleid and Gray's proposal arose from a proliferation of possible textile tools distributed over all three sites and presumed to be more or less constantly in use. However, the recent re-assessment of Glastonbury and the evidence from Meare present a different picture. Whereas some combs may be associated with textile equipment such as spindle whorls, or loom weights, or bobbins, many more are associated with antler waste, with saw and cut marks, and show evidence of manufacture and repair. This suggests two separate activities, that of braiding and comb manufacture. To determine this one should consider what evidence to look for. Both activities would require good light and a separate workspace. For evidence of braid making one would expect to find groups of combs, worn and with broken outer teeth, spindle whorls for extra yarn or bobbins for use with different colours. For comb making one could expect to see quantities of antler waste, combs in manufacture or evidence for repairs such as teeth which have been recut after use.

### Glastonbury

Most mounds (M) in Glastonbury have antler but only in small quantities. Some have groups of combs and of these the most promising are M.37 with four, M.74 with seven, M.70 with seven, M. 65 and attached clay spreads of 62-64, with eight and M.42 with nine.

*Mound 37.* Small spread of yellow clay in the centre of the settlement suggested as a weaving area by both Bulleid and Gray (1948); Coles and Minnitt (1995). It produced 9 loom-weights in the Middle Phase and 'several' in the Late phase. Also found were holes that may have been used for looms, warping frames or drying racks for dyed wool. In addition there were 6 spindle whorls, bobbins and 4 combs. If the combs were used to form a strip or braid at the top of the warp to attach it to the loom, this could well have been the focus for weaving for the settlement but is not likely to have been more than that.

*Mound 74.* Seven combs came to light here. In the Early phase M.74 is a house with no combs. In the Middle phase an extended work floor is added and used for metalworking. GLV66 belongs to this Phase, found in the house, a fine comb but very little used. In the Late Phase, the work floor is relaid and extended again and 6 combs are found. Two are unfinished, GLV62 with unfinished teeth and GLV54 with unfinished teeth and decoration of ring and dot. This leaves four for weaving. GLV55 is in fragments; GLV65 and 66 are heavily worn while the outer teeth of GLV61 have been worn down, and re-smoothed for further use. Only 3 spindle whorls and no loom weights or other tools were found. This suggests braid making on a small scale for family use (fig.1).

*Mound 70.* Seven combs were found associated with loom weights and 10 spindle whorls. The house was built in the

Middle Phase, no combs were found. In the Late Phase the house was refurbished and subsequently burnt down. The combs and other artefacts were found sealed under ash on one floor. Of the combs two were fragments with no teeth, GLV52 was worn out. GLV48, 49 and 51 have an exactly similar decoration found nowhere else as finished combs, other than one in M.78 next to the complex at M65. These combs have the same decoration but the size of the teeth appears to differ. GLV44 once had long medium teeth, lost since excavation, and wear suggests braid making. In addition a matching necklace of bone was found. A set of matching combs and a necklace of similar design suggests that this was one worker with a special set of tools rather than several braidmakers working together. Charred bone of one adult humerus and two from children were found at the back of the hut.

*Mound 65 and adjacent spreads at 62 - 64.* M.65 was a house built in the Late Phase and continuing into the Final Phase. Also in the late Phase were attached clay spreads at 62, 63 and 64. By the Final Phase only 65 and 64 remain. M.65 has no evidence for weaving or braids other than two spindle whorls and no evidence for comb manufacture. Therefore work was being done on the spreads. In the Late Phase, 4 combs were found on M.62. GLV9 is worn out, GLV78 is a fragment without teeth, GLV11 also worn and GLV15 has wear on the outer teeth. On M.63 there were 2 combs. GLV8 is a fragment without teeth and GLV13 has worn teeth and a distinctive pattern found at Meare, so it may have been acquired from there. Also on these spreads were 13 spindle whorls, 10 bobbins and some bone needles. This is the only possible candidate for large scale working and maybe the braid making centre for the settlement (fig.2).

*Mound 42.* One of the 9 combs was made from an ox metatarsal. M.42 was a sheltered work area principally in use in the Final Phase. Several of the combs were worn and one appears to have been hurriedly made up out of a piece of bone. Others have designs unusual for Glastonbury. GLV12,19 and 69 have square butts normally associated with the East coast of Britain. GLV70 and GLV19 are both very unusual designs, not normally seen at either Glastonbury or Meare. Other combs are well worn. These combs were in use in the Final Phase which Coles suggests as one of seasonal summer visits by people who came to exploit the wetland resources and maybe to do some craftworking at the same time. This suggests seasonal workers coming in from a number of places and bringing their combs with them. It is proposed that, far from there being a flourishing textile industry at Glastonbury, only domestic production continued for local people living on site (fig. 3).

### **The Meare lake villages**

Excavations on the Meare settlements started in 1909 and, with breaks for the two World Wars, continued until 1956. By this time Bulleid had died and Gray was 84. Meare West was published in three volumes between 1948 – 1966. Meare East was left unrecorded until in 1987 when Coles collected all the available evidence and wrote up a report. (Coles 1987).

Although Meare Village West had a few substantial buildings in its very early phases, most of the structures found at both sites were flimsy and may have been tents, shelters or wind-breaks. There was much evidence for craftworking in glass, metal, pottery, antler and shale. The sites are on the borders of three tribal territories, the Dobunni, Durotriges and the Dumnoni. These three facts suggested to Coles that the Meare Villages were a place for seasonal craft fairs on neutral ground where groups could meet for work, trade and exchange (Coles 1987).

### **Meare Village West**

This area has had no re-assessment similar to Glastonbury and as a result evidence is very much more difficult to sort out. Not only are the structures and floors more confused in plan but also the demise of the site through severe flooding has meant that many of the artefacts may have been swirled around in the waters and thus been displaced.

One hundred and thirty combs came from Meare West and these occur in large groups accompanied in many cases by large quantities of worked antler and waste, e.g. M38 with 49 pieces. It is also apparent that antler was being brought in from a number of different locations and that its quality varied as a result. As well as evidence for ongoing repairs, manufacture is also indicated. A linear design peculiar to Meare was locally distributed and occasionally in other parts of the country (fig. 4). These linear patterns can also be associated with Ring and Dot designs and some combs were also very elaborately decorated. This suggests that combmakers were gathering here to produce combs of a specific design and may even have set up particular workshops. There is also evidence for braid making. Mounds with several combs include M.7 with 28, M.9 with 15, M.22 with 17, M.24 with 7 and M.34 with 17 specimens. Of these M.9 and M.24 have their combs assigned to Mound only and are therefore out of context.

*Mound 22.* Seventeen combs were found here, MVW58, MVW68, and MVW116-130. Bulleid noted that ten were found lying together, MVW118-128 on Floor 2. Of the ten supposedly found together, MVW118-122 were close to the NW of the hearth. MVW124, 127 and 128 were on the other side of the floor, MVW123, a whalebone comb, was on Floor 1. MVW125 was lying in a modern ditch which cut through the Mound, MVW126 was outside the Mound and MVW117 assigned to the Mound only, and out of context. Of the other combs MVW58 was not on the plan, MVW126, 116 and 68 were outside the Mound and MVW125, 129 and 130 were in the ditch. Therefore only seven could be considered. These all show heavy wear and MVW130 has had its teeth recut. Eleven spindle whorls and 3 bobbins were found. All the combs found in the ditch had the Meare Linear design and antler waste was apparent so there might be evidence for both comb and braid manufacture on a production scale. However disturbance of the site by the roots of thorn bushes on the banks of the ditch and possible dispersal of artefacts by flooding in antiquity, makes the evidence unreliable (fig. 5).



*Mound 7.* Twenty-eight combs. MVW 1-13, 15-29. M.7 was a substantial work shelter used in two episodes. A heavy layer of brushwood was covered by a thick layer of occupation soil within which were two floors, 7 and 8. This formed Phase 1. Above this 6 more floors constituted Phase 2. Ten combs come from Phase 1 and 14 combs from Phase 2. Four are assigned to the mound only and therefore out of context. There were also 49 pieces of worked antler some finished goods and the rest was waste. Of the combs 7 had the Meare Linear design. Two of these had linear as well as ring and dot patterns and appear to have been made as a matched pair. There was evidence for manufacture from MVW20 (unfinished teeth), and MVW23 (an unfinished perforation in the lower half of the comb). Based on average comb measurements MVW28 appears to have been a full-length comb where the teeth have been cut into the design. This suggests that plain combs were being made and decorated to order. Manufacture and repair evidence as well as combs with the Meare linear design being distributed through both phases suggests an antler workshop where combs were made and repaired. Of the remaining combs, 11 have heavy wear and there were two double ended combs. MVW2 and 19 with different sized teeth at either end thus in effect making four combs, 15 in all. Also found were 34 spindle whorls and 20 bobbins. Thus braid making was also taking place on the spot along with repairs for broken combs.

*Mound 34.* Seventeen combs from here included, MVW90-91, 93-96, 98-101 and MVW103-108. M34 was a large work area with six floors and several hearths where a variety of different crafts were practiced. Of the combs MVW76 was out of the Mound and most of the rest were assigned to the Mound and out of context. Only 12 can be said to be on one level. These were found near the centre and a series of superimposed hearths. Three were Meare linear combs, two had very elaborate designs with interlinked circles, and there was also evidence for manufacture and repair. Two combs had recut teeth (fig. 4, MVW94). Three combs were full length with teeth cut to order. Others had attempted perforations. Thus there was strong evidence for comb manufacture. In addition there were 47 spindle whorls and 5 bobbins for extra yarn. This suggests that both comb and braid making went on.

*Mound 35 and Mound 24.* These two mounds were adjacent to M.34 and may have been part of a large complex of attached work areas. The combs from M.24 were out of context but those from M.35 can be considered as being from one level. Here there were 5 more combs. Three had elaborate designs and one of these was very worn with teeth ready to be recut. One had the Meare linear design and there was one recut comb, MVW97. This comb may have had the teeth recut more than once as almost one third of the design has been taken away (fig. 4). Two combs of unusual design were found lying one on top of the other. This suggests extensions of the braid and comb making activities of M.34 and, if one can use the parallel with M.42 in Glastonbury, possibly visiting braid makers had brought in tools from elsewhere.

### **Meare Village East**

Descriptions of the mounds at Meare East taken from Bulleid's site notebooks are often brief and accompanied only by rough site sketches, so that assigning or tracking down artefacts to specific floors is difficult. The combs show little sign of manufacture on the whole, although there are some recuts. Most are heavily worn and many are broken which suggests that braid making may have been predominant. Two complexes associated with combs will be discussed here: Mounds 13-14, and M21-22 -22a.

*Mounds 13-14.* Twenty combs were found here. Coles thought this was a single unit with more than one phase. M.13 contained Phase 1 with the lower floors and hearths and M.14 was Phase 2 added on to the M.13 with 3-4 hearths. Wattle walling supporting a shelter protected the whole. Out of 20 combs overall, 19 were heavily worn, showing that extra yarn was being spun. This suggests the complex as an area for braid making on a production level.

*Mound 13.* Thirteen combs came to light here, MVE58-70. Six of these combs were heavily worn; three more have some wear and broken outer teeth and four had had their teeth recut. There were 13 spindle whorls.

*Mound 14.* Six combs, MVE71-77, were found at this location. Here one comb had had its teeth recut and the rest were heavily worn. MVE 74 had had its outer teeth broken and subsequently smoothed off so that the comb could continue in use.

*Mounds 21 - 22.* These mounds appear to have been connected although the evidence is shaky. M.22 had two heavy clay floors including 9 hearths. There was a floor of oak boards and an ash tip between hearths 5 and 6. All these appear to have been in use at the same time. Beneath this was another layer of black earth over boards laid on peat. The mound was created probably in two phases. M.22a spread out from M.22 probably in the later clay floor stage. There were many finds, none of them were precisely located and only three combs were definitely found together MVE32-34. But within the clay floor area, which is sometime in the later Phase 2, two pairs of matched combs MVE36, 46 and MVE34, 38 were found, all with worn teeth. Evidence here is confused but as the combs are all worn, and in use, braidmaking is most likely.

### **Conclusions**

The re-assessments done at Glastonbury has enabled the study of bone and antler combs and artefacts to be separated into phases of between 50–25 years. Thus it has been possible to demonstrate that whereas comb and braidmaking continued throughout the use of the settlement it was on a domestic level for the local inhabitants. Contact with the Meare settlements must have taken place with some combs acquired from there such as GLV13.

The Meare settlements are in much need of further work. To date it is possible to suggest both comb and braid making on a much larger scale and in concentrations that suggest groups of people working together. Antler appears to have been brought to Meare from different areas, possibly to barter for new combs or to pay for the repair of those still in use. The picture that appears to be emerging is that of combmakers from different settlements meeting to work together in the summer months, possibly as part time specialists rather than working for domestic production.

## References

- Bulleid, A. & Gray, H. St George 1911. *The Glastonbury Lake Village*, Volume I. Glastonbury Antiquarian Society, Glastonbury.
- Bulleid, A. & Gray, H. St George 1917. *The Glastonbury Lake Village*, Volume II. Glastonbury Antiquarian Society, Glastonbury.
- Bulleid, A. & Gray, H. St George 1948. *The Meare Lake Village*, Volume I. Taunton Castle, Taunton.
- Coles J. M. & Minnitt S. C. 1995. *Industrious and Fairly Civilised. The Glastonbury Lake Village*. Somerset County Museum, Somerset.
- Coles, J. M. 1987. *Meare Village East: The Excavations of A. Bulleid and H. St George Gray 1932 - 1956*. Somerset Levels Papers 13.
- Gray, H. St George & Bulleid, A. 1953. *The Meare Lake Village*, Volume II. Taunton Castle, Taunton.
- Gray, H. St George & Cotton M. A. 1966. *The Meare Lake Village*, Volume III. Taunton Castle, Taunton.
- Tuohy, T. 1995. Bone and Antler Working. In *Industrious and Fairly Civilised. The Glastonbury Lake Village*, eds. J. Coles & S. Minnitt. Somerset County Museum, Somerset.
- Tuohy, T. 1999. *Prehistoric Combs of Antler and Bone*, Volumes I and II. British Archaeological Reports, British Series 285, Oxford.

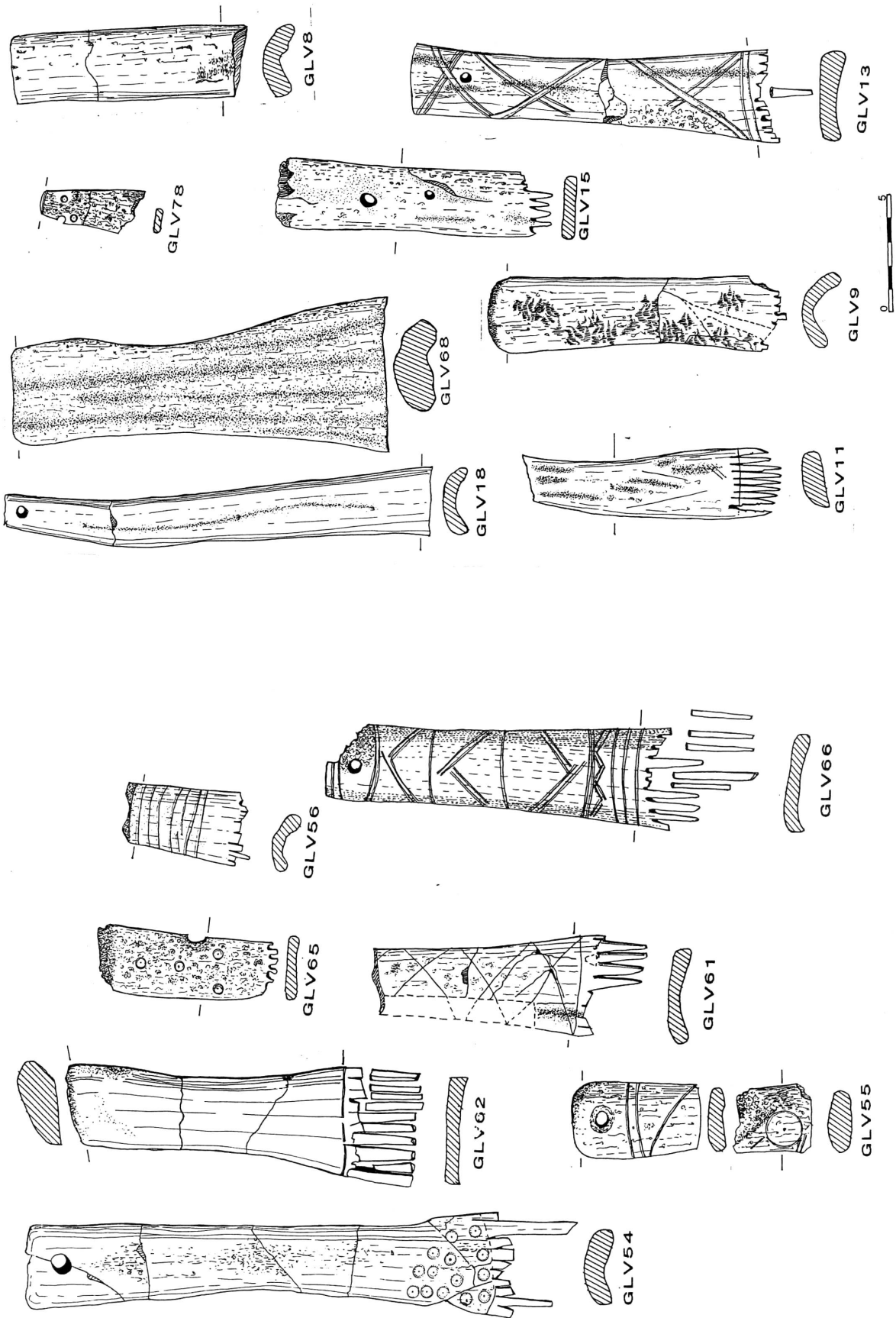


Fig. 1 Combs found on Mound 74 at Glastonbury Lake Village

Fig. 2 Combs found on Mound 65 and adjacent clay spreads at Mounds 63 and 64 at Glastonbury Lake Village

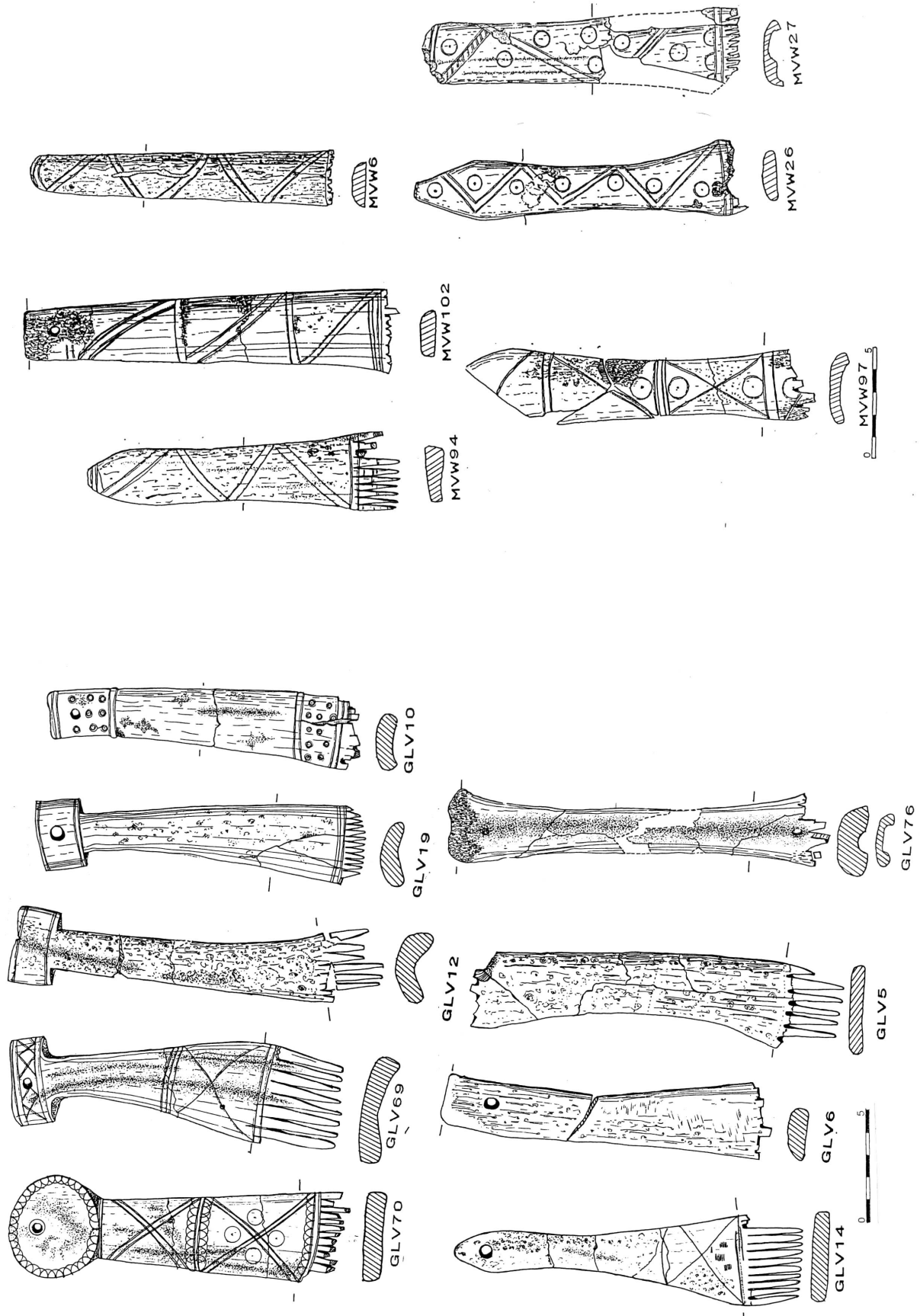


Fig. 3 Combs found on Mound 42 at Glastonbury Lake Village

Fig. 4 Combs from Meare Village West showing the Meare Linear design and combs where Linear and Ring and Dot motifs have been combined

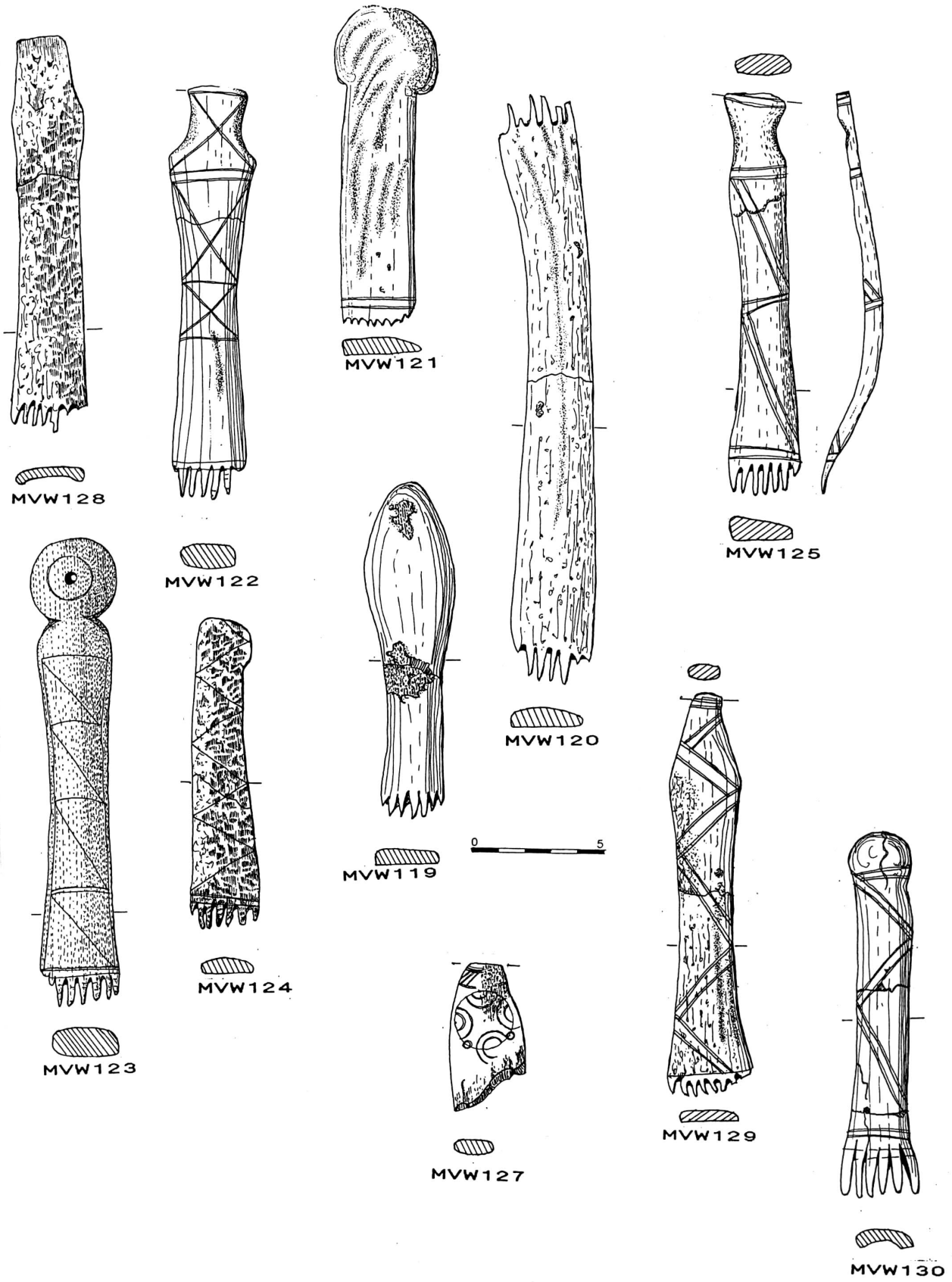


Fig. 5 Combs found on Mound 22 at Meare Village West