

**COMB-MAKING IN MEDIEVAL
NOVGOROD (950-1450).
AN INDUSTRY IN TRANSITION**

(Volume 1)

LYUBA IGOREVNA SMIRNOVA

*A thesis submitted in partial fulfilment of the requirements of Bournemouth
University for the degree of Doctor of Philosophy*

February 2002

1715 25000M

**School of Conservation Sciences
Bournemouth University**

This copy of the thesis has been supplied on condition that anyone who consults it is understood to recognise that its copyright rests with this author and that no quotation from the thesis and no information derived from it may be published without the author's prior consent

Comb-making in Medieval Novgorod (950-1450).

An Industry in Transition.

Lyuba Igorevna Smirnova

ABSTRACT

This is a descriptive and analytical study of combs used for the hygienic and aesthetic purposes of cleaning, disentangling and arranging hair. Hundreds of these products of professional artisans made out of skeletal materials and wood forming the basis of this research, derive from major excavation sites investigated during 1951-2000 in the medieval town of Novgorod (NW Russia). The site covers the extensive overall area of over 23,000sq.m bearing stratified waterlogged deposits and structures dating from ca 950 to ca 1450.

The objects in the assemblage are analysed typologically (survey of comb morphological traits) and contextually (chronological and spatial distributional analyses). As a result, chronological trends and stylistic changes are outlined with regard to combs themselves and their relationship to the immediate environment of the properties they originate from, as well as to broader contexts of the town quarters (Ends), Novgorod as a whole and, to a certain extent, to the complex of Northern European urban communities. The combs are used for gaining insights into the character and status of artisans through the analysis of aspects concerning the use of raw materials and application of specific techniques, and into the character and status of consumers. It is demonstrated that behind distribution patterns of particular comb types lie such important spheres as craft specialization, trade, the movement of commodities and shifts of fashion, reflecting the changing demands of the consumer's market.

The comb study draws out some fundamental changes in the comb repertoire and the comb-making industry in its transition from the late Viking Age through the Middle Ages. It can also be seen against the background of the development of urban society and, as such, becomes a valuable source for further comprehensive analysis of the character of life in medieval Novgorod, which involves assembling and correlating of relevant data.

TABLE OF CONTENTS

Volume 1

	pages
<i>Acknowledgements</i>	x-xi
<i>A Note on Thesis Layout, Spellings and References</i>	xii
Chapter 1. INTRODUCTION	1-11
1.1 Aims and Structure of the Study	1-2
1.2 Methods	2-5
1.2.1 The Database	2-3
1.2.2 The Typological Analysis	3-4
1.2.3 The Distributional Analysis	4-5
1.3 Problems and Limitations	6-8
1.4 An Introduction to Novgorod Excavation Sites	8-11
Chapter 2 COMBS, COMB-MAKING, COMB-MAKERS AND COMB-USERS IN NOVGOROD	12-22
2.1 Combs – A Special Category for the Study of the Dynamics of the Transition of Urban Industries. Its Role as an Interpretative Tool	12-14
2.2 Raw materials: Identification and Availability	14-21
2.3 The Assemblage of Combs from Novgorod: Primary Classification and Terminology	21-22
Chapter 3. SINGLE-SIDED COMPOSITE COMBS AND COMB CASES	23-104
3.1 Chronology	23-25
3.2 Survey of morphological traits	26-79

3.2.1 Construction	29-48
3.2.1a Combs	29-41
3.2.1b Comb Cases	42-48
3.2.2. Decorations	48-69
3.2.2a Decorative motifs	48-56
3.2.2b Decoration of billets and end-plates	57-58
3.2.2c Decorative schemes on the ornamented side-plates of combs and cases	58-69
3.2.3 Forms	69-79
3.2.3a Cases	69-70
3.2.3b Combs	70-73
3.2.3c Side-plates of combs and cases	73-76
3.2.4 Raw Materials	76-79
3.3 Review of the Main Stylistic Groups of Class 1 Combs with Comparative Analyses of Assemblages from Rytic Gorodishche, Staraja Ladoga and Other Contemporary Sites in and outside Russia	79-87
3.4 Chronological and Spatial Distribution of Single-sided Composite Combs in Novgorod Properties	87-94
3.5 Areas of Origin and Place of Manufacture.	94-104
3.5.1 Use, Loss and Disposal	94-96
3.5.2 Production	97-101
3.5.3 Distribution	101-104
Chapter 4 – SIMPLE COMBS IN SKELETAL MATERIALS	105-205
4.1 Introduction. Chronology	105-109
4.2 Survey of Morphological Traits	109-156
4.2.1. Comb Outline and Integral Parts	110-130
4.2.1a Outline	110-122
4.2.1b Teeth	122-126
4.2.1c Central zone	127-130
4.2.2. Decoration	130-146
4.2.2a Decoration of central zone	132-143

4.2.2b	Decoration of sides of comb faces	143-144
4.2.2c	Decoration of side edges	144-147
4.2.3	Raw materials	147-156
4.3	Review of the Main Stylistic Groups of Class 2a Combs with Comparative Analyses of Assemblages from Rytic Gorodishche, Staraja Ladoga and Other Contemporary Sites in and outside Russia	156-170
4.4	Chronological and Spatial Distribution of Simple Combs of Skeletal Materials in Novgorod Properties	170-188
4.5	Areas of Origin and Place of Manufacture	189-205
4.5.1	Use, Loss and Disposal	189-192
4.5.2	Production	192-203
4.5.3	Distribution	204-205
Chapter 5	– BOXWOOD SIMPLE COMBS	206-241
5.1	Introduction	206-208
5.2	Chronological and Spatial Distribution	208-212
5.3	Survey of Morphological Traits	212-231
5.3.1	Comb Outline and Integral Parts	212-222
5.3.1a	Outline	213-217
5.3.1b	Teeth	217-220
5.3.1c	Central zone	220-222
5.3.2	Decoration	223-229
5.3.3	Raw materials	229-231
5.4	Review of the Main Stylistic Groups of Class 2b Combs.	231-234
5.5	Areas of Origin and Place of Manufacture.	234-241
Chapter 6	– DOUBLE-SIDED COMPOSITE COMBS	242-319
6.1	Introduction, Chronology.	242-245
6.2	Survey of Morphological Traits	245-295

6.2.1 Construction	246-256
6.2.2 Outline	257-278
6.2.2a Front view	257-270
6.2.2b Size	270-273
6.2.2c Teeth	273-278
6.2.3 Decoration	278-291
6.2.3a Decoration of side-plates	278-288
6.2.3b Decoration of end-plates	288-290
6.2.3c Decoration of the side edges	290
6.2.3d Decoration of billets	291
6.2.4 Raw Materials	291-294
6.3 Review of the Main Stylistic Groups of Class 3 Combs with Comparative Analyses of Assemblages from Rytic Gorodishche, Staraja Ladoga and Other Contemporary Sites in and outside Russia	294-298
6.4 Chronological and Spatial Distribution of Double-Sided Composite Combs in Novgorod Properties	298-309
6.5 Areas of Origin and Place of Manufacture.	309-319
6.5.1 Use, Loss and Disposal	309-311
6.5.2 Production	311-316
6.5.3 Distribution.	316-319
Chapter 7 – CONCLUSIONS: COMB-MAKING ACTIVITIES IN NOVGOROD. HISTORICAL MODELS OF THE INDUSTRY DEVELOPMENT IN CONNECTION WITH THE SOCIAL AND CULTURAL DEVELOPMENT WITHIN THE TOWN	320-340
7.1 The Repertoire of Comb Classes	320-328
7.2 Manufacture of Combs and Raw Materials.	328-331

7.3 Use of Combs in the Urban Context: Chronological Evolution of Combs on the Background of the Social and Economic Development of the Urban Community of Novgorod	332-339
7.3.1 Early Novgorod: 10 th – early 12 th century	332-336
7.3.2 ‘Republican’ Novgorod, pre-Tartar-Mongol epoch: mid 12 th – early 13 th century	336-237
7.3.3 The Novgorod State in the mid 13 th – mid 14 th centuries	338
7.3.4 The dawn of fame: Novgorod in the late 14 th – 15 th centuries	338-339
7.4 Results and Perspectives	339-340
List of tables	341-345
List of figures	346-356
Glossary	357
List of references	358-376
List of abbreviations	377-380

TABLE OF CONTENTS

Volume 2

List of figures	<i>iv-xiv</i>
Figures	1-226
Appendix	CD

Acknowledgements

This study became possible through the provision of a 3-year bursary by the Research Committee of the School of Conservation Sciences of Bournemouth University. I owe much gratitude to the members of the Committee for this award.

My special thanks for encouragement, guidance and assistance go to my colleague and friend Dr. Peter Gaidukov, leader of the Novgorod team at the Department of Slavic Archaeology (Institute of Archaeology, Russian Academy of Sciences), from whose original ideas my involvement in the studies of artefacts in skeletal materials grew.

Since combs became my passion from my very first season in the Novgorod excavations in 1981, I am grateful to the late Dr. Olga Davidan, a recognised comb expert and former curator of archaeological collections from Staraja Ladoga (the State Hermitage, St.-Petersburg) for her experienced guidance and powers of conviction to undertake detailed studies of 'bone'-working waste prior to the research on combs and other small finds in skeletal materials.

Grateful thanks are due to Dr. Irina Kuzmina (Institute of Zoology, Russian Academy of Sciences, St.-Petersburg), an animal bone expert, for her training and assistance in identification of bone, antler and ivory waste and for the opportunity to use the superb reference collection of animal bones at the Zoological Museum.

My sincere admiration and affectionate gratitude go to the late Dr. B.A.Kolchin and the late Dr. A.F.Medvedev, whose work on compilation of the archive of illustrative material (photographs, drawings) of thousands of finds uncovered during the first few decades of the excavations in Novgorod has not been given enough credit. Dr. Medvedev's archive, which I was privileged to inherit, encompassed dozens of photographs and hundreds of drawings and sketches of medieval 'bone' objects uncovered from Novgorod and elsewhere in Russia in the 1940s-1970s, personally assessed by the researcher during his work at various museums. It came to be a very useful source of information for the comparative analysis of the Novgorod assemblage, which I highly appreciate and dearly value.

Apart from my own photographs the pictures of combs taken by the late S.N.Bocharov and S.A.Orlov have been used. To both I acknowledge my debts.

Illustrators Svetlana Shapovalova, Tatiana Radygina and dozens of anonymous architect and art students from Moscow receive my warmest thanks for having made beautiful drawings of combs over years of work for the Novgorod expedition.

My colleagues at the Institute of Archaeology, Russian Academy of Sciences, Natalia Faradzheva and Dr. Nikolai Lopatin must be acknowledged for constant and patient assistance with a wide variety of minor inquiries, which popped up throughout the research.

I would like to thank a great number of museum curators and researchers at various museums and archaeological institutions whose help during the work with comb finds was of extreme significance: Galina Kozhina, Natalia Efimova and Tatiana

Varfolomeeva (the Novgorod State Museum), Dr. Natalia Astashova and Dr. Veronika Murashova (the State Historical Museum, Moscow), Dr. Sergei Tomsinsky, Natalia Foniakova and Boris Korotkevich (the State Hermitage, St.-Petersburg), Victor Labutin, Liudmila Kudrova and Tatiana Ershova (Pskov State Museum), Dr. Ingrid Ulbricht (Schleswig-Holsteinisches Landesmuseum, Schleswig), Dr. Andrew Russel and Duncan Brown (Southampton City Heritage), Anne Brundle (The Orkney Museum).

I am most grateful to my supervisors at Bournemouth University, Mark Brisbane and Mark Maltby, whose detailed guidance, challenging critical remarks, encouragement and admirable forbearance were invaluable. These words of acknowledgement are but a small token of gratitude to both for their tremendous kindness, tolerance and support.

Rob Haslam deserves words of gratitude for his willing help in setting up and carrying out the antler identification microscopic analysis and for cheering me up during troublesome periods.

Eileen Wilkes and Jeffrey Chartrand receive many thanks for providing advice and help in various aspects of computing, especially on editing digital images. Eileen's advanced knowledge in editorial matters, which she was always so eager to share, is highly appreciated too.

This study would not have been brought to completion without the uniquely pleasant working conditions between Dresden and Bournemouth provided by the School administration, all members of which are especially to be thanked. Many thanks also go to all my colleagues and friends within the Archaeology Group of the School of Conservation Sciences and beyond for providing an extremely stimulating, friendly and relaxed atmosphere to work in.

Finally, many thanks go to my husband, Stephen John Holden, the first proofreader of endless versions of the chapters, for being extremely supportive and outstandingly forbearing during the seemingly interminable time it took to complete the research. With my affectionate gratitude this study is dedicated to him.

A Note on Thesis Layout, Spellings and References

i. THESIS LAYOUT

The thesis consists of two volumes, the main text forming the body of Volume 1. Tables within the text are numbered in a single sequence separate from those accompanying graphs within illustrations (see List of Tables).

The illustrations of various kinds are compiled in Volume 2. They are all referred to as Figures without distinguishing between maps, graphs, photographs or drawings. The numbering system consists of a prime digit of 1 to 7 which corresponds to the number of the relevant chapter followed by a running number for each figure within a particular chapter (e.g. Fig. 3.12 = Figure 12 within Chapter 3). Objects are depicted in their original sizes unless stated otherwise. All combs, whether illustrated or referred to in the text, carry reference codes consisting of a letter indicating the main class of comb material (A for single-sided composite combs and comb cases, B for simple (one-piece) combs in skeletal materials, C for simple wooden combs, and D for double-sided composite combs), and an individual number within the corresponding database (e.g. C298 = comb No.298 in the database C for simple wooden combs). Detailed information for individual combs can be extracted from the databases in the Appendix.

The Appendix is comprised of the Databases A, B, C and D on the main classes of comb material is recorded on a CD attached to the back of Volume 2.

ii. SPELLINGS

For Slavonic names, the modified Library of Congress transliteration system without diacritics is used. Medieval word-forms have been transliterated according to modern spelling conventions. As for modernized forms, the 'soft sign' ('), showing that a consonant is palatalized, is included in italicized terminology (e.g. *tsar'*) and bibliographical references (e.g. Kondrat'eva = Кондратьева). It is omitted, however, when the word appears as an ordinary part of the text: hence Suzdal, rather than Suzdal', and Rus, rather than Rus'.

Excavated properties within Novgorod sites are traditionally designated by capital letters of the Russian alphabet, as are comb types in B.A.Kolchin's classification widely used by Russian archaeologists. To avoid confusion, I have retained Cyrillic names of properties and use Kolchin's comb type names in transliterated form.

iii. REFERENCES

References are completed and cited using the Harvard system. References to monographs and articles in Russian appear in the text in the form of transliterated author's name followed by the year of publication, so these references are arranged alphabetically along with all references to the papers in other languages. In the list of references each Russian entry is marked with a bracketed abbreviation (Rus.), the author's name and the title being given in Cyrillic. Only titles of monographs are doubled in transliterated form.

Chapter 1

INTRODUCTION

1.1 Aims and Structure of the Study

This research is a detailed study of a specific group of artefacts, namely combs used for the purpose of cleaning, disentangling or arranging the hair growing on the head (including moustaches and beards). The objects are analysed typologically and contextually. The Databases A-D for main comb classes (section 1.2.1) have been compiled and presented in the Appendix.

It is intended to outline the chronological trends and stylistic changes in combs themselves and in their relationship to the immediate environment of the properties they originate from, as well as to broader contexts of the town quarters (Ends) and the entire complex urban community. The research also aims at using these objects for drawing out the fundamental changes of the comb-making industry in its transition from the late Viking Age and through the Middle Ages and as a background to the development of the urban society.

Owing to certain values of combs as a specific and distinctive finds group (chapter 2) it was hoped that they could be used as a tool for diagnosing and registering some concrete problems of the retrieval of archaeological information.

The typological analysis (see section 1.2.2) presents the full range of combs uncovered in Novgorod (NW Russia) during half a century from the beginning of large scale systematic excavations in 1951 up to the year 2000, marked with the completion of the largest trench (Troitsky XII) (Fig. 1.2 and 1.3). The typological analysis viewing various morphological characteristics of combs is interrelated with the contextual study of these objects (distributional analysis), approaching the artefacts, both individually and collectively, from the angle of their chronological and spatial settings. Both spatial and chronological distributional analyses are conducted on macro- (entire town and its Ends; broad chronological Periods) and

micro-levels (individual properties; shorter lengths of time minimised to a third of a century (see section 1.2.3)) along with comparative analysis of the Novgorod assemblage with the assemblages of contemporary objects from other European urban sites. The latter is aimed at underlining local and international trends in the manufacture and utilisation of combs within urban communities in Northern Europe.

The typological analysis and the study of chronological and spatial distribution patterns of the four comb classes (section 2.3), as well as the matters concerning the production and consumption of these objects are discussed in analytical chapters 3-6, which are structured similarly. The final chapter 7 presents an attempt to synthesize the chronological trends in the stylistic peculiarities of combs and changes in the comb repertoire on macro- and micro-levels and, to see behind these specific patterns some wider implications relating to the social, economic and cultural development of Novgorod.

1.2 Methods

As was stated above, the research on Novgorod combs is based on two fundamental analytical elements, a typological survey and a distributional (contextual) analysis, both employing the data compiled in the Database.

1.2.1 The Database

The raw data on individual combs is compiled in the Database consisting of four separate Databases dedicated to specific comb classes:

Database A – single-sided composite combs (class 1)

Database B – simple combs in skeletal materials (class 2a)

Database C – simple combs in wood (class 2b)

Database D – double-sided composite combs (class 3)

The original software was designed in 1996-97 by D.Laushkin (St.-Petersburg) for the project ‘Waste materials of the ‘bone’-working industry in medieval Novgorod:

The database' funded by G.Soros's Scientific Foundation. Every individual object is described in a single entry by a number of fields containing the data concerning the field details and the allocation to a particular museum collection, spatial and chronological settings, measurements, morphological features with regards to construction, outline, decoration and raw materials (Fig. 1.1).

The original Data has been transferred into four worksheets (bearing the same names Database A, B, C and D) of a Microsoft Excel file presented on a CD as the Appendix. This is lists of related data where rows of related information are records (on individual objects) and columns of data are fields. The first rows of the four lists contain labels for each column. It is worth remembering that throughout the text of this thesis, objects compiled in the Database are referred to by their individual numbers consisting of a letter and a numerical figure, e.g. a specimen A12 is a single-sided composite comb listed in the database A under number 12.

1.2.2 The Typological Analysis

The review of the existing classifications of combs outlined at the outset of every analytical chapter, demonstrates that most of these classifications are either out of date or not applicable to the Novgorod assemblage and discourages the researchers from any attempt to cram the great variety of combs into the straight jacket of a typology. Instead, the range of various morphological features of combs relating to their forms (face outline, cross-section and size), constructional elements or integral parts, decoration and the raw material are assessed first with the aim of eliciting objective and distinctive criteria for subsequent grouping. The appraisal of comb traits is interrelated with chronological analyses aiming at tracking both constancy and change in comb styles over centuries, which are believed to reflect the transition of the comb-making industry throughout adaptability or modification conventions, the exploitation of opportunities, improvisations and probes for alternatives. Combs at this stage are viewed collectively via specific characteristics in their chronological retrospective (sections 3.2, 4.2, 5.3 and 6.2).

Then, eventually, the Novgorod finds are discussed within comb classes in terms of loose stylistic groups rather than types, characteristic for broader chronological

periods, rather than formal divisions of time, the chronological and typological separation being made on the basis of the initial assessment of morphological trends. The Novgorod combs are also set in relation to their counterparts from other Russian and Northern European sites (sections 3.3, 4.3, 5.4 and 6.3).

1.2.3 The Distributional Analysis

The distributional analysis which comprises the two main avenues of research, namely the study of the chronological and the spatial distributions of combs, has been preceded by the painstaking archive work of placing each dendrochronologically datable object in the assemblage within its chronological (stratigraphically) and spatial (allocation to particular context (property, street)) settings. This means that initially 'undatable' objects are separated and set apart, these being either 'currently undatable' finds deriving from the sites whose detailed chronology has not yet been worked out (e.g. Mikhailo-Archangelsky site, Tikhvinsky site) or 'permanently undatable' finds uncovered from technical drainage trenches and wells within sites and stratigraphically disturbed or uncertain contexts.

The datable objects within each excavation site, whose rough three-dimensional position is determined by the spit (20cm thick horizontal slice of the excavation area), square (2x2m cell with a unique number within the grid pattern of an excavation site) and field number (giving an idea of a more precise location of a find within squares of certain spits), are processed in the following manner. An object obtains its dendrochronological date after having been allocated to a particular construction layer, which is a stratigraphical slice of the pie of archaeological deposits comprising all contemporary structures. Construction layers are compiled by excavators and are dated according to the results of the tree-ring analysis of dendrochronological samples from the structures within these layers. The date of a construction layer and, thus, of an object allocated to it, is always a period between two absolute dates. For a number of reasons, the duration of this period varies from just over a decade to a few decades. To make the dating task even more complicated, some finds, due to certain imperfections of the methodology of excavation, can be allocated to two construction layers, which doubles the dating period (see section 1.3).

In order to achieve a uniform chronological reference throughout the research for dated objects uncovered at different stages from different sites by different excavators, divisions of a century into thirds is suggested (referred to as early, mid and late century). An object dated by excavators to 953-972 will be referred to as a mid 10th century object, since the largest part of the given period lies within the second third of the 10th century, whereas an object with the dendrodate of 950-1000 will be called for the same reason a late 10th century object. Fully realising that this system is far from perfect and creates a source of potential criticism (see also section 1.3), it is, nevertheless, argued here that it is the only conceivable, way of tackling the obvious methodological problem at this stage.

The spatial distributional analysis is interlaced with the chronological distributional analysis and conducted on macro- and micro-levels. The former means the observation and interpretation of patterns of comb dispersal within the town as a whole and within its Ends at different periods distinguished through the typological study of the combs. The latter implies the application of the same methods for smaller areas of properties and streets within excavated sites in different parts of the town. One of the main analytical tools employed in the research is the comparison of densities of finds using indices of concentration showing the number of finds per 100 sq.m of excavated area. The index of concentration, making possible the comparative analysis of artefacts from sites of varying sizes, was first used for the study of concentrations of 'bone'-working manufacturing waste in Novgorod (Smirnova 1995).

Micro-level analysis proved to be more problematic due to the movement (within certain limits) of property boundaries through time. Painstaking searches through dozens of plans of construction levels of major sites allowed the drawing of arbitrary boundaries for properties within each Period (a broad length of time defined throughout the typological surveys and combining a few construction layers), which are median lines conflating boundaries of a number of construction layers within Periods. This allowed the assessment of the excavated areas of various contexts, properties and streets alike, and the calculation of the indices of concentration of finds.

1.3 Problems and Limitations

There are a number of problems and limitations relating to methodological, contextual and, to a certain extent, typological aspects of the research.

Methodology

The main methodological problem in the analysis of hundreds of finds, deriving from various sites excavated during a long period stretching over decades, lay in gathering all the contextual information about the finds and their dating. Some sites are relatively well published (e.g. the Nerevsky, Kirovsky, Nutny sites), with the stratigraphical and chronological analyses providing a useful starting point for the work on the location of finds within their chronological and spatial settings. Still, an additional search through the field reports in the archive¹ is always needed for a precise physical positioning of objects and its relation to the structures. This is not always a success, due to certain inadequacies of field documentation and post-excavation descriptions. Other sites (such as the Troitsky site) present partially finished chronologies and stratigraphies, which implies a larger amount of archive work as well as searches through primary field documentation and consultations with the excavators.

Context

The problems and limitations relating to contexts arise mainly from the methodology of urban excavations in Novgorod. The sites are excavated in levels of 20cm spits in two-metre square blocks, artefacts being hand-collected not always by experienced archaeologists. Because of the extreme dampness of the cultural deposits, drainage trenches 50-100cm wide are dug normally at least 50cm deeper than the current excavation horizon along the perimeter of the site. Occasionally, there are two to four deep sumps (ca. 100x100cm) dug in the corners of the site for drainage purposes. These drainage trenches and sumps are excavated with the least accuracy and also tend to accumulate finds dropped or washed out of the site sections during the seasons of excavations. The identification of finds uncovered from these areas of

¹ The Archive of the Institute of Archaeology, Russian Academy of Sciences.

the site and having, therefore, dubious stratigraphical positions, is not always as straightforward procedure, as it might sound.

Although there are normally few major disturbances of the sequence of the deposits, post-medieval (e.g. wells, 17th century drainage pipes) and later intrusions occasionally occur on the excavation sites rendering the finds stratigraphically undatable.

Combs, which happen to have been found close to the property boundaries, are also amongst the finds requiring special attention and double-checking in connection with their relationship with particular construction levels.

Typology

Despite a relatively clear function for most of the combs studied here, there is a slight grey area concerning the precise functional character of a small group of eight long-toothed combs, which for this reason are excluded from the detailed typological analysis of the main comb classes and are discussed separately in section 4.3.

Aspects relating to raw materials, being part of the typological survey, have some limitations arising from the problem of the identification of the organic raw materials. Identification of wooden combs (class 2b) is made on a sampling basis, whereas all 'bone' objects have been identified to the type of skeletal tissue (antler, bone or ivory) and some specimens (class 1 antler combs and class 2a ivory combs) have been identified microscopically to species (section 2.2). An attempt to collect indirect evidence for the identification of antler simple combs to species is outlined in section 4.2.3, but this taxonomic classification is empirical, rather than scientific, and is thus limited in value.

A number of problems occur during comparative analysis of the Novgorod assemblage with the collections of combs from other sites. Unless the actual material is studied at the museums, archaeological units or academic institutions, it is virtually impossible to extract all required data from the published material. One of the most frustrating common errors concerning, for instance, combs of composite

construction, is the lack of indication of junctions between the billets (aka tooth-plates) on illustrated combs. It is worth listing here the comb assemblages which the author had the privilege to work with:

Hedeby (Schleswig-Holsteinisches Landesmuseum, Schleswig (Germany))

Orkney (the Orkney Museum, Kirkwall (UK))

Pskov (Pskov State Historical Museum and Pskov Archaeological Unit, Pskov (Russia))

Sarkel (Belaia Vezha) (State Hermitage, St.-Petersburg (Russia))

Schleswig (Schleswig-Holsteinisches Landesmuseum, Schleswig (Germany))

Southampton (Southampton City Heritage, Southampton (UK))

Staraia Ladoga (State Hermitage, St.-Petersburg (Russia))

Staraia Russa (Novgorod State Museum and its Affiliate in Staraia Russa, Novgorod-Staraia Russa (Russia))

1.4 An Introduction to Novgorod Excavation Sites

Urban excavations in Novgorod started by A.V.Artsikhovskiy in 1932 were interrupted by the Second World War. In 1941-42 there were fierce battles in the region and the town was unfortunately in the line of cross fire. Eventually seized by the Germans, Novgorod was totally deserted by civilians and heavily destroyed. Even for the few first years after the war the town was all but ruins and abandoned grounds overgrown with weed. These sad circumstances, however, made it possible to resume excavations in 1947 on a scale, which had not been seen earlier. Since then there has been no break in the archaeological investigations in the town and nearly 30, 000 sq.m have been excavated, which cover ca. 2% of the whole area of 15th century Novgorod.

Medieval Novgorod consisted originally of three rather independent administrative-political units traditionally called Ends: the Nerevskiy and Lyudin Ends on the St. Sophia's side of the town on the left bank of the river Volkhov and the Slavenskiy End in the southern part of the market side on the right bank of the river (Fig. 1.3). The Plotnitskiy End in the northern part of the market side of the town and the

Zagorodsky End in the western part of the St.-Sophia's side came into being in the 12th and 13th centuries respectively.

This research is based on the comb assemblages from 18 excavation sites, which cover over 80% of the excavated area of Novgorod. In the following full list of Novgorod sites, these sites are given in Bold. Figure 1.3 shows the location of Novgorod excavation sites numbered according to this list and the sites, whose material is used in this research, are clearly indicated. Most of the remaining sites feature no combs in the assemblages of the recovered artefacts. The material from some of the sites excavated in the late 1990s was not available for study due to its registration procedures at the Novgorod museum.

The list of Novgorod excavation sites

1. on Slavensky Hill (1932, 1934, 1936 and 1937)
2. on Borkova Street (1932)
3. in Iaroslav's Court (1938-1939)
4. in the south of the Kremlin (1938-1939)
5. in Iaroslav's Court (1947-1948)
6. on the eastern rampart (Okol'ny gorod) (1947-1948)
7. on Chudintseva Street (1947)
8. on Kholopia Street (1948)
- 9. Nerevsky (1951-1962)**
- 10. Il'insky (1962-1967)**
- 11. Buyany (1967)**
12. Slavensky (1968)
- 13. Gotsky (1968-1970)**
- 14. Tikhvinsky (1969)**
- 15. Mikhailovsky (1970)**
- 16. Torgovy (1971)**

- 17. Rogatitsky (1971)**
- 18. Kirovsky (1972-1974)**
- 19. Liudogoshchensky (1972)**
- 20. Troitsky (1973-present)**
- 21. Kozmodemyansky (1974)**
- 22. Dmitrievsky (1976)**
- 23. Duboshin (1977-1978)**
- 24. Nutny (1979-1982)**
- 25. by the Likhudov House in the Kremlin (1985, 1996)**
- 26. on Bol'shevnikov Street (1988)**
- 27. Molotkovsky (1999)**
- 28. in the west of the Kremlin (1990)**
- 29. Mikhailo-Arkhangelsky (1990-1991)**
- 30. Fedorovsky (1991-1993, 1997)**
- 31. Ipatievsky (1992)**
- 32. Lukinsky (1993)**
- 33. Koniukhov (1994)**
- 34. Andreevsky (1995, 1998, 1999)**
- 35. by the Bell Tower in the Kremlin (1998)**
- 36. Posol'sky (1999)**
- 37. Dobrynin (1999)**

Within the range of the sites whose material became available for this study three excavations, namely the Nerevsky (9), Troitsky (20) and Fedorovsky (30) sites are of special importance for a number of reasons. Firstly, these are the largest excavation areas conveniently representing three different Ends of the town; secondly, all three feature a number of urban properties adjacent to medieval streets with a developed chronology and stratigraphy; and, thirdly, the sites have produced the largest assemblages of combs. Of the smaller sites, the Duboshin (23) and Kirovsky (18)

excavations in the Slavensky End of Novgorod are of special interest due to high numbers of combs from stratified deposits.

Chapter 2

COMBS, COMB-MAKING, COMB-MAKERS AND COMB- USERS IN NOVGOROD

The manufacture and use of combs were activities forming a part of urban life in medieval towns and as such, their development is closely linked to the evolution of urban communities. The detailed study of these based on the Novgorod material offers, therefore, a valuable source for a vitally needed modern approach for comprehensive work, which involves the assembling and correlation of all data relating to the character of life in medieval Novgorod.

2.1 Combs – A Special Category for the Study of the Dynamics of the Transition of Urban Industries. Its Role as an Interpretative Tool

Combs, however humble objects they might be deemed, by virtue of their intrinsic characteristics represent a special category of artefacts from urban contexts. Like the analysis of many other artifactual types, a comb study can provide the evidence for a variety of aspects concerning the objects themselves, their typological and historical development. These are, for instance, the aspects of introduction, fashion shifts, changes and continuity in comb styles revealed by means of the analysis of common and rare forms, decorative patterns and techniques as well as the use of raw materials on a macro scale (the town as a whole) or in relation to the particular properties in the particular parts of Novgorod.

However, some specific characteristics of combs, as a specific artifactual type, appear to reinforce all the individual and interrelated aspects of the research and make the use of these artifacts, as a medium for the study of broader aspects of social and cultural development in a medieval community, a more powerful tool. These characteristics are:

- clear function

- universality
- status as professional products
- statistical reliability
- specific primary mechanisms of deposition

Clear Function

Clear function of the vast majority of combs as tools for combing hair or beards¹, whether ritual (liturgical combs, bridal combs) or hygienic (for the sake of tidiness and cleanliness, or in order to keep lice at bay), denotes their status as personal items unlikely to be shared with other people, very much like modern combs, hair or tooth brushes. Combs, therefore, belong to the group of objects of everyday use which, although indirectly, personify individuals and as such, may be indicative of the owners' personal tastes as well as, probably, gender, age, ethnic background and social status etc.

Universality

In theory the clear function of combs implies also their universality in the sense of their availability with certain limitations to all members within a community. Whether this can be proven on the basis of the assemblage of combs from Novgorod, remains to be seen.

The universality of at least certain groups of combs, such as single-sided composite combs, can be seen by their presence in Viking Age contexts over a vast area of Northern Europe from the British Isles in the west to the Urals in the East.

Status as Professional Products

Combs as products of professional artisans and never 'home-made' items for personal use, can provide insights into the character and status of comb-makers through revealing the use of particular raw materials and through the application of specific techniques. To a certain extent, they are also indicative of the character and

¹ Long-toothed combs are the only group of combs of dubious function, their usage for combing hair being generally considered as a possible option.

status of consumers as well, being either mass-produced objects or one-off, 'special order' products.

Statistical Representativity

Of all categories of small finds, combs form, probably, the most statistically representative group, providing the opportunities for distributional analyses (both spatial and chronological). Having said that, it should be remembered that due to the fact that combs are made of organic materials, their survival is largely dependent on certain burial conditions. Assemblages of combs from sites with waterlogged deposits are least prone to suffer from poor preservation.

Specific Primary Mechanisms of Deposition

A high percentage of almost complete combs in assemblages from various European sites suggests that the majority of combs were lost or misplaced rather than deliberately thrown away, so theoretically these objects have more chances to lie close to their original deposition point (both spatially and chronologically) and play, therefore, a greater role as a tool interpreting the immediate physical and structural environment within which the combs were presumably used and lost.

2.2 Raw materials: Identification and Availability

In the manufacture of combs in the past times, organic raw materials utilised were osseous materials (antler, bone, and ivory), keratins (horn, tortoiseshell) and wood. The analysis of raw materials in finished objects, along with the assessment of manufacturing waste, can provide an insight into various aspects of comb-making, such as

- whether the combs were made in the town or brought into Novgorod as finished objects, or, rather, which combs can be identified as local products and which can be seen as 'foreign' goods
- to what extent the craftsmen exploited local resources of the town and its hinterland (elk antler, skeletal bone from the livestock, some species of wood)

- whether the presence of raw materials exotic for the area (red deer and reindeer antler, ivory, boxwood) are indicative of the transportation of finished goods or raw materials

The problem of identification of skeletal materials has been the focus of archaeological studies over the last two decades. In 1985 Arthur MacGregor published his fundamental book *Bone, Antler, Ivory and Horn. The Technology of Skeletal Materials Since the Roman Period*, which up to now remains the most systematic and comprehensive exercise of its kind yet undertaken. In this book for the first time the principal materials (bone, antler, ivory and horn) were reviewed in terms of their structure, morphology and availability, and their mechanical properties were compared and quantified in objective scientific terms (MacGregor 1985). The book had a great impact. It drew the attention of British archaeologists to skeletal materials. Since the late 1980s Britain has become the centre of studies into the nature and identification of various skeletal materials. Dr Terry O'Connor (University of York), Sonia O'Connor (York Archaeological Trust) and Prof. John D. Currey (University of York) have made considerable contributions to the understanding of the nature of skeletal materials and their preservation in various burial conditions, as well as to the introduction of methods of their treatment (Starling and Watkinson 1987; O'Connor S. 1999).

Still, the identification of skeletal materials can be problematic, especially when the preservation of organic materials is poor. During the study of Viking Age and medieval combs at the museums and archaeological units across Europe a significant number of misidentifications have been registered. The most common error in the Russian museum catalogues is a misleading term 'bone' assigned to combs. Bone combs form only a minority in nearly all assemblages, the bulk of the objects being made of antler with a noticeable number of ivory specimens as well. Highly distinctive ivory combs, for some bizarre reason, remain unidentified in many collections in the west too, being registered most often as bone¹ or occasionally as

¹ I am grateful to A. Russel (Southampton City Heritage) for the opportunity to see the collection of combs from medieval Southampton.

wood¹. It is hardly debatable, therefore, that the assemblages featuring well preserved identifiable artefacts are of particular importance as reference material.

In the light of the knowledge obtained through the studies into the nature and identification of various skeletal materials, all artefacts in the Novgorod collection have been identified to the type of tissue.

No horn combs or other objects have been found so far in the town. Horn sheath and other keratinous materials are normally more affected by different burial factors and rarely survive in water-logged conditions (O'Connor S. 1987, 15). A few waste elements including five slightly worked cattle and sheep horns deriving from the Fedorovsky and Duboshin sites, and three dozen sawn cattle, sheep and goat horn cores uncovered mainly from the sites on the Trade side of the town are the only indications of horn working activities (Smirnova 2002, Table 1).

The vast majority of combs in skeletal materials (86.2%, 1933 entries in the Databases A, B and D) are made of **antler**, with **bone** specimens accounting for 10.2% (228 entries) and **ivory** combs for 2.3% (52 entries). A total of 30 composite combs (1.3%) (Database D) exhibit a **mixture of skeletal materials** in the assemblage (antler-bone, antler-ivory and bone-ivory).

The predominance of antler in nearly all categories of 'bone' objects and close to perfect preservation of skeletal materials (apart from keratins) have raised the problem of identification of antler objects to species. It is hardly questionable that in some cases (single-sided composite combs of the Viking Age and Early Middle Ages) the use of antlers of different species is of a crucial significance. The identification of antlers to species is a more difficult task due to the presence of mainly compact material and conventional removal in the manufacturing process of distinctive morphological features of antlers of different species. The problem of antler identification was discussed as one of the vital importance at the 2nd

¹ A few elephant ivory combs from Hedeby and Schleswig have been identified by the author. I.Ulbricht (Schleswig-Holsteinisches Landesmuseum) recently confirmed that an allegedly wooden plain simple comb of slender proportions (Ulbricht 1984, Taf. 62:2) had been independently identified as elephant ivory (Personal communication, December 2001).

International Meeting of the Worked Bone Research Group in Budapest (31 August – 5 September 1999).

The first attempts of identification of antler archaeological finds from Novgorod to species were carried out in 1996-97 on the basis of the experience of observing and examining characteristic features of elk, red deer and reindeer complete antlers in the reference collection of the Institute of Zoology (St.-Petersburg, Russian Academy of Sciences), as well as fragmented antlers amongst waste material from the waterlogged deposits in Novgorod (Novgorod State Museum). Whereas some useful observations of shapes and sizes of pedicles, tines, burrs and bony coronets around burrs, as well as some distinctive features of the surface layer and schemes of how certain parts of antlers are arranged on complete antlers were extremely helpful in the identification of antler waste, the study of waste fragments in its turn provided a firmer basis for the attempts to identify antler objects to species.

Archaeological worked antlers retaining some surface morphology also reveal the internal structures of various parts of antlers. Deriving from the same burial conditions as antler objects, they also provide some important evidence as to the peculiarities in texture as well as colour, which antler artefacts obtain in the specific deposits of Novgorod. Burial conditions vary only slightly throughout the town. However, the archaeological antlers of elk, red deer and reindeer identified amongst waste elements demonstrate specific colours and distinctive textures.

Summarising the principles of 'naked eye' identification of antler objects to species, it should be noted that, because in most difficult cases where the surface morphology is lost and only compact tissue is present, the identification is to be determined by considering a whole series of criteria including texture, colour and shape and size of objects. A useful criterion is the thickness of compact material, which varies a good deal in antlers of different species of the deer tribe and determines certain dimensional restrictions on the size and form of manufactured objects.

No other antler has such a massive piece of compact material as parts of elk antler between the burr and the palm. The inner medulla of elk antlers, compared to that of reindeer and red deer, is less organised and more compact enough to be partially

used for the manufacture of some objects. Unlike tines of other members of the deer family capped at the tips with compact material, elk tines have practically no visible porous cores. It has been noted that elk antler with its ramified network of fine blood vessels is more 'woody' in appearance; its texture looks more 'friable'. While being stained by ground waters elk antler gets darker than any other antler. Creamy-white in fresh state it becomes ginger- or greyish-brown. **Red deer antler** looks more 'bony' and is much lighter (normally yellow-brown). **Reindeer antler** is distinguished by its greyish-brown colour and specific texture: it is rough and does not finish to a polished surface.

In order to support the principles of the attribution of antler objects to species with scientific evidence and to gain insights into the microstructure of the skeletal tissue, microscopic analyses of antler fragments using microscopes with reflected and transmitted (thin section analysis) light have been carried out at the laboratory of the School of Conservation Sciences of Bournemouth University. The analysis was inspired by the pioneering trial attempt of comparison of microstructure of red deer and elk antlers carried out by K.Ambrosiani (1981, 102-103). Interesting results of microscopic analyses of bones and antlers has been obtained by Sabine Deschler-Erb on the materials from the Roman site of Augusta Raurica in Switzerland (Deschler-Erb 1998, 40-47) were also encouraging. The sub-arctic species of deer, however, has not been analysed thoroughly yet.

Fifteen samples of different parts of archaeological and modern antlers of elk, reindeer and red deer were selected. These have been sawn to obtain 45 micro-samples for the microscopic study of transverse and longitudinal (radial and tangential) sections of compact material and the adjacent areas of the porous core (Fig. 2.1 and 2.2). Thin-section analysis, although extremely helpful for the understanding of the micro-structure of compact material of antlers, has been proven to be of a limited use for identification purposes, for it requires the removal of samples from artefacts and thus could not be used on museum objects. Microscopic analysis of objects in reflected light at fairly low magnification (x7-x15) has produced good results and as a non-destructive tool should be favoured.

A transition area between compact material and porous core turned out to be a very distinctive feature clearly observable on the transverse cross-sections. Red deer antler reveals a very sharp transition from a very dense compacta (average 5-7mm wide) to a highly porous spongy inner medulla (Fig. 2.3c). The compacta of reindeer antler is fairly narrow (average 3-5mm), but a wider transition area makes for a larger amount of usable material (Fig. 2.3b). Besides, a very consistently observable feature on all studied reindeer samples is very thick blood vessels almost always containing the encrusted blood remains. These coarse blood vessels visible on transverse sections as dark dots (Fig. 2.3b) and lines on longitudinal sections (Fig. 2.4b) most certainly stand for the rough texture of reindeer compacta.

Both red deer and elk antler compacta feature a system of very fine blood vessels, those of red deer being more organised in longitudinal plane (Fig. 2.4c) and those of elk being more ramified in other directions (Fig. 2.4a). The transition from outer compacta to porous core in elk antler is very gradual, which along with the large size of elk antlers provides an enormous amount of usable material. Unlike roundish pores of red deer and reindeer, those of elk take the form of elongated slits invisible by naked eye (Fig. 2.3a) and are more densely packed, enabling partial use of the porous area which in case of the other species is sheer waste. Being still fairly porous on the microscopic level objects made of elk antler more easily absorb stains from the cultural deposits and, therefore, are normally darker coloured than those made of antler of the other deer. Because the compact outer layer in red deer and reindeer antlers is relatively thin, its peripheral areas with transition zone and the border zone of porous core are often retained in the finished products and can be used for the identification.

The methods of microscopic antler identification to species were applied for the analyses of single-sided composite combs from the collections of Novgorod State Museum (303 objects) in July 2000. The borderline (transition area) could be observed on the backs of billets and the sides of the side-plates. Only eight objects (2.6%) were impossible to identify precisely due to the lack of distinctive features and poorer preservation of compact material, however, they were identified as non-reindeer antler, being either red deer or elk. A few objects have revealed the use of different materials for combs and matching cases (elk/red deer, red deer/reindeer) or

even different parts within a single assembly (elk/red deer), but the vast majority of the 290 objects have been proven to be made out of antler of single species. Only 50% of the identifiable objects were made of locally available elk antler, the other 50% have been identified as red deer (44%) and reindeer (6%) antler. Both of the latter two species of deer are not distributed naturally in the Novgorod hinterland, which raises the question of either the transportation of these raw materials or the transportation of single-sided composite combs.

The microscopic identification of other groups of antler combs has not been undertaken and for that reason the preliminary identification is omitted in this research.

Ivory was definitely a type of skeletal materials, which was not available in the proximity of Novgorod and must have been transported from the Far North or the Far South. Whether this scenario was the case or the finished products of comb-makers were brought into town remains to be seen. With a few exceptions of unidentifiable fragmented or poorly preserved objects walrus ivory and elephant ivory combs have been encountered amongst 52 ivory combs in the overall collection. **Elephant ivory** can be distinguished by the 'cone-within-cone' patterns clearly seen on the faces of some simple combs, reflecting the deposition of layer upon layer of dentine around the inside of a conical pulp cavity in the process of the tusk growth. A highly characteristic pattern often called 'engine turning' can be seen on small areas of the tips of comb teeth revealing transverse surfaces of the ivory.

Primary dentine from the upper canines of **the walrus** is visibly coarser than elephant ivory and shows none of the specific features (O'Connor S. 1987). It is laid down in cones but these are so fine that under low magnification the surface of the object may appear to be totally structureless and homogeneous. Walrus ivory has one particularly distinctive feature: the central cavity, which contains dental pulp whilst the animal is young, is filled on later stages with amorphous secondary dentine resembling marble. Luckily, a great majority of walrus ivory objects retain, at least partially, areas of translucent and crystalline secondary dentine, which makes them highly recognisable (Fig. 4.62 and 4.63).

The identification of wooden combs has been done on a much lesser scale (see section 5.2.3). However, the fact that the vast majority of identified objects were made of boxwood raises the same dilemma of finished product versus raw material trade.

As far as the wooden combs are concerned, only stylistic analyses of Novgorod objects and comparative analyses of the assemblages of contemporary combs from other European sites can be employed to solve the problem. In the case of the combs in skeletal materials the evidence from the analyses of 'bone' waste materials from the town might be useful, although there are fairly few waste elements identifiable as specifically comb-making waste (Smirnova 1999).

2.3 The Assemblage of Combs from Novgorod: Primary classification and Terminology

When in August 2000 trench XII of the Troitsky site was excavated down to the natural soil, the Novgorod assemblage numbered 2883 combs of various types uncovered during 50 years of systematic excavations in the town. The assemblage is split up in the collections of four museums listed here from the largest to the smallest: the Novgorod State Museum (Novgorod), the Russian State Historical Museum (Moscow), the State Hermitage (St.-Petersburg) and the Museum of the Departments of Archaeology and Ethnology of Moscow State (M.V.Lomonosov's) University. A group of 315 wooden combs analysed by Kolchin (1968) and Rybina (1978a) have not been included in the databases (chapter 5), yielding a total of 2568 combs which form the basis of this research.

For the reasons discussed in analytical chapters 3-6, the existing classification of Novgorod combs (Kolchin 1958) is out of date and should be critically revised. A basic division of the assemblage and a comb descriptive terminology are outlined below.

In accordance with the generally accepted classification of combs, two basic divisions into simple (one-piece) (I) and composite (II) combs can be made each comprising two classes of those with one (single-sided) or two (double-sided) rows

of teeth (Fig. 2.5). Simple single-sided combs are unknown in Novgorod, the remaining classes are numbered in accordance with the chronological sequence of their occurrence in the deposits of Novgorod, i.e. class 1 being the oldest class of single-sided composite combs, class 2 being simple combs and class 3 being double-sided composite combs, the youngest class in terms of the first appearance in the Novgorod cultural layers. Simple combs are encountered in skeletal materials (antler, bone and ivory) and wood presenting two sub-classes of simple double-sided combs, class 2a and class 2b respectively.

One of the major problems in comparative analyses of objects from different European sites is inconsistency of terminology, which is particularly confusing in measurements reflecting forms, sizes and proportions of objects. In order to avoid misunderstanding and misinterpretation of descriptive terms, a standard system of measuring heights, widths and depths of three-dimensional objects¹ is accepted in this research, all measurements being given in millimetres (Fig. 2.6). A comb should be always positioned with its face towards the viewer and the teeth running in the vertical direction and coarse tooth side on the top. In the case when only a part of a composite comb is present (a side-plate, a billet), it should be positioned reflecting its location on the imaginary complete object. This system allows the consistency in description of combs of different forms and proportions.

Issues concerning terminology used for elements of composite combs and integral parts of simple combs are discussed at the appropriate point in the following chapters.

¹ The same is applicable to comb parts.

Chapter 3

SINGLE-SIDED COMPOSITE COMBS AND COMB CASES

3.1 Chronology

Single-sided composite combs from the cultural deposits of Medieval Novgorod form chronologically the earliest class of the comb category. The assemblage comprises 252 combs and 118 comb cases including fragments made exclusively of antler. In Novgorod, like elsewhere, the finds of combs with matching cases are extremely rare and number seven objects A16, A29, A54, A212, A218, A278, A358 deriving from the deposits of the late 10th – first half of the 11th century (Fig. 3.1, 3.2). From the remaining 111 comb cases only three can be associated unambiguously with specific counterparts from the remaining 244 combs. Stylistically identical and dimensionally matching case A341 and comb A311 come from the deposits of the late 10th century on property K and were recovered in the neighbouring trenches of the Nerevsky site. Comb A191 and matching case A197 were found in successive spits of the same square on Troitsky XII (property K in the Lyudin End). The other matching pair (case A50 and comb A51) is derived from different structures within two successive construction levels dated to the late 10th – early 11th century on property II of Troitsky site (Fig.3.2).¹ There may be other pairs among fragmented items, but they cannot be identified without ambiguity.

Figure 3.3 shows chronological distribution of single-sided composite combs and comb cases in the town. From a total of 337 stratified objects we have excluded seven finds of combs together with matching cases for a simple reason of their neither being just combs, nor just cases. One can see that combs of class 1 and associated cases are common in the deposits of the 10th – first half of the 11th century, reaching their peak in the late 10th century. Whilst considering objects from the earliest period of the mid 10th century, it should be borne in mind that, firstly, up until the 970s-980s there were no other classes of combs in use, secondly, the area of

¹ Combs found along with retained comb cases occur as single records in the database A, whereas matching combs and cases identified by the author in the museum collections are recorded as separate entries.

the settlement was small, and thirdly, dwellers' numbers were finite. By the mid 11th century combs and cases drop in numbers noticeably and, as we will see below, class 1 is no more of domineering status in the comb repertoire. In the late 11th century the combs and cases become very rare and are practically unknown later. Single-sided combs of composite construction reappear in very small numbers (4 instances) in the late 12th century, but are totally unknown from the 13th century onwards. Similar patterns of chronological distribution of combs of class 1 have been traced everywhere on the periphery of the Scandinavian world (MacGregor et al. 1999, 1925). They were common in the 9th-11th century contexts and seem to have gone out of use by the beginning of the 12th century: only very few finds belonging to some specific types derive from 12th century context. In Scandinavia, in the cultural (not geographic) meaning of the word, single-sided composite combs do remain numerous in the 12th century and survive well into the 13th and 14th centuries (Andersen 1968; Flodin 1989; Grieg 1933; Ulbricht 1984; Wiberg C. 1977, Wiberg T. 1987). Of all the areas that came within the ambit of Viking influence outside their homelands, the tradition of single-sided composite comb-making continues into the 13th - early 14th century only in Ireland (Dunlevy 1988, 362-368; Hurley 1997 b, 654-5).

Among artifactual types found in the 10th and 11th century deposits of Novgorod, combs of class 1 are the most numerous, if not the only mass category of finds (apart from pottery, of course). The temptation to use more precise dates for the contexts given by excavators is, therefore, too much to resist and here is the only exception to the accepted scale of chronological divisions. Figure 3.4 shows a more detailed chronological distribution of combs and cases in the deposits of the 10th-11th centuries when the latter are most common. Four obvious peaks occurs in the 960s, 990s, 1010s and 1040s. A sharp decline in the use of single-sided composite combs and cases is seen as early as in the 1060s, and finds of the 1070s-1080s can be no more than residual noise. Peaks of occurrence of combs and cases are roughly simultaneous. However, on both graphs a peculiar picture of cases outnumbering combs is seen around the mid 11th century.

The combs and cases of class 1 belong to the types which were still in vogue in the Viking Age Northern European emporia in the 10th - 11th centuries. Cases invariably

form a smaller assemblage compared with combs both in Scandinavia proper (Ambrosiani 1981, 66-67; Ulbricht 1984, 51-52) and on Viking settlements elsewhere (MacGregor et al 1999, 1939) and are believed to have been manufactured for only a minority of composite combs. This mid 11th century 'phenomenon' which lacks any plausible explanation, highlights some basic fault in the approach to the category of comb cases.

Traditionally, single-sided composite combs and comb cases are treated as separate sub-categories or functional groups. Indeed, functions of the two objects are different. Meanwhile, since as a rule none of the cases in any assemblage can be associated with a specific comb, and examples of finds of complete sets are extremely rare, this separation seems to be unnecessary if not erroneous. Cases without matching combs deputize for the complete set as much as combs with certain constructive features (retaining hole and others) (see below in 3.2.1) which ascribe them to the group designed to be kept in cases for protecting the teeth when not in use (Fig 3.5). Both, therefore, should be treated indiscriminately as surviving parts of the whole. In this case the category can be divided into two sub-categories of cased combs (i.e. combs manufactured along with a matching composite case) and 'non-cased' combs (or simply combs). This separation does not by any means mean that the latter were not kept in other kinds of cases protecting comb teeth. They may well have been stored in leather or textile purses suspended on the waist when not in use. From here onwards cases will appear as parts of cased combs in charts and tables unless for some reason it is stated otherwise.

Figures 3.6 and 3.7 are rearranged versions of figures 3.3 and 3.4 respectively with the addition of 7 cased combs found together with their cases, 3 other pairs of identified objects belonging to one set being treated as three cased combs. Corresponding peaks of occurrence of combs of both groups persist and seem more meaningful. During the first few decades after the first dwellers founded a new settlement three kilometers down the river Volkhov from Rytic Gorodishche, cased combs formed a minority of utilised combs. The situation started changing in the ca. 980s and from the very end of the 10th century onwards the cased combs invariably outnumbered those designed without a case of composite construction.

3.2 Survey of Morphological Traits

The 1960s to 1980s saw a phenomenal boom in the Viking Age studies including analysis of the Viking Age and early medieval single-sided composite combs. This resulted in new typologies being added to the existing Hedeby-based typology (Jankuhn 1943) and the Wollin-based one (Wilde 1953). Space precludes detailing all existing diverse classifications of the 9th -11th combs. Moreover, most typologies were assessed by K.Ambrosiani (1981, 16-18).

It seems worthwhile, nevertheless, to linger around Ambrosiani's Birka-based typology (1981, 58-90) and W.-D.Tempel's classification of combs from Hedeby (1969). These frequently cited typologies differ in many respects. Excavations at both sites have produced very large assemblages of combs and very extensive evidence of comb production. Birka's copious material deriving from graves, mostly cremations, is more fragmented than Tempel's collection of 196 finds from the settlement of Hedeby. Tempel's thorough analysis of comb forms and decorations and variations of forms of comb constituent elements and parts of these elements resulted in a set of 14 form-groups and six sub-groups. This typology gives an impression that the form groups are rather isolated from one another and one can not see the wood of main trends of comb-making for the trees of numerous variations of comb traits.

Ambrosiani's classification was originally based exclusively on the analysis of decoration of side-plates, but later it gained a second dimension by use of further criterion. The author herself called it '*comb form*' (Ambrosiani 1981, 18, 62), but the criterion should be better described as '*relative depth of the side-plates*' seen in a side-plate height to depth ratio (Ambrosiani 1981, 61 Fig. 24), from now on referred to as '**Index KA**'. All combs appear to have side-plates with a plano-convex cross-section, those with shallow side-plates (Index KA over 3.5) being allocated to Group **A** (Ambrosiani 1981, 63 Fig. 25-27), and combs with deep side-plates (Index KA less than 3.5) belonging to Group **B** (Ambrosiani 1981, 64 Fig. 28-33).¹ An index of 3.5, therefore, is the shallowness threshold. Independently Olga Davidan (1974,

¹ To avoid the confusion with the system of referring to the objects in the databases Ambrosiani's group and type names are given in bold italic.

1982), whilst analysing combs from Staraja Ladoga, worked out the same criteria distinguishing two groups of combs having deep and shallow side-plates with the shallowness threshold at 4. At Birka, as well as at other contemporary sites examined by Ambrosiani, 'A' combs have a tendency to predominate in the earlier layers of sequences (early 9th –late 10th century), while 'B' combs are more common in the later layers. According to the decoration, three and four types are distinguished among respectively 'A' and 'B' combs (*A1-A3; B1-B4*) (Ambrosiani 1981, 62).

What is misleading in this quite logical typological scheme is that dimensional characteristics of a comb and its parts are treated seemingly as irrelevant. It is implicitly demonstrated in the diagram showing a demarcating line between relatively deep and relatively shallow side-plates of Birka combs (Ambrosiani 1981, 71 Fig. 37 reproduced as Fig. 3.79). Actual height of shallow side-plates ('A' combs) varies from 8.5 to 19 mm, depth ranging from 2 to 4.3 mm. Deep side-plates of 'B' combs do seem smaller (height 5-14.5 mm, depth 2-4.5 mm), but the dimensional overlap of the two groups is far from marginal. The confusion occurs when one examines the depicted 'A' combs which are invariably and clearly larger than 'B' combs (Ambrosiani 1981, Figs. 4, 9, 18, 25-33). The suspicion is confirmed by strong association of 'A' combs with Tempel's form groups 1-3 and Davidan's group 1 (Davidan 1962, 1968, 1999) comprising big combs (comb width over 160 mm, height of the side-plate over 17-18 mm).

The lack of dimensional criteria can easily provoke misunderstanding. Thus, four combs allocated to 'A' group at York on the grounds of featuring side-plates with Index KA higher than 3.5 come from chronologically diverse contexts and seem to have nothing to do with classical 'A' combs (MacGregor et al. 1999, 1930, Figs. 883-84).

It appears that despite a remarkable similarity in forms, from the British Isles in the west to the Volga basin in the east, no classification seems to be universally suitable and definitive. However appropriate some may appear to certain assemblages or types of archaeological sites, they turn out to be inapplicable to others either because the types are irrelevant or only partially relevant, or because chronological sequences are not fully identical. It is clear that none of the traditional typologies are

appropriate for a comprehensive understanding of single-sided composite combs
Further criteria need to be considered.

Table 1 Major assemblages of Viking Age and medieval single-sided composite combs

Site	Type of context	Dates	Size of assemblage incl. fragments ¹	Reference
Birka	graves	9 th -10 th C	325 (18)	Ambrosiani 1981
Birka	harbour	9 th -10 th C	88	Danielsson (Ambrosiani) 1973
Cork	settlement	mid 12 th -early 13 th C	43	Hurley 1997a
Dublin	settlement	9 th -11 th C	69 (6)	Dunlevy 1988
Gotland	graves	9 th -11 th C	ca 210	Thunmark-Nylén 1991
Hedeby	settlement	9 th - early 11 th C	17	Jankuhn 1943
Hedeby	settlement	9 th - early 11 th C	196	Tempel 1969
Hedeby	settlement	9 th - early 11 th C	245	Ulbricht 1978
Ladoga	settlement	8 th - early 11 th C	89 (3)	Davidan 1962, 1968
Ladoga	settlement	8 th - early 11 th C	15	Davidan 1999
Schleswig	settlement	early 11 th - 14 th C	277 (76)	Ulbricht 1984
Trondheim	settlement	early 11 th - 16 th C	322 (22)	Flodin 1989
Waterford	settlement	late 11 th - 13 th C	72	Hurley 1997b
Wollin	settlement	late 9 th -early 11 th C	37	Wilde 1953
York	settlement	9 th -11 th C	145 (4)	MacGregor et al. 1999

The character of a single-sided composite comb is determined by a great number of interrelating features or morphological traits creating the complexity of a composite comb. Paradoxically, a single-sided composite comb is, by far, a more complicated object of analysis than a double-sided composite comb. In order to build up a substantial, minimally subjective typology, it is essential to appraise the range of

¹ Where known, numbers of comb cases are shown in brackets.

objects by means of a number of diagnostic criteria relating to construction, form, use of material and decoration.

Before starting to describe and depict the main morphological features of combs of class 1, it is worth listing the most numerous assemblages among the published materials comprising combs of the 10th –13th centuries. Table 1 contains useful data for the comparative analysis of single-sided composite combs, such as the locations of Northern European Viking Age and Medieval sites, the chronological sequences and sizes of assemblages, as well as references to relevant publications.

3.2.1 Construction

3.2.1a Combs

None of the other products in organic materials can rival a composite comb in terms of complexity of its construction. The vast majority of combs feature a standard method of construction (Fig. 3.8). A comb is assembled from certain prefabricated units, which are:

- a symmetrical pair (pairs) of **side-plates**
- a number of **billets** – thin, rectangular plaques of even depth of skeletal material with the ‘grain’ running with the vertical axis (depending on the position of a billet in the assembly **end-plates** and **tooth-plates** are distinguished)
- a number of **rivets** fastening the whole assembly when driven into pierced holes in side-plates and billets alike

Owing to the works of Z.Hilczerowna (1961), E.Cnotliwy (1973), I.Ulbricht (1978) K.Ambrosiani (1981), P.Galloway and M.Newcomer (1981) and A.MacGregor (MacGregor and Currey 1983; MacGregor 1985), the methodology of composite comb construction is now well understood. A pair of side-plates is first produced, decoration and polishing of the side-plates being generally completed before any further steps are undertaken. An appropriate number of blank billets is then assembled. All the plates are shaved down to an even thickness and their vertical

edges are trued up. When tightly gripped between side-plates, tooth-plates and side-plates alike are pierced with holes for the rivets which fasten the whole assembly. Then the projecting tops of the billets are cut off and filed flush with the back. A blade-like form is given to the tooth-plates by filing them into line and forming a continuous pointed edge. Finally, teeth are cut and tapered and rounded individually.

Only one comb (A336) in the Novgorod assemblage features a different and rather unusual assembly. Instead of having two side-plates, it has a solid grip triangle in cross-section with a slot cut into it to receive billets (Fig 3.9). This type of construction is extremely rare and the only known parallel comes from Engholmen, Ksp. Helgøy (Norway). The comb depicted by Tempel (1969, 75-6, Abb. 28) is similar dimensionally and in construction. Its Novgorod counterpart deriving from the late 11th century layers features angular interlaced decoration covering all space inside the marginal frame, confirming its Scandinavian origin.

Attributes of various subdivisions of the remaining composite combs are discussed as follows.

Billets

Plaques of skeletal material (most often antler) gripped between two side-plates are usually called end-plates when positioned at the ends of a set, whilst those in between side-plates are normally called tooth-plates. In fact teeth are cut through all the plates regardless of their position in the set. All plaques, therefore, are tooth-plates. In addition, there are cases when combs feature only two or, even, one plate, which are difficult to allocate to either of the subgroups. In order to avoid confusion, it is proposed here to use the term 'billets' when discussing the whole assembly and 'end-plates' and 'tooth-plates' when addressing specific traits in the design of comb ends or backs.

Average depth of billets is 2-3mm, but billets can be up to 5mm. When viewed in vertical cross-section, a billet has sides which are parallel for most of its height and curve inwards to a point only at the tip of the tooth. Other fashions (found much less often) are: billets that are parallel-sided only within the area covered by the side-

plates, tapering thereafter in a long slope towards the tip; billets of elongated V-section; biconical section of billets tapering towards the back as well as towards the tip.

A total of 174 combs in the assemblage present the evidence for the original number of billets (Table 2). The number of billets composing a comb varies from one to twelve. Those most frequently encountered are combs assembled with three, four or five billets; sets of six, seven and eight billets are found fairly often, but assemblies of more billets are very rare. Over 10% of complete objects feature no more than two billets per comb. That the number of billets only partially was determined by the required width of the comb can be understood if we examine the range of comb width in the group of most common 3-billeted combs: the width varies from 72 to 155mm. Absolutely amazing are mid 10th century specimens A152 (Fig. 3.10) and A235, each featuring only one billet with a width of 70 and 113 mm respectively. The second determining factor was obviously the raw material: limited amount of compact antler varied significantly between different species of the deer tribe (see below section 3.2.4).

Table 2 Combs quantified by number of billets

Number of billets	Number of combs	%
1	2	1.1
2	17	9.8
3	50	28.9
4	33	19
5	34	19.5
6	15	8.6
7	9	5.2
8	10	5.7
9	1	0.6
10	2	1.1
12	1	0.6
Total	174	100

Most combs reveal a fairly even width of billets in the assembly (most frequently 15-40mm). Some (A55, A81, A147, A186 (all Fig. 3.11), A329 (Fig. 3.5), A333), however, demonstrate a noticeably variable width of these parts. In some cases the discrepancy between the width of billets is very pronounced. Thus, two-billeted A184 has billets of 26mm and 62mm; billets of A11 (Fig. 3.18) and A332 are respectively 43-22-35 and 54-14-45mm wide. Three combs A36 (Fig.3.5), A126 and A232 feature a very narrow billet (3-7mm) squeezed between other billets of normal width, which may be indicative of repair. A crack in one of the billets could have occurred either during manufacture (drilling, riveting) or through wear-and-tear. A loose bit was replaced with a new narrow billet plugged in the gap.

On a single comb no deliberate differentiation in tooth spacing has been noted, teeth being fairly regular. As for the fineness of teeth, 84% of the assemblage feature medium frequency of 6-8 teeth per 10mm. Just over 15% have finer teeth (9-10 per 10mm). Coarse teeth were found on two examples (Fig. 3.37): one of them (A326) definitely belonging to the group of so-called horse combs (see below section 3.3), and the other (A334) possibly qualifying for the same group.

Both these combs, deriving respectively from mid and late 10th century layers, have another specific feature: the central tooth-plate projects above the comb back in the form of a rounded crest with a suspension hole. On A334 it is absolutely intact, whilst on A326 a broken crest was filed off in the past, the remainder still projecting slightly above the back of the comb. The late 12th century A153 (Fig 3.36) has the same functional crest with a suspension hole carved out of a projecting tooth-plate next to a missing end-plate. All the other billets were treated in a conventional fashion: projecting parts were cut off and filed flush to the back.

Generally speaking, billets projecting above the back of a comb is an extremely rare feature occurring basically on one-off objects. A non-functional, but decorative type of crest is discussed in section 3.2.2.

End-plates

The form of the end-plate should be differentiated in relationship to the side-plate terminals. The most common and simple of the encountered fashions is the end-plate cut square with the end of the side-plate, the back edge line echoing that of the side-plate. The latter is most common in the form of a curve sloping down towards the end (e.g. A78, A324, A325 (Fig.3.13), or sloping down and sweeping sharply up to a point before terminating in a straight edge (so-called 'eared' combs A12, A15, A94 (Fig. 3.12). Further combs feature more rounded 'ears' (e.g. A149 (Fig. 3.12)). On two examples (A13 (Fig. 3.12), A214 (Fig. 3.46)) the end of the side-plate expands to form a square terminal with the end-plate.

A straight vertical line of the outer edge of the end-plate is encountered most commonly (e.g. A78, A324, A325 (Fig.3.13)). Quite often the end-plates drop inward (A54 (Fig. 3.1), A36 and A53 (Fig. 3.5)) or outward (A13 and A15 (Fig. 3.12)) at an angle. Other fashions include concave curves (A94, A130, A149 (all Fig. 3.12)), concavo-convex curves (A152 (Fig. 3.10)) or a complex profile (A334 (Fig. 3.37)).

On A77 (Fig. 3.14) and A335 (Fig. 3.36) the end-plates extend above the side-plates in the form of square 'wings'. Another example of upswept 'wings' is probably encountered on A113 (Fig. 3.14), although the very ends of the end-plates are not preserved. 'Winged' square end-plates extending above and beyond the side-plates survived on nearly identical A7 (Fig. 3.14), A188 and A300, as well as on A35 and A121 (both Fig.3.14).

Some combs have holes drilled in one (A49, A324, A325 (all Fig. 3.13) or both end-plates (A79 (Fig.3.18)) below the side-plate. This is a distinguishing feature of cased combs. When placed in a comb case, a comb could be held firmly in place by a peg or a thong passed through this hole and a corresponding hole in the side of the comb case. Retaining holes for cases should not be mixed up with suspension holes drilled in the 'wing' beyond the side-plate (e.g. A7 (Fig. 3.14), A188). Cased combs cannot have outswept end-plates, they are either straight vertical or sloping in. Another feature encountered most often on cased combs is the side-plate cut square, but short

of the outer edge of the end-plates (e.g. A47, A49, A107 (all Fig. 3.13) (see also subsection 'End-plates' in section 3.2.1b).

Rivets

Rivets anchor billets firmly in place, passing through the holes drilled through the sandwiched layers of side-plates and billets. A minimum number of three rivets occurred on three combs: on A152 (Fig. 3.10) and A235 a single billet was secured at its ends and in the middle; and on the three-billeted A9 a rivet anchored both end-plates, whilst a third rivet was shared by the central tooth-plate and one of the end-plates. Six and five rivets per comb are the most frequently encountered numbers, although combs featuring four rivets are quite common as well (Table 3). Thirteen percent of all complete combs have seven or eight rivets, but sets of more than nine rivets are found only rarely on single-sided composite combs.

Table 3 Combs with copper alloy and iron rivets quantified by number of rivets

No of rivets	No of combs with <i>copper alloy</i> rivets	% of the total of 94 combs with <i>copper alloy</i> rivets*	No of combs with <i>iron</i> rivets	% of the total of 75 combs with <i>iron</i> rivets*	No of all combs in the sub- assemblage	% of the total of 169 combs
3	2	2.1	1	1.3	3	1.8
4	16	17.0	16	21.3	32	18.9
5	13	13.8	31	41.3	44	26.0
6	37	39.4	14	18.7	51	30.2
7	6	6.4	6	8.0	12	7.1
8	7	7.4	3	4.0	10	5.9
9	1	1.1	3	4.0	4	2.4
10	3	3.2	1	1.3	4	2.4
11	3	3.2	0	-	3	1.8
12	2	2.1	0	-	2	1.2
14	1	1.1	0	-	1	0.6
15	1	1.1	0	-	1	0.6
16	1	1.1	0	-	1	0.6
18	1	1.1	0	-	1	0.6
total	94	100.0	75	100.0	169	100.0

* Percentages higher than those for the overall sub-*assemblage* (rightmost column) are given in Bold.

A total of 236 (93.6% of all) objects with identified rivet material fall into two quantitatively almost equal groups of 120 (51%) combs with copper alloy rivets and 116 (49%) combs with rivets made of iron. Chronological distribution of combs with iron and copper alloy rivets (Fig. 3.15) reveals an interesting pattern showing the predominance of copper alloy-riveted combs in the 10th century and iron-riveted combs in the 11th century. All four late 12th-century combs feature copper alloy rivets.

Table 3 shows 169 complete or almost complete combs of both groups, which were available for quantification by number of rivets. That the quota of combs with copper alloy rivets is higher (56%) in this sub-assembly is probably indicative of the fact that combs with thicker and heavier iron rivets were more susceptible to breakage. In the majority of 5- and 6-riveted combs, the former more commonly feature iron rivets, the latter being fastened more often with copper-alloy ones.

It is obvious, that the pattern of riveting was largely determined by the number of billets involved. A further sub-assembly of 157 combs has been quantified by the average number of rivets per billet, calculated as a ratio of rivets and billets featuring in a comb (Table 4).

Table 4 Combs with copper alloy and iron rivets quantified by the average number of rivets per billet

Rivets/ billets ratio	Number of combs with <i>copper alloy</i> rivets	% of the total of 86 combs with <i>copper alloy</i> rivets*	Number of combs with <i>iron</i> rivets	% of the total of 71 combs with <i>iron</i> rivets*	Number of all combs in the sub- assembly	% of the total of 157 combs in the sub- assembly
0.5-0.7	1	1.2	11	15.5	12	7.6
0.8-1.0	2	2.3	33	46.5	35	22.3
1.1-1.3	14	16.3	10	14.1	24	15.3
1.4-1.6	6	7.0	4	5.6	10	6.4
1.7-1.9	53	61.6	11	15.5	64	40.8
2.0-2.2	4	4.7	1	1.4	5	3.2
>2.2	6	7.0	1	1.4	7	4.5
total	86	100.0	71	100.0	157	100.0

* Percentages higher than those for the overall sub-assembly (rightmost column) are given in Bold.

As can be seen in Table 4, nearly 80% of the combs fall into two groups: one comprising combs with an average of two rivets per billet (ratio ≥ 1.5), and the other including combs with an average of one rivet per billet (ratio < 1.5). It is hardly surprising that the former arrangement is more common with the usage of lighter copper alloy rivets. The latter fashion, being more frequently encountered on iron riveted combs, most likely reflects the effort to minimise the weight of a finished product and the breakage during manufacture, since thicker iron rivets necessitated the drilling of bigger holes. What is remarkable is that all 13 iron-riveted combs (A11, A14, A81, A94, A95, A122, A124, A125, A128, A129, A234, A325, A334) with an average of two rivets per billet come from 10th century contexts, mainly from the earliest mid 10th century deposits. The pattern of chronological distribution of iron-riveted combs (Fig. 3.16a) explicitly demonstrates that the system of double-riveting billets represents in Novgorod an old tradition which, on copper alloy-riveted combs (Fig. 3.16b), lives on into the early 11th century but declines by the mid 11th century. A system which results in an average of one or less rivets per billet is, generally speaking, a later fashion (Fig. 3.17), and deserves further discussion.

The early practice widely represented among combs in the Novgorod collection involves riveting billets at both ends (e.g. A79 (Fig. 3.18), A81 (Fig. 3.11), A95 (Fig. 3.52), A183 (Fig. 3.66), A241 (Fig. 3.37), A357 (Fig. 3.70), A370 (Fig. 3.35)). Occasionally, central billets (usually more narrow) are secured with only one rivet in the middle (e.g. A94, A124 (both Fig. 3.18) and A144 (Fig. 3.33)), but end-plates are invariably fastened at both ends and, sometimes, in the middle as well (A11 (Fig. 3.18), A80 and A100 (both Fig. 3.19)). On 4-billeted A123 (Fig. 3.19), end-plates are riveted in the conventional manner, whilst two tooth-plates share one rivet between them and have additional rivets at the outer ends; on 2-billeted A128 (Fig. 3.19), both billets have two rivets each and share another one in between. Closely allied to this system is the practice of riveting billets more or less through the centre, an odd billet being secured twice (A15 (Fig. 3.12), A18 (Fig. 3.31), A27, A55 (Fig. 3.12), A80 (Fig. 3.19), A309).

This riveting practice reveals a concern about the secure fastening of billets, rather than about even spacing of rivets or about disfigurement to the ornament. It could have resulted in being quite ornamental itself (A22 (Fig. 3.52), A119 (Fig. 3.66),

A130 (Fig. 3.12), A147 (Fig. 3.11), A148), fairly non-intrusive to the comb decoration (e.g. A18 (Fig. 3.31), A79 (Fig. 3.18), A325 (Fig. 3.13), A357 (Fig. 3.70), A370 (Fig. 3.66)) or even-spaced (A44, A94 and A124 (both in Fig. 3.18), given that the billets would have had even widths or would have been arranged symmetrically according to the varied widths. However, quite often the combs feature asymmetrical and unevenly spaced riveting (e.g. A11 (Fig.3.18), A12 (Fig. 3.12), A125, A128 (Fig. 3.19), A146, A184, A227 (Fig. 3.52)).

Three combs deriving from 10th century contexts stand apart from this practically determined prevailing riveting system and display a high standard of craftsmanship, being aesthetically flawless as well as soundly made. All three are most certainly one-off products; all three derive from the earliest deposits dating from at least the 950s-960s; and, finally, all three feature iron riveting, evenly-spaced and deliberately arranged so as to be less intrusive to the comb decoration. The 'horse' comb A326 (Fig. 3.37), A355 (Fig. 3.31) assigned to Ambrosiani's *A3* type (Fig. 3.), and A115 (Fig 3.70) with an exquisite interlaced decoration slightly differing on either face, are multi-billeted. The end-plates are fastened by either one rivet in the centre or two at the ends; the central tooth-plate is secured in the centre, all other rivets being placed evenly and indiscriminately whether passing through at the junction between tooth-plates or in the centre of a tooth-plate. On A115 nine rivets are iron and one is copper alloy, which is probably indicative of repair.

Contrasting to the system of riveting through the billets (most common at their ends) is a practice which can be seen on numerous combs appearing in the late 10th century. There is next to nothing from earlier than the last quarter of the century, a growing trickle after c.980, swelling to a fair stream by the turn of the 11th century. From the early 11th century it becomes the predominant fashion of riveting composite combs found in Novgorod. As a basic rule, iron rivets pass through both end-plates; all the other billets may share one rivet between two, inserted either at every junction (e.g. A47 (Fig. 3.13), A74 and A76 (both Fig. 3.20)), or at every second junction (e.g. A25 (Fig. 3.20), A36 and A53 (both Fig. 3.5), A113 (Fig. 3.14)). It occasionally happens that either the central tooth-plate in the assembly, or any towards one of the ends, is secured with a rivet (e.g. A110 (Fig. 3.20)). Typically,

combs with copper alloy rivets which follow this fashion, belong contextually mainly to the latest specimens (A53, A69, A77, A164, A174).

It is sometimes very difficult to compare assemblages from the European Viking Age and early Medieval sites with regard to riveting practices. The main obstacle is the lack of data: comb back views or the notches, indicating junctions between the billets, are missing on the illustrated combs, and contributors tend to describe riveting in terms of spacing and the degree of disfigurement to the decoration. In fact, the matter has been discussed thoroughly only for the comb collections from Hedeby (Tempel 1969, 66-68) and York (MacGregor et al 1999, 1931), which are lavishly illustrated as well. Since the luxury of observing real objects in the assemblages from elsewhere is quite an event in anybody's research practice, every scrap of information had to be extracted in order to find parallels to the riveting fashions on combs from the Novgorod.

Among the two most common riveting practices the early one (riveting through the billets) can be called Eastern Scandinavian: it is most frequently encountered on the 10th century combs from Birka (Ambrosiani 1984; Arbman 1943; Danielsson. 1973; Hyenstrand 1991) and, especially, from Gotland (Thunmark-Nylén 1991). It is listed by W.-D.Tempel (1969, 66-68) among various systems noted on the Hedeby combs, but it represents only a small portion of combs found there. In Norwegian assemblages of combs made out of reindeer antler (with inevitably narrow billets) from Oslo and Trondheim Cristina Wiberg and Lena Flodin distinguish between *E1* combs with rivets passing through the middle of billets and *E2* combs featuring riveting at the junction of the billets (Wiberg 1987, 414-15; Flodin 1989, 29-31).

The later fashion of riveting composite combs in Novgorod (at the junction of the billets) can be named Western Scandinavian. In earlier times of 'the Northern European fraternity' it represents the most common Viking Age usage of rivets, originating probably in Frisia or the south-west Baltic region, but from around c.900 it reveals itself with a marked consistency in the west of the Scandinavian world and in the British Isles. It is worth stressing once again that a remarkable inflow of combs featuring this tradition occurs from c.1000 and from then on the alternative systems can be observed only on individual objects.

Among the handful of the late 12th century combs chronologically isolated from the majority of single-sided composite combs and stylistically alien to the assortment of combs utilised in Novgorod at that time, one can see riveting systems alternative to the Viking Age usage. Those with the ultimate emphasis on embellishment become in vogue in Scandinavia in the late 11th-13th centuries. Two combs feature the fashion of having copper alloy rivets set very closely. On A153 (Fig.3.36), copper alloy riveting enhances the contrasting effect of the side-plate T-shaped openings against the background of bronze sheeting; rivets are arranged in two rows, echoing the pronouncedly curved upper and the straight lower edges of the side-plate. On the elongated A337 (Fig. 3.48) with simple straight side-plates, a single row of closely set rivets presents the only ornamental element.

Side-plates

Lying across the set of the billets and flanking them on both sides, the side-plates provide some structural strength which is then fixed with the rivets. However, the stabilizing function of the former should not be underestimated.

As the forms and decorations of side-plates are discussed in separate sections of this chapter (see below section 3.2.2 and 3.2.4c), only the basic attributes such as outline, size and cross-sections are described here.

Outline

A large group of completely or partially preserved combs has been uncovered which reveals the basic outline of side-plates. Those with plano-convex outlines by far outnumber other types. The lower edge of these side-plates is straight, whilst the upper edge is convex. The curve can be very pronounced (e.g. A15 (Fig.3.12), A55 (Fig. 3.11), A144 (Fig. 3.18)), gentle (e.g. A35 (Fig. 3.14) A53 (Fig. 3.5), A79 (Fig. 3.18), A324 (Fig. 3.13)), or somewhat angular (e.g. A6, A7 (Fig. 3.14), A42, A329 (Fig. 3.5)). A slightly more angular curve (e.g. A47 (Fig. 3.13), A91, A358 (Fig. 3.1)) grades a few side-plates into a seemingly different group of those having a somewhat rounded angular upper edge; but it is impossible to put an objective transition point between an angular curve or a rounded angle, and this warns against distinguishing the latter as a different group.

Two late 12th century combs (A114 and A337 (both Fig. 3.48)) have straight side-plates. The 10th century A22 (Fig. 3.52) features side-plates which are convex on their upper and lower edges. A concavo-convex side-plate with the lower edge echoing the upper one has been encountered only once on A57 (Fig. 3.43), having an uncertain date.

Size

The most frequently encountered side-plates (86%) range from 70mm to 130mm in width and from 7mm to 15mm in height (Fig. 3.21a). Cased combs fall exactly into this group (Fig. 3.21b), featuring average width of 95 mm. Up to 9% of combs feature somewhat longer side-plates (width 132-184mm) with normal height (10-15mm) (e.g. A7 (Fig. 3.14), A13 (Fig. 3.12), A35 and A77 (both Fig. 3.14)). Combs with wide (height over 15mm) and long (width over 160mm) side-plates form a small group (c.5%). They are found among the oldest objects in the assemblage (e.g. A46 (Fig.3.31), A326 (Fig. 3.37), A355 (Fig.3.31)), as well as among the youngest ones (e.g. A335 (Fig.3.36), A336 (Fig. 3.9)).

Cross-section

A total of 241 objects in the collection form a sub-assemblage of combs with recognisable side-plates in terms of their cross-section. Side-plates with plano-convex cross-section amount for the vast majority of combs (226 or 94%).

Plano-convex

Two kinds of side-plates can be distinguished: relatively deep and relatively shallow. It was already mentioned above that Ambrosiani (1981, 70-2) and Davidan (1999, 167-8) separated the two groups using the height to depth ratio (Index KA) with a shallowness threshold of 3.5 and 4 respectively. As the measuring has to be done in the middle of the side-plate, only 209 combs with plano-convex cross-section have been selected for quantifying by the Index KA (Fig. 3.22; 3.29). It appears that the subdivision point at 3.5 is more applicable to the Novgorod assemblage. Deep side-plates outnumber the shallow ones by a factor of 3:1. Figure 3.23, however,

illustrates a proportional change in favour of shallow side-plates during the 11th century.

In both groups a few combs featuring side-plates with a minor deviation from the classical plano-convex cross-section can be pointed out. These have slightly bevelled top and bottom edges (or top edge only) giving a somewhat D-shaped form to the cross-section (e.g. A77 and A113 (both Fig. 3.14), A114 and A337 (both Fig. 3.48), A192 (Fig. 3.35)). Combs with a D-shaped form of the plano-convex cross-section of the side-plates come mainly from the deposits of the 11th-12th centuries.

Rectangular

Thirteen combs (5%) feature rectangular side-plates, with the outer ribs being occasionally slightly rounded (A7 (Fig. 3.14), A16 (Fig.3.2), A35 (Fig. 3.14), A45, A47, A49 (both Fig. 3.13), A60, A91, A92, A112 (all Fig. 3.44), A66, A218 (Fig. 3.1), A300). When applying the height to depth ratio to rectangular forms of cross-section, all of these should be classified as being relatively shallow (Index K.A. \approx 4.3, ranging 3.6-5). Two combs (A 45 and A60) were found in the late 10th century layers, while all the rest derive from the early 11th century contexts.

Trapezoid

Only one comb uncovered from the context dating to the turn of the 11th century (A262) has side-plates which are trapezoid in cross-section.

Plano-piriform

Comb A153 (Fig. 3.36) features side-plates with a specific cross-section which can be called plano-piriform: narrow at the top with the side-plate bulging out in the bottom half.

Forms of the side-plates classified on the bases of their outline, size and cross-section are discussed below in section 3.2.4c.

3.2.1b Comb cases

Structural units of a comb case naturally correspond to those of a comb and differ only slightly (Fig. 3.8):

- one or two symmetrical pairs of **side-plates**
- a pair of **end-plates** sandwiched between the ends of the side-plates
- a number of **rivets** fastening the whole assembly

Dummy terminals, two pairs of small lengths of antler, which can be riveted to the top of the end-plates contiguously to the side-plates, do not belong to elements constituting the construction of the case. Only two of 60 cases with intact ends feature riveted dummy terminals (A29 (Fig. 3.2) and A340 (Fig. 3.25)). On most combs in this sub-assembly (nearly 80%), dummy terminals are carved as integral parts of the end-plates (see below under 'End-plates'). Twelve (20%) cases (A2, A37 (Fig. 3.45), A 54 (Fig. 3.1), A93 (Fig. 3.24), A134 (Fig. 3.45), A162, A218 (Fig. 3.1), A339 (Fig. 3.25), A341, A348 (Fig. 3.45), A349 and A350 (Fig. 3.24)) in the Novgorod collection have no dummy terminals at all, which implies that this element is optional.

Structural elements of a composite case are discussed in the same order as those of a comb.

End-plates

End-plates (or spacer-plates) are fastened to the side-plates so that their inner ends limit the appropriate width for the comb, whilst their depth secures a gap just big enough to insert the comb.

Usually, the end-plates project from the ends of the side-plates, forming either angular, rectangular, trapezoidal, or rounded (etc.) decorative terminals. Unlike comb end-plates those of a case are not necessarily symmetrical. Angular projecting ends are encountered more often and tend to be fairly symmetrical (e.g. A87, A93

(both Fig. 3.24), A338 (Fig. 3.26), A339 (Fig. 3.25), A348 (Fig. 3.45), A350 (Fig. 3.24), A358 (Fig. 3.1)), although some cases feature asymmetrical ends, one end being somewhat low and slightly rounded (A105 and A340 (both Fig. 3.25)). Case A342 has one angular and one rounded projecting end-plate, while on A56 (Fig. 3.25) the angular end-plate opposes the ornate bulbous one having a rounded point at the top. Two of the latter forms of end-plates are featured on A84 (Fig. 3.24).

The trapezoidal form of projecting end-plates occurs on fewer cases (A38, A50 (Fig. 3.2), A135). Rectangular ends of the end-plates are featured on A344 (Fig. 3.25), the angles being slightly rounded. The ends of the end-plates on A88 (Fig. 3.24) terminate at one end in a low B-shaped form, and at the other in a high egg-shaped form.

Four cases in the assemblage have one projecting triangular (A134 (Fig. 3.45), A216 (Fig. 3.25), A346) or rounded (A292) terminal, with the other being cut flush to the end of the side-plates.

Most end-plates have dummy terminals in the upper third, carved as integral parts on both faces in the form of outgrowths, being plano-convex¹ or rectangular in cross-section. The intricate form of this kind of side-plate, which is absolutely crucial for the whole assembly, is shown in detail in Figure 3.26. The bulbous upper part is carved so that the height of the flat lower part was equal to the height of the end of the side-plates (or joint height of the two contiguous side-plates) to be attached to both faces. Together with the riveted side-plates, this form of end-plate makes for the perfect lock on both ends.

The inner edge of the end-plate is cut straight, the edge of the flat part, however, is often cut short to that of the bulbous top part, a vertical slot being cut through the bulb to reach the inner edge of the flat part. It was noted above (see sub-section 'End-plates' in section 3.2.1a), that on some cased combs the side-plate was cut square, but short of the outer edge of the comb end-plates. The vertical slot of the case end-plate serves to accommodate the projecting edge of the comb, so as to

¹ Often D - and its mirror image-shaped.

render the end edge of the comb side-plate contiguous to the extended inner end of the bulbous part.

The main role of the dummy terminals is, therefore, to compensate for a greater length of the side-plates of the inserted comb. In some instances (e.g. A29 (Fig. 3.2)) their form and decoration are so skillfully executed that the whole set of the comb and its case look perfectly symmetrical: together with the dummy terminals, the shorter side-plates of the comb become optically equal in width to those of the case.

Examples of preserved complete cases demonstrate that one of the end-plates has a suspension hole in the projecting end (e.g. A29, A50 (both Fig. 3.2), A56 (Fig. 3.25) A88, A93 (both Fig. 3.24), A105 (Fig. 3.25), A339, A340, A344 (all Fig. 3.25)), and A84 (Fig. 3.24) features suspension holes in both end-plates. Cases A87 (Fig. 3.24) and A216 (Fig. 3.25) have no suspension holes at all.

Rivets

The riveting fashion is fairly standard in comb cases: pairs of side-plates (whether one or two) are riveted at both ends to the end-plates, normally with one rivet per end. Cases with one pair of side-plates, hence, have two rivets, and those with two pairs of contiguous side-plates have four rivets.

It is not uncommon, however, that a comb with two pairs of side-plates has an additional rivet fastening the two lower plates in the middle close to the back (A24, A139 (both Fig. 3.27)), most likely, a ploy to secure the plates at a fixed distance in order to prevent unnecessary mechanical stress. Due to the shape of the billets of a comb tapering towards the tips of the teeth, the resulting unavoidable gap between the billets and the lower side-plates of a comb make the latter susceptible to additional stress. Because antler grain runs along the longitudinal axes of the side-plates, any stress and strain in the direction perpendicular to the flow of the grain increases the danger of breakage. This was probably the cause of breakage of the lower side-plate on A83 (Fig. 3.27).

On A56 (Fig 3.25) four copper alloy rivets fasten the ends of two side-plates to the end-plates, the fifth securing a fixed gap between the side-plates at the lowest point in the middle close to the back. On the peculiar case A88, with single side-plates at both faces imitating pairs of contiguous side-plates, four iron rivets are inserted at the ends of pseudo-contiguous side-plates. The third case A101 with double riveting, the ends of a single pair of the side-plates survived as a small fragment of the side-plate.

Iron rivets are generally more common (89%) than copper alloy ones, the latter being characteristic for earlier types of cases with two pairs of side-plates (see below section 3.2.4a).

Side-plates

The side-plates of a case provide the protection for the teeth of the comb they are manufactured with. The outline, size and cross-section, as well as the basic form and decoration (see below section 3.2.2 and 3.2.4) of a case, are largely determined by those of the matching comb.

Outline

Comb cases with two pairs of contiguous side-plates invariably have a plano-convex outline of the lower side-plates, echoing the outline of the back of the comb, and a straight outline of the upper side-plates providing the mated edges of the lower side-plates and the side-plate of the comb. The lower side-plate on A93 (Fig. 3.24) has a rounded angular outline.

Cases featuring one pair of side-plates more often incorporate side-plates with a rounded angular outline (e.g. A29 (Fig.3.2), A105, A340 (both Fig. 3.25), A342), but very few have side-plates with the pronounced angular outline of their backs (e.g. A4, A42, A136, A358 (Fig. 3.1)). Plano-convex outlines of the side-plates are most commonly encountered on the cases of this group.

Size

The height of a single side-plate or a joint height of a pair of contiguous side-plates of a case should be enough to cover the teeth of the matching comb, the width of the side-plates of a case being inevitably larger than that of a cased comb. Figure 3.28a shows the sizes of complete side case plates: the width varies from 85mm to 150mm, which is, indeed, larger than the width of the side-plates of the cased combs (Fig. 3.21b); the height range is from 8mm to 23mm. Narrower side-plates of the cases with contiguous plates are located at the bottom part of the chart, the height ranging from 8mm to 14mm; the top part of the chart accommodates the side-plates of the combs having a single pair of side-plates (height 13-23mm).

Fifty-seven complete or almost complete cases reveal the approximate width of the missing combs varying from 66mm to 120mm with an average width of 92mm. This is in accordance with the evidence from the analysis of cased combs.

Cross-section

Two cases in the assemblage are represented by the end-plates only. In the remaining 116 cases at least one side-plate (from a set of two or four) with a recognisable cross-section was preserved.

Cases with plano-convex cross-sectional side-plates form the largest group (91 examples or 78.4 %).

Plano-convex

Compared to plano-convex cross-sectional side-plates on combs, those of the cases are generally more shallow (Fig. 3.29).

Cases with two pairs of side-plates (29 examples) more often feature plano-convex cross-sections (almost 90%); lower side-plates invariably have this form of cross-section, whereas straight upper plates have either a plano-convex (73%) or triangular (27%) cross-section. Only 6 cases have been retained with both pairs of side-plates surviving, five feature plano-convex cross-sectional plates only (A24 (Fig. 3.27),

A50 (Fig. 3.2), A93 (Fig. 3.24), A200 and A350 (Fig. 3.24)), and one (A87 (Fig. 3.24)) has plano-convex and triangular cross-sectional side-plates.

Plano-convex cross-sectional side-plates also outnumber other forms in the group of 87 cases with one pair of side-plates (71%).

A total of 87 cases from both groups featuring complete, or almost complete side-plates, have been quantified by the Index K.A. (Fig. 3.30). Cases with two pairs of side-plates occupying the left side of the chart have, therefore, deeper side-plates (Index K.A. varying from 2.3 to 4.7) than cases featuring one pair of side-plates, which all qualify for being distinguished as shallow (Index K.A. 3.5-11.5). The former, however, fall into two quantitatively almost equal sub-groups of 12 relatively deep (Index K.A. <3.5) and 13 relatively shallow specimens (Index K.A. >3.5).

Triangular

A triangular cross-section is a rare form of side-plate, featuring only on some of the upper side-plates of the cases with contiguous side-plates on both faces. As well as A87 mentioned above, there are three finds of single side-plates from the upper pair (A251, A252 and A313).

B-shaped

Six cases have a peculiar B-shaped cross-section of the side-plates. Due to the deep horizontal groove, carved in the middle of the side-plates and optically separating both faces into upper and lower zones, the single side-plates look almost exactly like pairs of contiguous plates. Five combs (A54 (Fig. 3.1), A88 (Fig. 3.24), A162, A228 and A349) have side-plates imitating two pairs of contiguous plates with a plano-convex cross-section, whilst A315 features side-plates which have prototypes among cases with a plano-convex cross section of the lower side-plate and a triangular cross-section of the upper one. These cases derive mainly from the contexts dating to the first half of the 11th century.

Rectangular

This form of cross section is encountered quite commonly (15 cases or 17%), but only on combs with a single pair of side-plates (e.g, A37, A134 (both Fig. 3.45), A344 (Fig. 3.25).

Forms of the side-plates classified on the bases of their outline, size and cross-section are discussed below in section 3.2.4c.

3.2.2 Decoration

Most of the combs (86%) and almost all of the cases have decorated side-plates; decoration of the end-plates and backs of billets also occurs on some objects. A single comb or case can feature a variety of decorative motifs, executed with a number of tools and arranged in a certain decorative scheme.

3.2.2a Decorative motifs

Linear decorations

Vertical lines¹

Judging by the square outline of the cross-section of grooves, vertical lines are executed by saw. They are incorporated in various decorative schemes, most often either occupying just the ends of the side-plates (e.g. A7 (Fig. 3.14), A12 (Fig. 3.12), A110 (Fig. 3.20) A139 (Fig. 3.27), A340 (Fig.3.25)), segregating panels filled with other motifs in the central zone (e.g. A75, A329 (Fig. 3.5)), or occurring at both the ends and in the central zone as well (A56 (Fig. 3.25), A325 (Fig. 3.13)).

¹ Abbreviated as Lv in database A.

Marginal lines¹

Single or double marginal lines following the upper and lower edges of the side-plates are found most commonly on the mass types of 11th century combs, mainly cased examples such as A7 (Fig. 3.14), A47 (Fig. 3.13) and A110 (Fig. 3.20), the marginal lines frequently being combined with a pair of medial lines across the field reserved by the former (e.g. A91, A92, A107 (all Fig. 3.44), A344 (Fig. 3.25)). On the case A340 (Fig. 3.25), six marginal lines echoing the lower edge of the side-plate form a decorative ribbon.

Marginal linear decoration is also involved in different decorative schemes (see below sub-section 3.2.2b 'Decorative schemes') on mid-late 10th century big combs associated with Ambrosiani's 'A' combs (A46 (Fig. 3.31), A326 (Fig. 3.37), A328 (Fig. 3.46), A355 (Fig. 3.31)), and on those 11th century combs which show adherence to the same fashions, unusual for the contemporary products from the areas outside Scandinavia proper (A336 (Fig. 3.9), A371 (Fig. 3.47)).

Oblique lines²

Decorative motifs of oblique saw-cut lines are encountered fairly rarely on their own. They occur twice on the back of comb billets (see below in this section), more commonly enhancing the central zone of the side-plates within either the vertical linear limits (e.g. A85 and A86 (both Fig. 3.24)), or within the reserved zone marked by marginal lines (e.g. A2, A37 (Fig. 3.45), A53 (Fig. 3.5), A328 (Fig. 3.46)). On two combs oblique lines decorate the upper margins of the side-plates outside the marginal line (A214 (Fig. 3.46), A360).

An abundant use of saw-cut oblique lines can be seen on the mid 11th century specimen A77 (Fig. 3.14), where they combine the background for a meandering belt in the central zone which is outlined by oblique lines alternating in the direction of the slope. The belt is incised occasionally with ring-and-dot motifs, but otherwise is free of decoration. A similar pattern on a lesser scale is featured on a cased comb

¹ Abbreviated as Lm in database A.

² Abbreviated as Lo in database A.

A36 (Fig. 3.5), ring-and-dot motifs also being incorporated. Other examples combining ring-and-dot elements with oblique knife cut incisions are discussed in the 'Ring-and-dot' section of this chapter.

Occasionally oblique lines are incorporated within saltire motifs (see below 'Saltires' in this section).

*Cross-hatching*¹

Cross-hatched linear motifs executed by saw are fairly common and occupy most often the central zone of the side-plates, limited by vertical incisions (e.g. A95 (Fig. 3.52), A161 (Fig. 3.45), A307, A328 (Fig. 3.46), A345 and A357 (Fig. 3.70)), or by vertical incisions and marginal lines on A112 (Fig. 3.44). On A57 (Fig. 3.43) the decoration occupies all the area of the side-plate except for the ends, which feature a vertical linear ornament. Comb A262 has zones of cross-hatching decoration in the centre of the upper and lower facets of the trapezoidal cross-sectional side-plate.

This motif is cut with a saw as a rule and combines single (A350 (Fig. 3.24)) or more commonly double lines, indicative probably of the use of a double-bladed saw. However, specimen A128 (Fig. 3.19) features a rather botched cross-hatching (presumably of a secondary nature) executed with a knife and covering the whole area of the side-plate.

Cross-hatching can also enhance the backs of the billets (see below in this section).

*Saltires*²

Saltire crosses, single or multiple, are always executed with double lines and fill as a rule the central field of the side-plates.

A single saltire motif in the central field outlined by vertical multiple incisions is featured on A261, A65 (Fig. 3.43) and A187 (Fig.3.44). In the case of further combs

¹ Abbreviated as CH in database A.

² Abbreviated as S, SB and SB2 in database A.

and comb cases incorporating this motif, the upper and lower angles are filled with either vertical (A56 (Fig. 3.25)) or oblique (A306) lines. Combs A117 (Fig. 3.43) and A204 exhibit a central zone segregated into two equal halves by vertical saw cuts, each containing a single saltire elaborated with vertical incisions. On A259 (Fig. 3.43) two single saltire motifs with defining vertical lines are separated by the empty field. Multiple saltire elements segregated by vertical lines and elaborated with oblique lines in the upper and lower angles, side angles being filled with ring-and-dot motifs, occupy the entire space of the side-plate except for the ends on A17 (Fig. 3.43). A further two combs A77 (Fig. 3.14) and A335 (Fig. 3.36), which belong to the group of the youngest in the assemblage, feature two outlined panels of saltire motifs flanking the heavily ornamented central zone. This flanking position of saltire motifs appears to be characteristic for a later tradition compared to the central location of elements on older objects.

A group of three (A24 (Fig. 3.27)) or four (A324 (Fig. 3.13)) saltire motifs orientated horizontally and elaborated with hatched vertical lines in the angles, fills the whole of the middle area of the side-plates, flanked at the terminals by vertical lines. Multiple saltires with a more vertical orientation cover the entire space of the side-plates on A23, but are restricted to the centre on further objects, either with vertical cuts flanking the group (A184) or without them (A309, A310). A similar band of vertically orientated saltires with upper and lower angles filled with vertical lines is exhibited on A73 (Fig. 3.43).

Another pattern involving double bands of saltires positioned centrally in the area defined by vertical lines is very common on the 10th –early 11th century cased combs. A total of 25 combs and cases are decorated with double saltire bands, consisting of repeated vertically orientated double saltires, designedly cut so that single elements in the two bands were one on top of the other. The accuracy of the execution of the intended design, however, varies quite noticeably: some objects reveal reasonably proficient craftsmanship (e.g. A78, A79 (Fig. 3.18), A87 (Fig. 3.24), A227 (Fig. 3.52)), whilst others exhibit a careless exercise in applying the pattern (e.g. A19, A89 (Fig. 3.52), A139 (Fig. 3.27)). On five combs, saltire elements in the bands incorporate vertical (A20, A84 (Fig. 3.24), A254), oblique (A255) or vertical and oblique (A257) lines in the upper and lower angles.

It is also worth mentioning here a unique comb in the Novgorod collection (A351), featuring cast copper-alloy side-plates decorated with alternating panels of single saltires, and groups of two and three saltire elements, segregated by vertical lines.

Chevrons¹

A saw-cut chevron motif is used extremely rarely and encountered only on combs and cases dating to the 10th and early years of the 11th century. Cases A83 and A253 feature double chevrons combined to produce three lozenges in the outlined central zone. On case A50 and comb A51 combining one set (Fig. 3.2), multiple incisions forming chevrons produce an X-shaped figure in the centre, divided in the middle and flanked on both sides by triple vertical incisions, chevron areas at the ends being combined by multiple incisions as well.

Cased comb A107 (Fig. 3.44) and case A61 feature terminal chevron areas and on cased comb A118 (Fig. 3.52) multiple incisions forming chevrons and zigzags are cut with a knife all over the side-plates.

Interlaced linear decorations²

All seven combs with interlaced linear decorations, varying in their dates from the mid 10th to the late 11th century, have an intensive Scandinavian affinity which is manifested rather explicitly in all other morphological traits (see above section 3.2.1a, below sections 3.2.2c, 3.2.3 and 3.2.4c) and in the provenance of the closest parallels (see below section 3.3).

Combs A46 and A355 (both Fig.3.31) fall into Ambrosiani's *A3* type (Davidan's group 1) unknown in the deposits later than the second half of the 10th century. On the former, a knife-carved interlaced decoration is placed within a vertical band interrupting the upper and lower marginal lines. On the latter (A355) it is contained mainly inside a narrow plano-convex field, outlined by the lines echoing the edges of

¹ Abbreviated as CV in database A.

² Abbreviated as IL(L) in database A.

the side-plates and within the space marked by the marginal lines, splashing out over the inner lines only in the very centre, and remaining restricted by the marginal lines.

A narrow plano-convex field is featured also on two 11th century combs (A214 and A328 (both Fig.3.46)), but a very simple stylized geometrical interlaced decoration fills it only on the former, the latter having terminal vertical bands of interlace. On the late 11th century specimen A336 (Fig.3.9), interlaced decoration fills the entire space outlined by marginal incisions and is carved, as on A355 with both saw and knife, whilst all other combs reveal the use of knives only for carving interlace linear motifs.

On two further combs belonging to the mid 10th century 'B' or group 2 types (Ambrosiani and Davidan respectively), the use of knives is very proficient, the elegant design on A18 (Fig. 3.31) being fairly modest, whereas on A115 (Fig. 3.70) the decoration is exceptionally dense and complex.

Non-linear decorations

Meanders¹

The meander pattern created by cutting V-shaped incisions into alternate sides of a plain band is seen only on two objects both dated to the 10th century; on the case A314 it is featured in the centre of a side-plate as a single band outlined by vertical lines; and on A115 (Fig. 3.70) meanders are incorporated within the intricate interlaced decoration.

Dots²

Dots applied probably with an awl occur on four objects; on combs A56 (Fig. 3.31) and A115 (Fig. 3.70) they are combined with the interlaced linear decorations, whilst on the cases A56 (Fig. 3.25) and A84 (Fig. 3.24) they are incorporated together with saltire motifs.

¹ Abbreviated as IVMB in database A.

² Abbreviated as D in database A.

Except for the peculiar case A56 with its uncertain date (probably not earlier than the late 12th century), the objects come from 10th century contexts.

Ring-and-dot

Ring-and-dot motifs applied with a centre-bit are among the most common decorative elements, with over 40% of the combs and cases in the Novgorod assemblage featuring them. It can be distinguished between bands of repeated ring-and-dot motifs located one next to another (RDB) and single elements (RDE), located either at certain intervals, in seemingly random clusters, or arranged in small groups.

Ring-and-dot elements¹

Ring-and-dot motifs can be combined with saltire motifs incorporated within panels outlined by vertical lines (e.g. A17 (Fig. 3.43), A 77 (Fig. 3.14), A335 (Fig. 3.36)) or with tangential knife cuts sloping up and down from opposite sides of the motifs producing a stylised form of interlace (A348). To emphasise the effect, the latter technique often involves additional short diagonal lines cut at an angle to tangential lines, more effectively imitating interlace in a stylised manner (A29 (Fig. 3.2), A75 (Fig. 3.32), A113 (Fig. 3.14), A224). This technique appears not earlier than the late 10th century, but becomes really in vogue in the 11th century, when knife-carved variants of stylised interlace in relief were developed (A35 (Fig. 3.14), A59 (Fig. 3.32), A64, A70 (Fig. 3.32)). A centre-bit carved circular type of interlace around ring-and-dot motifs is featured on three comb cases (A216 (Fig. 3.25), A136, A358 (Fig. 3.1)).

Two mid 10th century combs (A122 and A144 (both Fig. 3.33)) are decorated with single ring-and-dot motifs and groups of two, three and five ring-and-dot motifs all over the side-plates.

A group of four ring-and-dot motifs is carved in the middle of the side-plates on 'winged' combs A7 (Fig. 3.14), A188 and A300; and on the case A339 (Fig. 3.25)

¹ Abbreviated as RDE in database A.

seven ring-and-dot motifs form a rosette in the centre of the side-plate. More often, however, combinations of two to eight ring-and-dot motifs are present in the upper part of the side-plates of some cases (Fig. 3.34), where they occupy either the ends of the reserved area (A34, A38, A346), or ends and centre (A106), or the entire reserved area (A347), whereby the lower part of the side-plates invariably features bands of multiple ring-and-dot motifs.

On a big comb A371 (Fig. 3.47) found in the Novgorod Kremlin, eight single ring-and-dot motifs are set just along the hunched back of the side-plate outside the upper marginal line.

The occurrence of ring-and-dot motif motifs on the end-plates and backs of the billets is discussed below (see sub-section on ‘Decorations of end-plates and backs of the billets’ in this section).

Ring-and-dot bands¹

Vertically arranged ring-and-dot bands outlined by vertical double or triple lines in the centre of the side-plate, seemingly characteristic for the earliest objects, are featured only on two combs dated to the mid 10th century (950s-early 960s) (‘horse’ comb A326 (Fig. 3.37) and A370 (Fig. 3.35)).

Numerous examples of cased combs combining ring-and-dots bands arranged horizontally along marginal lines (e.g. A170 and A370 (both Fig 3.35)) come from the late 10th century and especially 11th century deposits.

Openwork decorations²

In contrast to the bulk of decorated objects which feature one or another kind of carved motif, only two combs deriving from the late 12th century contexts have T-shaped openings in the side-plates. Both A153 and A335 have perforated side-plates backed by sheet bronze, a rare technique encountered only once on another object

¹ Abbreviated as RDB in database A.

² Abbreviated as OW in database A.

from the town, a gaming piece (counter)¹ with partially surviving bronze sheet sandwiched between two round plates of antler with openwork decoration (Fig. 3.36).

This decorative technique can be seen on a variety of objects including casket mounds, gaming pieces (MacGregor 1985, 91, 199, 207) and both single- and double-sided composite combs found mainly in 12th century contexts in the north of Europe. As in Novgorod, single finds of single-sided composite combs with T-shaped openings and bronze sheeting are known elsewhere. In England, for example, three combs come from London (Baldwin Brown 1915, pl. LXXXVI, no.2), Northampton; (Baldwin Brown 1915, pl. LXXXVII, no. 1) and York (Waterman 1959, pl. XVIII, no. 2).

The most numerous finds, however, come from early 12th to 13th century contexts in Bergen, Oslo (Grieg 1933, 223-24, Fig. 181, 182; Molaug 1975, Abb. 17, 2; Wiberg 1977, Fig. 5; 14; Wiberg 1987, 417, Fig. 3, d, h) and Trondheim (Flodin 1989, 29-33, Fig. 6; Long 1975, 26-17, Fig. 9, b) in Norway, Danish (later German) Schleswig (Ulbricht 1984, pl.29, no 6; pl.70, nos. 2-3), Lödöse (Broberg and Hasselmo 1981, 84-85, Fig. 64,3) and Lund (Persson 1976, 293, 49A) in Scania (Danish in the middle ages). They are also present in the materials from Sigtuna (Arbman 1945, 12-15, Fig. 6-7) and Västergården (Gotland) (Floderus 1934). Danish and Norwegian sites also reveal common finds of double-sided composite combs with perforated side-plates backed with sheet bronze (see below chapter 6) from 12th to 13th century contexts. It can, therefore, be assumed that the style is of later Scandinavian origin, more likely from the Western part of the early Middle Ages of the Scandinavian world.

Openwork decoration of the end-plates has been encountered only once (see next sub-section).

¹ Ner-XIII-55, 19-926; property Б, construction layer 18/19 (1134-1177).

3.2.2b Decoration of billets and end-plates

Side-plates definitely carry most of the decoration on a comb or case, other structural elements as a rule remain undecorated. Nevertheless, a few combs feature ornamentation on the backs of billets or (and) on the end-plates.

Billet back

Decoration of backs of billets occurred in seven instances. Cross-hatching has been encountered twice: on all billets of A258 and just on the outer halves of end-plates on A310. Combs A79 (Fig. 3.18) and A227 have all plates decorated with oblique incisions, whilst the same decoration enhanced only the central billets of A335 (Fig. 3.36). The central billets of A77 (Fig. 3.14) carry a row of saltires executed with double lines flanked by triple border lines. Every billet on A144 features a single ring-and-dot motif (Fig. 3.33).

A hunched crest on the late 12th century comb A335 (Fig. 3.36) formed by four central tooth-plates (enhanced with diagonal incisions on the back faces) extending above the back of the comb is purely decorative.

End-plates

One case and eighteen combs have decorated end-plates, with vertical straight or wavy lines being the most common ornamental motif. It is very characteristic for the earliest types of combs in the assemblage; thirteen out of fifteen combs featuring this kind of decoration of the end-plates¹ derive from the 10th century deposits, the other two coming from the early 11th century layers. Decoration such as this (Fig. 3.37) elaborated occasionally with additional chevron motifs (A241), is complementary to the terminal linear ornamentation of the side-plates (e.g. A236, A326) and the line of the edge of the end-plate (A334).

A single ring-and-dot motif can be seen on one of the broken end-plates on the early 10th century A122 (Fig. 3.33), which has side-plates enhanced rather carelessly with

¹ A22, A27, A98, A115, A130, A148, A165, A179, A180, A181, A234, A236, A241, A326 and A334

single ring-and-dot elements towards the ends on one face, and groups of either four or five ring-and-dot motifs in the centre on both faces (Fig. 3.33). Three other instances of the use of ring-and-dot motifs on the end-plates are encountered on the early 11th century case A88 (Fig. 3.24), mid 11th century comb A77 (Fig. 3.14) and on the late 12th century comb A335 (Fig. 3.36), both combs having end-plates ornamented on the 'wings' as well as on the sides.

Amongst the 'winged' combs which are fairly rare in the assemblage, A35 (Fig. 3.14) stands out, having ornate upper and side edges of the end-plates perforated by multiple holes in the parts of the 'wings' extending above the side-plate.

3.2.2c Decorative schemes on the ornamented side-plates of combs and cases

The survey of decorative motifs encountered on combs and cases has demonstrated that only few ornamental elements or techniques (less common as a rule) tend to be characteristic for certain chronological periods. Thus, chevrons are incorporated in the decoration of objects deriving from the early 11th century, dots and meanders are used almost exclusively on 10th century combs, whereas open work decoration of the side-plates with bronze sheeting as the background can be seen only on the late 12th century combs, which were most likely produced somewhere in Jutland or Norway.

The more common motifs of carved decoration do not show any chronological seriation unless they are analysed in terms of patterns of arrangement. Thus, it was shown that the flanking position of saltire elements is characteristic for the most recent objects in the assemblage, whilst their location in the centre of the side-plate is distinctive for the earlier combs, with double bands of multiple saltire elements being found on the earliest cased combs. Some decorative motifs, such as linear interlaces, are anchored in Scandinavia proper, and it is the arrangement of them on a comb which is chronologically diagnostic.

One element alone should not be treated as being decisive in the comparative analysis of objects from different sites, otherwise the conclusions might be dubious, if not misleading. A recent example of such an approach can be found in a very

comprehensive publication of bone, antler, ivory and horn artefacts from Anglo-Scandinavian and Medieval York by A.MacGregor, A.J.Mainman and N.S.H.Rogers. Partially due to the lack of sufficient explanation of decorative schemes involving marginal lines on 'A' combs (and more precise definitions of 'A' combs in general, see introduction part of section 3.2) by K.Ambrosiani (1981), the researchers of the York material have applied the chronological trends traced scrupulously by Ambrosiani on the material from 9th-10th century Birka to the 9th-11th century assemblage from York, and explained the correlation between borderline decoration and 'B' combs rather than 'A' combs by differences in the working practices on either side of the North Sea (MacGregor et al 1999, 1935-39).

It seemed worthwhile therefore to classify the decoration of side-plates through an analysis of arrangement and combination of decorative motifs, in other words decorative schemes, in order to register chronological trends, should there be any.

Table 5 The occurrence of decorative schemes on the side-plates of single-sided composite combs and comb cases

Decorative scheme	Number of combs	% of a total of 116 combs	Number of cased combs	% of a total of 93 cased combs	Number of cases	% of a total of 110 cases	Number of cased combs and cases ¹	% of a total of 193 objects
0	3	2.6	0	-	0	-	0	-
1	0 (2)*	- (1.7)*	1	1.1	1	0.9	2	1.0
2	64	55.2	8	8.6	7	6.4	14	7.3
3	23 (21)*	19.8 (18.1)*	12	12.9	17	15.5	28	14.5
4	12	10.3	6	6.5	11	10.0	16	8.3
5	1	0.9	1	1.1	3	2.7	4	2.1
6	10	8.6	58	62.4	71	64.5	122	63.2
7	1	0.9	7	7.5	0	-	7	3.6
8	2	1.7	0	-	0	-	0	-
total	116	100.0	93	100.0	110	100.0	193	100.0

* Two specimens with missing ends have been assigned to decorative scheme 3 (for convenience of presentation in Table 3.5), although they were probably decorated according to decorative scheme 1, resulting in slightly different numbers and percentages given in brackets.

¹ The sum-assemblage of artefacts representing cased combs, complete sets being treated as one item.

The analysis has resulted in nine basic decorative schemes and 29 variants (some with further variations)¹ shown in Figures 3.38-3.42. Table 5 demonstrates the occurrence of the decorative schemes on the side-plates of combs and cases as well as on cased combs and those designed without a matching case in skeletal material.

Decorative scheme 0 (Fig. 3.38)

Cased combs do not carry decorations arranged according to this scheme, which features single or small groups of single decorative motifs located in the centre (0.1 and 0.3), or spread from the centre towards the ends of the side-plates (0.2). Only three combs from the very extremes of the chronological sequence fall into this scheme. Both A122 and A144 (Fig. 3.33) from the contexts dated to the 940s-960s do not have absolutely identical side-plates on their faces, but on A144 they are decorated according to variant 0.2 whereas those on A122 feature variants 0.1 and 0.2.

Variant 0.3 is hypothetical, because the only comb, the late 12th century comb A153 (Fig. 3.36) with T-shaped openings in the centre of the side-plates, has both ends missing.

Decorative scheme 1 (Fig. 3.38)

This type of decorative scheme, featuring decorations contained only within the central field outlined by vertical incisions, is rare and encountered only on one cased comb from the context dated to the turn of the 11th century (A329 (Fig. 3.5)), and on one case belonging to unstratified finds (A75 (Fig. 3.32)). It is possible, but not free of ambiguity, that fragmented combs A263 and A301 from the deposits of the 10th-early 11th century fall into this scheme.

¹ In the coding system the first figure stands for the number of decorative scheme, first and second digits showing numbers of variant and sub-variant respectively. Letters 'a' and 'b', if they occur, show the variations in the terminal linear decoration of the side-plates.

Decorative scheme 2 (Fig. 3.38)

This decorative scheme is combined with zones of vertical lines incised at either ends of the side-plates without any further ornamentation. The only variation of this scheme (2.1a) is a terminal decoration somewhat thinned out towards the centre (e.g. A25 (Fig.3.20)).

A total of 72 combs out of 209 ornamented ones (34%) have this modest type of decoration, but the proportion is different when calculated for cased and non-cased combs separately (Table 5). From 93 cased combs only eight (9%) have terminal decoration (e.g. A12 (Fig. 3.12), A54 (Fig. 3.1), A74 (Fig. 3.20)), a similar proportion of 6% (7 cases from 110 decorated ones) being calculated for cases alone, with a resulting average of 7% for cased combs (including cases), whereas 64 out of 116 non-cased combs amount for 55% (e.g. A81 and A147 (Fig. 3.11), A80 and A123 (Fig. 3.19), A130 and 149 (Fig. 3.12), A152 (Fig. 3.10), A236 and A241 (Fig. 3.37)).

The bulk of objects with terminal linear decoration comes from 10th century deposits, a far smaller group is found in early 11th century layers, and only a few derive from later contexts.

Terminal linear decoration is incorporated in decorative schemes 3 and 4, also involving a vertical segregation of ornamental zones on the side-plates.

Decorative scheme 3 (Fig. 3.39)

Decorative scheme 3 presents the combination of three explicitly defined decorative zones on the side-plates. As well as terminal zones with vertically arranged decoration, there is a decorated area in the centre, either defined with vertical incisions (3.1-3.3) or without them (3.0). The latter variant is found fairly rarely and is known on four 10th century caseless combs (A13 (Fig. 3.12), A18 (Fig. 3.31), A113 (Fig. 3.14) and A309) and on the case A339 (Fig. 3.25) dated to the last decade of the 10th – early years of the 11th century.

The scheme which is present on 35 combs and 17 cases is fairly common on both noncased (nearly 20% of all decorated combs without cases) combs (e.g. A334 (Fig. 3.37), A357 (Fig. 3.70) and A370 (Fig. 3.35)), as well as on cased combs (15%¹) (e.g. A79 and A95 (Fig. 3.52), A325 (Fig. 3.13), the latter being designed to be kept almost exclusively (with the exception of A339 mentioned above) in either cases with two pairs of contiguous side-plates (14 objects out of 17, e.g. A84, A85, A87, A350 (all in Fig. 3.24)), or with one pair of side-plates imitating two pairs of contiguous plates (A315, A349).

Variant 3.1 is most frequently encountered on both combs without cases (67%) and on cased combs (83%). On cases only a specific variation of the terminal decoration (b) can be occasionally seen, being the result of cutting off diagonally a part of the depth of the ends starting at the vertical limits, and incising two diagonal lines towards the upper and lower corners of the side-plates (Fig. 3.39).

Most objects ornamented according to the decorative scheme 3 come from late 10th century contexts.

Decorative scheme 4 (Fig. 3.40)

This scheme is characterised by lavish decoration covering all the space on the side-plates invariably with linear segregation of decorative zones. It can be distinguished between side-plates with some narrow strips free of decoration (variant 4.0), and those covered all over by the ornamentation with no gaps (4.1-4.2). The former variant is encountered only on five objects (the 11th century combs A243 and A259 (Fig. 3.43) and case A88 (Fig. 3.24), case A56 (Fig. 3.25) with uncertain date (within the latter part of the chronological sequence), and the mid 10th century comb A115 (Fig. 3.70)). This comb is the only object featuring sub-variant 3.01, with narrow strips free of decoration at the very ends of the side-plates.

Eighteen combs and eleven cases are ornamented according the decorative scheme 4, which is fairly common (Table 5) on both cased combs (e.g. A29 (Fig. 3.2), A324 (Fig. 3.13)) (7%), and on those designed without a matching composite case (10%)

¹ Calculated for a joint group of cased combs together with cases (see Table 5)

(e.g. A17 (Fig. 3.43), A77 (Fig. 3.14), A57 (Fig.3.43), A351). From the eleven cases, seven belong to the group with two pairs of side-plates (e.g. A24 and A139 (both Fig. 3.27)), and taking into account that among the other four (A63, A56 (Fig. 3.25), A29 (Fig. 3.2) and A88 (Fig. 3.24)), one (A88) features single side-plates imitating pairs of contiguous plates on both faces, it can be assumed that this decorative scheme is less common on cases with a single pair of side-plates.

Decorative schemes 5-8 are distinctive by the presence of marginal lines in the ornamentation of the side-plates.

Decorative scheme 5 (Fig. 3.41)

This scheme combining terminal vertical linear decoration with marginal lines can be seen infrequently, mainly on cased combs from the late 10th – first half of the 11th century deposits (A160, A264, A294, A340 (Fig. 3.25)). Only one comb (A260) most likely manufactured without a matching case, is known from the earlier contexts.

Table 6 The occurrence of variants of decorative scheme 6 on the side-plates of single-sided composite combs and comb cases

Variant	Number of combs	% of a total of 10 combs	Number of cased combs	% of a total of 58 cased combs	Number of cases	% of a total of 71 cases
6.?	0	-	2	3.4	2	2.8
6.0	0	-	4	6.9	0	-
6.1	0	-	11	19.0	3	4.2
6.2	4	40.0	30	51.7	11	15.5
6.3	0	-	7	12.1	29	40.8
6.4	1	10.0	1	1.7	2	2.8
6.5	0	-	0	-	17	23.9
6.6	0	-	0	-	4	5.6
6.7	1	10.0	2	3.4	3	4.2
6.8	3	30.0	1	1.7	0	-
6.9	1	10.0	0	-	0	-
Total	10	100.0	58	100.0	71	100.0

Decorative scheme 6 (Fig. 3.42)

Decorative scheme 6 differs from the previous one by the incorporation of other decorative motifs, most of which (6.0-6.7) involve horizontal bands of decorative elements. Variant 6.8 is distinguished by the presence of inner marginal lines forming a plano-convex field inside outer marginal lines, which is either filled with decoration (6.81-6.83) or remains blank (6.84). Variant 6.9 features the central decorative zone segregated by vertical incisions interrupting the marginal lines.

Generally speaking, this is the most frequently encountered arrangement of decorative elements found, on 68 combs and 71 cases (Table 6). In the group of combs, 58 items represent cased designs, and 10 objects are either true non-cased combs or those which were more likely manufactured without a matching comb of composite construction. When analysing combs and cases together, cased designs featuring this scheme take 63% in the group of cased objects, whereas non-cased combs take only 9% in their group. It is very symptomatic that nearly half of these combs are decorated following the scheme variants 6.8-6.9, which never occur on cases and hardly ever on cased combs. All six non-cased combs featuring other variants of the scheme are 'winged' combs deriving (apart from the late 12th century A335 (Fig. 3.36)) from the early 11th century contexts (A7, A 35 (both Fig. 3.14), A112¹ (Fig. 3.44), A188, A300).

On cased combs, which with the exception of one late 11th century specimen A348 (Fig. 3.45) are all designed with a single pair of side-plates, variants 6.2 (e.g. A53 (Fig.3.5), A59 (Fig.3.32) and A91 (Fig.3.44)²) and 6.1 (e.g. A69 and A107 (both Fig. 3.44)) are most frequent, 6.3 (A222, A268, A274, A275, A278, A295, A296) also being fairly common. On the case side-plates, however, variant 6.3 (e.g. A16 (Fig. 3.2), A218 (Fig. 3.1)) is most frequent, which can be seen on both A16 and A218 representing complete sets, and on the matching comb A191 and case A197 identified as one set, in combination with 6.2 on the comb side-plates, and on A341

¹ Comb A112 with missing ends stylistically belongs to the group of 'winged' combs and most likely used to have 'winged' end-plates.

² It is also possible, but less likely, that A91 with missing ends was decorated according the decorative scheme 7 (7.1).

in combination with variant 7.1 of comb side-plates. Another common variant on cases, 6.5 (e.g. A106 (Fig. 3.34), A134 (Fig. 3.45), A344 (Fig. 3.25), A346 (Fig. 3.34)), on complete sets is encountered in combination with 6.0 (A212, A278) and 6.2 (A358 (Fig. 3.1)) on the comb side-plates.

Variant 6.2 can be seen on the cases fairly often (e.g. A37, A159, A161 (all Fig. 3.45) and A216 (Fig. 3.25)), although variants 6.1 (A205, A209, A292), 6.4 (A348 (Fig. 6.45)), 6.6 (e.g. A105 (Fig. 3.25) and A338 (Fig. 3.26)) and 6.7 (e.g. A70 (Fig. 3.32)) belong to less common types.

Combs (both cased and non-cased) and cases featuring decoration combined according to the variants 6.0-6.7, with more emphasis on the horizontal arrangement of decorative elements, become noticeable by the very end of the 10th century, their heyday occurring in the first half of the 11th century. The tradition most likely originated in the Southern Baltic (probably in Denmark, since the earliest examples come from Hedeby (Tempel 1969, Taf. 25, 26)), where one can find numerous contemporary counterparts from the excavations in Århus (Tempel 1969, Taf 40(6)), Lund (Persson 1976, Fig. 288(4A, 6A, 8A), Fig.289 (17B), Trelleborg (Tempel 1969, Taf. 38(6), 40 (3)), Hamburg (Tempel 1969, Taf 40(5)), the Mecklenburg area (Lampe 1981, Abb. 8, 11, 13), in Polish Pommeranian towns of Szczecin (Cnotliwy 1973, Ryc. 73), Wollin (Wilde 1953, no. 42, 44), Kołobrzeg (Hilczerówna 1961, 137) and Gdansk (Hilczerówna 1961, Ryc.41, 45, 47) as well as in the more inland towns of Gniezno (Hensel 1960, Ryc. 112), Poznan (Hensel 1958, Ryc. 88) and Kruszwica (Hensel and Broniewska 1961, Ryc. 58).

Single finds of almost exact parallels to these combs are known in the British Isles as well, with combs from York (MacGregor et al 1999, Fig. 867, 884 (7548), 889 (7605, 7611)) and a comb case from Dublin (Dunlevy 1988, Fig. 12), however, they belong to the rare types there.

Variants 6.8-6.9 are represented by big combs, all of which are associated with either late 'A' combs ('A3' Birka type by K.Ambrosiani) dated from the late 9th up to the late 10th century (A46 and A355 (both Fig. 331), or by the 11th century A214, A328 (both Fig. 3.46), and A371 (Fig. 3.47). Parallels to the latter ones are found in

Aggersbork (Denmark) (Tempel 1969, Taf. 36, 3), Birka (Tempel 1969, Taf. 33, 2; 36, 2), Oslo (Molaug 1975, Abb. 17, 1; Wiberg 1977, Fig. 12), and Trondheim (Long 1975, Fig. 9a; Flodin 1989, Ill 3-5).

To sum up the description of the decorative scheme 6, it should be emphasised once again that there can be distinguished between two traditions within the group of objects featuring both marginal and vertical linear terminal decoration: the late 10th-11th century Southern Baltic tradition (6.0-6.7) and the Scandinavian tradition (6.8-6.9) with examples representing early (late 9th – 10th century) and late (11th century) stages.

Table 7 The occurrence of 10th –11th century undecorated and decorated objects, quantified chronologically

Dec. scheme	Comb group ¹	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC	Total in dec. schemes
undecorated	non-cased	14	5	0	0	0	20
	cased	0	0	0	1	0	(19/1)
0	non-cased	2	0	0	0	0	2
	cased	0	0	0	0	0	(2/0)
1	non-cased	1	0	1	0	0	3
	cased	0	1	0	0	0	(2/1)
2	non-cased	29	18	12	1	0	72
	cased	4	2	3	3	0	(60/12)
3	non-cased	3	10	3	2	1	41
	cased	5	11	2	4	0	(19/22)
4	non-cased	1	5	3	1	1	24
	cased	3	7	2	1	0	(11/13)
5	non-cased	1	0	0	0	0	5
	cased	0	2	1	1	0	(1/4)
6	non-cased	1	1	5	1	0	129
	cased	2	31	46	38	4	(8/121)
7	non-cased	0	1	0	0	0	8
	cased	0	6	1	0	0	(1/7)
8	non-cased	1	0	0	0	1	2
	cased	0	0	0	0	0	(2/0)
Total of decorated	non-cased	39	35	24	5	3	286
	cased	14	60	55	47	4	(106/180)

¹ The group of cased objects encompasses cased combs and comb cases, complete sets being treated as single objects.

Decorative scheme 7 (Fig. 3.41)

Decorative scheme 7 differs from the previous one by the absence of the terminal decoration and is encountered only on combs. Seven cased examples represent variant 7.1, with decorative belts within the central belt defined by the marginal lines (e.g. A60 (Fig. 3.44)), and far more rarely on non-cased combs featuring variant 7.2, with the central belt free of decoration and areas of decorated zones located centrally outside the marginal lines (A262).

One set only (comb A311 and case A341) shows a combination of variant 7.1 on the comb and variant 6.3 on the case.

Decorative scheme 8 (Fig. 3.41)

This decorative scheme is characterised by border-lines running parallel to the periphery and defining a large field filled with decoration either in the centre (variant 8.1) or all over (variant 8.2).

The two combs representing this decorative scheme affiliate with the Scandinavian tradition of ornamentation in its early mid-10th century stage (A326 (Fig. 3.37)) and late 11th century stage (A336 (Fig. 3.9)).

Apart from decorated objects, there is a group of 23 objects with no decoration at all, including one mid 11th century case, A93 (Fig. 3.24), 21 non-cased combs and one cased comb. Two undecorated combs, non-cased A114 and cased A337 (both Fig. 3.48), belong to the youngest four combs in the assemblage, reappearing in the cultural deposits in Novgorod after a chronological gap of no less than 70 years, and being totally alien to the bulk of mid and late 12th century combs which was dominated by simple and double-sided composite combs.

Table 7 demonstrates the frequency of decorated and undecorated objects during the 10th and 11th centuries when these items occur most commonly. One can see that undecorated combs, being exclusively non-cased, are found most often in the 10th century contexts. Furthermore, they are more numerous among mid 10th century artefacts (e.g. A15 (Fig. 3.12), A124 (Fig. 3.18), A367 (Fig. 3.48)) than among late

10th century finds (e.g. A55 (Fig. 3.11), and A100 (Fig. 3.19)). The mid 10th century A11 (Fig. 3.18) carries a rather botched chevron pattern, being a secondary decoration scratched with no particular care on one of the side-plates, the other one remaining blank.

Two undecorated combs, A145 (Fig. 3.10) and A330 (Fig. 3.48), stand apart by being not composite, but one-piece combs carved from compacta of elk antler. Similar one-piece combs are known among the finds from Birka (Hyenstrand 1991, 59, Fig. 15) and Staraja Ladoga (Davidan 1962, 102, Fig. 4, 2), however, they are always analysed along with simple single-sided composite combs with stylised animal heads, characteristic for the Finno-Ugrians. The reason that these objects have been included into the group of single-sided composite combs and cases, is that they are carved to look almost exactly like their composite counterparts, and are in fact imitation composite combs. They are either trial pieces, experimental items, exploratory products employing the advantages of elk antler with a larger area of compact material (A145) within the tradition of composite comb-making, or amulets (A330) imitating real objects. The latter can be compared to antler amulets in the form of a sheathed knife common in the 11th-early 12th century layers (Fig. 3.48).

Coming back to the decorated objects (Table 7), one can see fairly clearly the chronological trend revealing the predominance of items ornamented according to the vertically arranged decorative schemes (1-4) during the 10th century, horizontally arranged decorative schemes (5-8) being most common in the 11th century. We recollect (Fig. 3.6) that non-cased combs are more numerous in the early period (10th century), their cased counterparts being prevalent in the later period of the occurrence of single-sided composite combs (11th century). When analysed separately, the two groups demonstrate quite different chronological trends (Fig. 3.49a,b). Only in the mid 10th century did vertically arranged decorations by far outnumber those arranged horizontally in both groups. Later on, up until the late 11th century, this pattern remains valid in the group of non-cased combs, with a slight rise in the occurrence of horizontally arranged decorations in the early 11th century. On the contrary, the cased combs reveal a shift in favour of horizontally arranged ornamentation as early as the late 10th century, and this pattern persists from then onwards. We also recollect the shift in favour of the predominance of cases with a

single pair of side-plates occurring in the first years of the 11th century (see above in this section).

Since decorative scheme 6 dominates among schemes with horizontally arranged patterns, it is more important to look at changes in combinations of vertically arranged patterns in earlier combs (Fig. 3.50). In contrast with the non-cased comb group (Fig. 3.50a), where undecorated objects and those with minimum ornamentation form the majority (60-92%) during the period of their most common occurrence (mid 10th – early 11th century), cased combs are more heavily decorated (Fig. 3.50b).

3.2.3 Forms

Despite an apparent diversity in forms, the basic forms of the combs and cases are limited. In order to comprehend the differences between non-cased and cased combs, and between combs in the latter group, it seems worthwhile to start with the cases.

3.2.3a Cases

All cases fall into two main groups, those which have one pair of side-plates, and those with two pairs of contiguous side-plates. Both kinds are designed to merge with the matching comb into the form of the weaving shuttle (lens), proportions, however, being different.

Since complete cases are rare finds and cases are often represented by the side-plates only, the proportions of the latter can be used to understand the proportions of the complete object. The proportions of a case with one pair of side-plates is calculated as a side-plate height to width ratio, and that of a case with two pairs of side-plates is seen as a side-plate double height to width ratio. Figure 3.58 clearly demonstrates that the two kinds of cases fall into two proportional groups, cases with one pair of side-plates being more elongated than the others.

The chronological distribution of the two main groups of combs (Fig. 3.59) shows that cases with two pairs of contiguous side-plates are older than the others, the peak of their occurrence in the cultural deposits of Novgorod being in the late 10th century. The younger cases with one pair of side-plates are most common in the early-mid 11th century.

The description of a case form is complete when the form of the side-plates is defined (see below in section 3.2.3c).

3.2.3b Combs

The basic forms of combs can be described using two characteristics: a comb proportion expressed as a comb height to comb width ratio, and the height of teeth (in relation to comb height).

Four proportional variants can be distinguished in the group of non-cased combs: long (height to width ratio 0.17-0.21, modal factor 1:5), medium long (height to width ratio 0.22-0.26, modal factor 1:4), medium short (height to width ratio 0.27-0.31, modal factor 1:3.5), and short (height to width ratio 0.32-0.40, modal factor 1:3), medium long and medium short being most common (Fig. 3.60). The youngest combs in the assemblage are either long (A114, A337) or medium long. Chronological changes in the combination of proportional variants in the group of non-cased combs is shown in Figure 3.61. These objects, being most frequently found in the mid 10th century contexts, constantly decrease in numbers thereafter, and practically cease to occur by the mid. 11th century. One can see a noticeable increase in the proportion of long combs in the early 11th century, which constitute up to 25% of the contemporary combs, in contrast to their small quota (4-8%) in earlier assemblages.

Cased combs can be divided into two proportional variants of medium long (height to width ratio 0.17-0.26, model factor 1:4) and medium short (height to width ratio 0.27-0.34, model factor 1:3.5). Chronological distribution of the two variants (Fig. 3.62) reveals the fact that medium short cased combs are generally older than medium long ones, the peak of the frequency of the former occurring in the late 10th

century, the latter being most common in the early 11th century. This pattern is very similar to the curves of chronological distribution of the cases with one and two pairs of side-plates (Fig. 3.59). Cases with two pairs of contiguous side-plates, which tend to be less elongated than the other ones (Fig. 3.58), also demonstrate the peak of occurrence in the late 10th century. Since the curve of medium long combs basically corresponds to that of the cases with one pair of side-plates, it can be assumed that they belong together.

Another characteristic feature making up the basic form of a comb, is the teeth height relative to the comb height. As shown in Figure 3.63, cased combs can be subdivided into two main groups consisting of those with relatively long teeth (taking 60-70% of the comb height, model factor 2:3) and those with relatively short teeth (taking 40-59% of the comb height, model factor 1:2). It can be assumed that two pairs of side-plates of the case were there to compensate for the longer teeth of combs, whereas one pair of side-plates could have been enough to protect the fairly short teeth of combs of the other group. The curves of chronological distribution of cased combs with longer and shorter teeth (Fig. 3.64) correspond to those of the cases with two and one pair of side-plates respectively (Fig. 3.59).

Table 8 Form characteristics in complete sets and matching pairs of comb and case

Database No	Fig.	Group of cases (number of side-plates)	Proportion of case (side-plates)	Proportion of comb	Teeth height relative to comb height
A 16	3.2	1 pair	0.13	0.20	0.55
A29	3.2	1 pair	0.13	0.25	0.54
A54	3.1	1 pair	0.14	0.23	0.60
A212	-	1 pair	0.16	0.23	0.50
A218	3.1	1 pair	0.14	0.25	0.58
A278	-	1 pair	0.14	0.25	0.56
A358	3.1	1 pair	0.15	0.24	0.52
A51(comb) A50 (case)	3.2	2 pairs	0.21	0.23	0.60
A191 (comb) A197 (case)	3.2	1 pair	0.13	0.20	0.52
A311 (comb) A341 (case)	-	1 pair	0.15	0.22	0.57

In order to verify the assumption that there is a connection between relatively more elongated cased combs with fairly short teeth and cases with one pair of side-plates on the one hand, and less elongated combs with longer teeth and cases with two pairs of contiguous side-plates on the other hand, a review of the forms of all complete sets and identified matching pairs should be made.

Table 8 contains the data on 7 sets and 3 matching pairs of combs and cases. Unfortunately, the group of cases with two pairs of side-plates is represented by only one matching pair (A50/A51), which reveals a proportionally less elongated case and comb with longer teeth. Eight out of nine sets and matching pairs representing cases with one pair of side-plates clearly confirm the connection between more elongated cases and medium long combs with shorter teeth. The set A54 featuring longer teeth of the comb is proportionally hybrid, with a single pair of side-plates imitating two pairs of contiguous side-plates.

Most of the non-cased combs feature relatively long teeth occupying close to and over 60% of the comb height (Fig. 3.63), however, a very small group of these combs reveal short teeth taking up almost exactly half of the comb height or slightly less. These combs are proportionally very stable, following closely the model with factor 1:5 or less frequently with factor 1:4. In the chart demonstrating forms of cased and non-cased combs, they occupy the left-hand extreme of the scatter (Fig. 3.65). All of these are big combs associated with Scandinavian 9th-10th century combs and falling into Ambrosiani's 'A' group (A326 (Fig. 3.37), A328 (Fig. 3.46), A355 (Fig. 3.31)). Symptomatically, all examined 'A' combs from elsewhere (Hedeby, Staraya Ladoga, Rytic Gorodishche) belong to this form by proportion and relative teeth height.

Some areas of the scatter are occupied by non-cased combs showing chronologically distinctive forms; thus, the extreme middle and top right areas feature mid 10th century combs with the longest teeth and either medium short (A124 (Fig. 3.18)), or more common short proportions (A183, A119 and A366 (all Fig. 3.66), A127, A145 and A152 (both Fig. 3.10), A204, A237, A302). Only two such combs derive from the late 10th century contexts, A241 (Fig. 3.37) and A246, and another two cased objects with similar forms were found in the mid 10th century layers (A128 (Fig.

3.19) and in the context dated to the last years of the 10th – early 11th century (A94 (Fig. 3.18).

The bottom part of the scatter is occupied with elongated forms of non-cased combs which appear in the cultural deposits of Novgorod from the early 11th century, when cased combs by far outnumbered their non-cased counterparts. The most distinctive group of non-cased combs of slender proportions is that of the so called ‘winged’ combs, made out of red deer antler and with iron rivets, deriving from the early 11th century layers (A7, A35 (both Fig. 3.14), A188, A300). The late 10th century A17 and A57 (both Fig. 3.43) with uncertain date are proportionally close, but totally different with regard to raw material (elk antler, copper alloy rivets), decorative style and riveting system. Undecorated 12th century combs (both cased and non-cased) are also encountered in the group of combs with elongated proportions (A114 and A337 (Fig. 3.48).

3.2.3c Side-plates of combs and cases

The basic description of the form of a comb or case is complete when the form of the side-plate is added as another variable to the proportion (proportion and relative teeth length in combs) of a whole object.

The classification of the forms of side-plates into six main groups is based on the relative width and depth, as well as on the outline and size of the side-plates (Fig. 3.67). Relative width (width/height ratio) is basically the same characteristic as ‘proportion’ (height/width ratio used throughout this research for describing forms of objects), expressed as a reciprocal fraction. The reason why the reciprocal form is used is that the Index of relative depth, borrowed as an idea from K.A.Ambrosiani (1981, 70-72) and widely adopted by other researchers, is expressed as an improper fraction (larger numerical value of the height opposed to smaller numerical value of the depth). It seems appropriate, therefore, to use an improper fraction in order to define the proportions of the side-plates in a way that may be compared to Ambrosiani’s system.

Group I

Group I encompasses evenly curved deep plano-convex cross-sectional side-plates of standard size (see sectors 3.2.1a and 3.2.1b). The variants are distinguished by the outline of the ends: I:1 with ears, I:2 with no ears, I:3 with square terminal expansion.

This form of side-plate is found most frequently on non cased combs (variants I:1, I:2 and I:3), but is also fairly common on cased combs and corresponding cases with two pairs of contiguous plates (lower plate).

Group II

This form of the side-plate is encountered only on non-cased combs.

Elongated (relative width of 12 and over) evenly curved or rounded angular shallow plates of standard size are divided into 3 variants: II:1 – plano-convex cross-sectional, II:2 – rectangular cross-sectional, and II:3 – trapezoid cross-sectional.

Group III

Evenly curved or rounded angular shallow plates of standard size are divided into 4 variants: III:1 – plano-convex cross-sectional, III:2 – rectangular cross-sectional, III:3 – triangular cross-sectional, and III:4 – B-shaped cross-sectional (with sub-variant III:4a – B-shaped side-plate imitating a profile of a pair of contiguous side-plates with plano-convex cross section of the lower side-plate and a triangular cross-section of the upper one).

This is a cased comb form found on non-combs only once. On cased combs it is featured in variants III:1, III:2 and III:3, and on cases in variants III:1, III:2 and III:4.

Group IV

Standard-sized side-plates with straight upper edges fall into two sub-variants: IV:1 with plano-convex cross-section and IV:2 with triangular cross-section.

Most commonly, this form is found as an upper plate of a case with two pairs of contiguous plates (variants IV:1 and IV:2). As side-plates of combs (both non-cased and cased), it occurs on the late 12th century objects.

Group V

Big side-plates (width over 160mm, height over 17mm) with an evenly curved back and a shallow plano-convex cross-section are featured only on non-cased combs. Two variants are distinguished: variant V:1 – with stylised animal heads at the ends, and V:2 – with conventional terminals.

Group VI

Plates with an arched back and either a shallow plano-convex (VI:1) or plano-piriform (VI:2) cross-section occur only on non-cased late 11th-12th century combs.

Table 9 Forms of side-plates of non-cased and cased combs quantified by chronological period

Form group	Comb group	m. 10 th century	l. 10 th century	e. 11 th century	m. 11 th century	l. 11 th century	l. 12 th century	Total
I	non-cased	54	40	21	3	2	0	120
	cased	11	18	7	2	0	0	38
II	non-cased		3	5	1	0	0	9
III	non-cased	1	0	0	0	0	0	1
	cased	2	40	48	44	4	0	138
IV	non-cased	0	0	0	0	0	1	1
	cased	2	5	3	4	0	1	15
V	non-cased	2	1		1			4
VI	non-cased	0	0	0	0	0	2	2
Total		72	107	84	55	6	4	328

The three-dimensional proportions of side-plates of different forms expressed as a combination of height to depth (relative depth) and width to height (relative width) ratio are shown in Figure 3.68. It now becomes obvious that the use of only proportional characteristics of the side-plates, can create a mishmash of combs having little, if anything in common with each other (see the preamble of section 3.2). Thus, forms III and V although proportionally identical are in fact

chronologically, stylistically and by provenance as much alike as cheese and chalk. The use of iron rivets (with not identical riveting systems) and execution of borderline decoration (whilst following different decorative schemes) do not bring these designs any closer. Nine- tenth century big non-cased combs with side-plates of form V and made most commonly out of elk antler originate in east Scandinavia (Ambrosiani's later types of 'A' combs), whereas normal (and small) size cased combs with side-plates of form III (one pair on cases) deriving from the contexts dated to the late 10th – first half of the 11th century, were fashioned and produced most likely in the South Baltic.

Table 9 presents six forms of side-plates of non-cased and cased combs quantified by chronological period.

Forms I and III appear to be most common, form I being older than form III. The former is more characteristic for non-cased and early cased combs, whereas the latter specifically is cased comb form of the later inflow. Form II is a late form of non-cased combs (early-middle 11th century), so is form VI found on the 12th century items. Straight side-plates of form IV are featured most commonly on cases with two pairs of contiguous side-plates from the late 10th century and on the youngest non-cased and cased 12th century combs. Form V is fairly rare and occurs more often on the oldest non-cased combs.

3.2.4 Raw Materials

All 363 objects from Novgorod deposits are made out of antler¹. For various reasons 60 items have not been analysed microscopically to identify the raw material to species. Among the remaining 303 objects, eight¹ have been identified as not being of reindeer antler (but could be either elk or red deer antler), the vast majority (290 items) being made out of antler of single species.

A few objects feature a combination of antler of different species. Thus, in the early 11th century specimen A16 (the set of a comb with a case), the comb is made out of

¹ Database A features 371 objects, eight of which were found in Rytic Gorodishche.

elk antler, whereas red deer antler was utilised for the case, and in the 11th century matching set the comb A191 is made out of red deer antler and the case A197 out of reindeer antler (all Fig. 3.2). Other sets with identified raw material (A29 (Fig. 3.2), A212, A218 (Fig. 3.1), A278) reveal the use of red deer antler. In the late 10th century case A87 (Fig. 3.24), which has two pairs of contiguous side-plates, the plano-convex cross-sectional pair (lower) is made out of elk antler, whilst the triangular cross-sectional pair (upper) is made out of red deer antler. Only the side-plates on the unstratified comb A107 (Fig. 3.44) are carved from red deer antler, all the billets being of elk antler.

Table 10 Identification of the antler raw material to species

Raw material	Number of non-cased combs	% of a total of 134 combs	Number of cased combs	% of a total of 83 combs	Number of cases	% of a total of 77 cases	Number of cased combs and cases ²	% of a total of 156 objects
elk	110	82.1	21	25.3	15	19.5	36	23.1
red deer	19	14.2	60	72.3	53	68.8	109	69.9
reindeer	5	3.7	2	2.4	9	11.7	11	7.1
total	134	100.0	83	100.0	77	100.0	156	100.0

Table 10 includes 290 objects with raw material identified to a single species, which clearly demonstrates that elk antler (50%) and red deer antler (44%) were the most utilised raw materials. Objects with the raw material identified as reindeer antler are far less common (6% of all identified objects) and this antler is used almost twice as frequently on cased items (e.g. A70 (Fig. 3.32), A89 (Fig. 3.52), A159 and A161 (both Fig. 3.45)) than on non-cased items (e.g. A25 (Fig. 3.20) and A112 (Fig. 3.44)).

The dynamics of chronological changes in the use of antler materials differ significantly between the groups of 125 dated non-cased combs (Fig. 3.51a) and 144 dated cased objects (Fig. 3.51b). Elk antler invariably predominates over antlers of

¹ A222, A224, A226, A251, A252, A257, A259, A260.

² Cased combs and cases are treated indiscriminately as cased objects, complete sets being calculated as single objects.

other species of the deer tribe in the group of non-cased combs, which tend to be more common in the 10th century layers. As for the cased combs found most frequently in the late 10th – 11th century contexts, from the late 10th century onwards red deer antler dominates in the bulk of the utilised deer antler, elk antler being prevalent only in the mid 10th century when cased combs are less common. The usage of rare reindeer antler had its peak (in terms of a proportion of the total of objects) in the early 11th century for non-cased combs and in the mid 11th century for cased ones. Generally speaking, elk antler forms the major part in the utilised raw materials in the 10th century, whereas red deer antler is the most commonly used raw material on the objects deriving from the 11th century layers (Fig. 3.55). Some older finds of combs made of antler of the three species of the deer tribe are illustrated in Figure 3.52. Three of the youngest four combs (A114, A335, A337) deriving from the late 12th century deposits are made out of red deer antler (A153 has not been analysed microscopically).

Each raw material defined certain limitations in the size and proportions of the constructive elements of the objects. The fact that elk antler provides more compact material available for manufacturing combs can be seen, for example, in Figure 3.53 which presents the combination of antler raw materials in the side-plates (of combs and cases) with varying relative depths (Index K.A.). As noted above (see sections 3.2.1a and 3.2.1b, Figures 3.22 and 3.29) a shallowness threshold of 3.5, defined by K.Ambrosiani and confirmed by the analysis of the Novgorod assemblage, separates relatively deep side-plates from relatively shallow ones. Nearly 80% of relatively deep side-plates (122 from 154 side-plates with Index of relative depth up to 3.5) are made out of elk antler, the deeper the side-plates the higher becomes the percentage of those made of elk antler. Conversely, the majority of relatively shallow side-plates (91 from 114, or 80%) feature the use of red deer antler.

Putting aside for the time being a fairly small group of objects in rare reindeer antler and concentrating on the most common antler raw materials, one can see a sharp shift from mainly elk antler to predominantly red deer antler almost exactly at 3.5 (Fig. 3.54), revealing a fundamental difference in structure between the elk and red deer antlers. It was already discussed above (see section 2.2) that red deer antler has a more narrow, much denser compacta. Furthermore, there is a sharp borderline

between the compacta and the extremely porous core, which cannot be utilised at all. These structural characteristics make for the inevitable shallowness of the side-plates cut out of red deer antler. Elk antler has a wider area of compact material as well as quite a prolonged transition zone (also suitable for utilisation) between the compacta and the porous core, and the core itself, which being much less porous than that of the red deer, can also be partially used.

The benefits from the use of elk antler for making composite combs can be also seen in Figure 3.56, showing the percentage of antlers of the main species identified in the billets of varying width. Elk antler allows cutting wider and hence fewer billets (see above section 3.2.1a), which makes for more robust products and a less risky manufacturing process. In order to see the division point for the billet average width amongst the most common antler materials, a group of 88 combs in elk and red deer antler has been selected featuring average billet width varying from 16 to 29 mm, a range in which both antler materials occur (Fig. 3.57). Starting from 25mm of average billet width, elk antler outnumbered red deer antler by a factor at least 2.1, and at the very extremity of the widths of red deer billets (27-29mm), they are outnumbered by those in elk antler by a factor of 9:1.

The question of whether the combs and cases were manufactured in the town or brought there as finished products is discussed below (see section 3.5). At the moment it is worth noting that from about the last quarter of the 10th century the number of products in red deer antler increases noticeably and by the early 11th century these products provide the bulk of combs in use.

3.3 Review of the Main Stylistic Groups of Class 1 Combs with Comparative Analyses of Assemblages from Rytic Gorodishche, Staraiia Ladoga and Other Contemporary Sites in and outside Russia

Summarising the survey of morphological traits of the combs in the Novgorod assemblage, it is worth noting that there appear to be two periods of the occurrence of single-sided composite combs in Novgorod with specific forms, manufacturing

practices, ornamentation and usage of raw materials. The first period lasts for a few decades following the foundation of the town in ca 950 up to the turn of the 11th century, the second covers mainly the first half of the 11th century, overlapping with the former period in the late 980s –1000s, which can be called a transition period.

First period (950-1000)

The comb repertoire is characterised by the predominance of non-cased combs made out of elk antler, among which the minority is formed by big combs with shallow cross-sectional side-plates, evenly spaced iron rivets placed to minimise intrusiveness to border-lined decorations with no apparent concern whether rivets are passing through the billet or at the junction of the billets. These are combs classified as 'A' combs by K.Ambrosiani and *Group I* combs by O.Davidan (Fig. 3.31, 3.37). Combs of this group form substantial parts in the collections from the sites with 8th - 9th century deposits, such as the settlements, burial and market grounds of Birka (Central Sweden), Hedeby (on the neck of Jutland peninsular), settlements and burial grounds on Gotland, as well as settlements at Wollin (South-East Baltic), Staraja Ladoga (13 km up the Volkhov from Lake Ladoga), Sarskii fort (on Lake Nero 50 kilometres south from the Volga in Iaroslavl), fortified settlement Krom (Pskov Kremlin on the promontory at the point of inflow of the Pskova River into the Velikaya River) and fort Kamno in the nearest vicinity of Pskov (Fig. 3.69).

On the sites with deposits of the late 9th – early 11th century, big 'A' combs invariably form a smaller group in the collections. This pattern can be seen in the materials from the cluster of sites in the neighbourhood of modern Iaroslavl in the Upper Volga region, including the settlements and burial grounds at Bolshoe Timerevo (set back 12 km from the Volga on the river Kotorosl, which rises near Lake Nero and flows into the Volga), Petrovskoe (on the south side of the Volga) and Mikhailovskoe (on the opposite, northern, side of the Volga) (Fig. 3.69). Other sites in the lands east of the Baltic which reveal similar compositions of 'A' and 'B' combs are the settlements and burial grounds along the Dnieper route from the Varangians to the Greeks, including Rytic Gorodishche (just over a kilometre from the outflow of the Volkhov from Lake Ilmen), Pskov burial ground, Gnezdovo west of modern Smolensk (astride the river Svinets' point of inflow into the Dnieper), and

Shestovitsy (near Chernigov). The lack of 'A' combs in the materials from 10th century deposits at Starokievskaya hill and Podol in Kiev can be explained by the small scale of excavations in the town.

The majority of non-cased combs at Novgorod are smaller combs with deep plano-convex side-plates and few billets pierced by rivets at either end (Ambrosiani's 'B' combs, Davidan's *Group II* combs) (Fig. 3.17, 3.18). In this group most combs feature copper-alloy rivets, however, there is a small group of iron-riveted combs among the oldest finds in the collection. Combs with either little (terminal decoration with vertical lines) or no decoration (Ambrosiani's *B2* and *B4* types) are most numerous (Fig. 3.48:A367, 3.52, 3.66), 'eared' variants being more common (Fig. 3.12). Combs similar to Birka *B3* types with groups of ring-and-dot motifs are fairly rare (Fig. 3.33). At Birka (Ambrosiani 1981, 81-82) and on Gotland (Thunmark-Nylén 1991, 113-118, Bild 3-5) these types are very common and dated to the later 'B' comb period (late 9th - 10th century), at Hedeby, however, they belong to rare types¹ (Tempel 1969, Tafel 20:37).

To the east of the Baltic these types are known at Sarskii fort (Eding 1928, Fig. 9; Leont'ev 1996, Fig. 64:16), Timerevo settlement (Dubov 1982, Fig. 9:2; Fig. 17:5,6; Fig. 26:2) and burial mounds (Fekhner 1963a, Fig. 23:11), settlement Beloozero by the Lake with the same name (Golubeva 1973, 169-175, Fig. 13:10) and Shestovitsy graves (Blifeld 1977, Table VII:2; XXVI:3; XXVII:10).

Other types with terminal and central decorative zones defined by the vertical lines and filled with cross-hatching lines (grid patterns and saltires) (*B1* Birka type) are less frequently encountered (Fig. 3.37, 3.43, 3.52, 3.70). It is very symptomatic that in east Scandinavia (Birka (Tempel 1969, Tafel 14:5,6; 37:2-6), Gotland (Thunmark-Nylén 1991, Bild 3)) and in the land of Rus (Staraja Ladoga (Davidan 1962, Fig. 3:4-9; Davidan 1999, Fig. 2:9-10), burial mounds south-eastwards of Lake Ladoga (Kochkurkina 1973, 43-44; Kochkurkina 1989, 267-268, Fig. 84: 9; Kochkurkina and Linevsky 1985, 95-124, Fig. 39: 5; 51: 14; Ravdina 1988, 8, Table 1: 3), burial grounds eastwards of Lake Onega (Makarov 1990, 56, Table XIII: 27; XV: 18, XVI:

¹ Only one comb in the Hedeby collection examined by the author was encountered which featured terminal decoration with vertical lines combined with copper alloy rivets piercing billets at the ends.

31), Rytic Gorodishche (A316, A317¹; Vevkhorubova and Shorin 1985, Fig. 1:6-10; Nosov 1992, 51, Fig. II.28:2), Gnezdovo (Pushkina 1993, 58, Fig. 1:2), Timerevo settlement (Dubov 1982, Fig. 17:7; 28:15) and burial mounds (Fekhner 1963a, Fig. 6; 7; 20), Sarski fort (Eding 1928, 38; Leont'ev 1996, Fig. 64:13-15)) these types of decoration are found on combs with prevailing riveting through the billets (normally at the ends), whereas at Hedeby (Tempel 1969, Tafel 20:42-44; 21:56-57; 23:80-81,105-106) and York (MacGregor et al 1999, Fig 884:7546, 7554; Fig. 885:7566; Fig. 886: 7574; Fig. 889: 7524) the same decoration is featured on combs with riveting predominantly between the billets.

The comb with copper-alloy side-plates (A351) also draws attention to the nexus embracing early Novgorod and other sites with analogous finds, such as Staraja Ladoga (Davidan 1962, Fig. 3.10), Gnezdovo (Astashova et al 1996, 56, Fig. 326; Sizov 1902, 89, Fig. 50), Timerevo and Mikhailovskoe (Fekhner and Nedoshivina 1987, Fig. 9:6; Fekhner 1963a, Fig. 23:15) Gotland (Jankuhn 1953, 41; Thunmark-Nylén 1991, Bild 2), Birka (Ambrosiani 1981 68-70, Fig. 36) and Hedeby, where combs with copper-alloy side-plates as well as a mould for casting these side-plates are known (Jankuhn 1953, 37-42).

Links with Scandinavia, and with Central Sweden in particular, can be seen when analysing the decoration of an exquisite comb A115 deriving from the earliest deposits on property Γ in the Lyudin End (Fig. 3.70). An intricate linear interlaced ornament, more common on big 'A' combs, covers almost all space on the side-plates, the decoration differing between the faces. K.Ambrosiani illustrated an A3 comb and an antler spoon, both found in the Black Earth of Birka and featuring almost the same interlaced decoration (Ambrosiani 1981, 47, Fig. 18). Another spoon with similar decorative features is known in Trondheim (Long 1975, 29, Fig. 11a). Although deriving from the filling of a 16th century well, it is, judging by its features (form, decoration) of a much earlier date (most likely the late 10th – 11th century). Two similar spoons, both carved from reindeer antler, were found in the

¹ Unpublished combs in the database A.

early layers of the Lyudin End and another antler¹ spoon was uncovered in the Nerevsky End.

The object deriving from the mid 11th century context on property E in the Lyudin End (Fig. 3.71:1)² is nearly identical to its counterpart from Central Sweden. Two other spoons deriving from the Lyudin End property Γ (turn of the 11th century) (Fig. 3.71:2)³ and the Nerevsky End property Д (late 10th century) (Fig. 3.71:3)⁴ reveal more proficient resemblance with the decoration of the comb A115. Apart from Novgorod and Birka, a similar spoon is known in Staraja Ladoga (Davidan 1982, Fig. 1:6).

Cased combs all belong to 'B' types, with the cases assembled with two pairs of side-plates (Fig. 3.2:A50, 3.24), and form from one fourth to one third of all combs of this period. Combs from settlements do not reveal the sex of their owners, the material from graves excavated elsewhere, however, offers some evidence for the sex attributions. Thus at Birka, cases (i.e. parts of cased combs) are particularly associated with male graves (Ambrosiani 1981, 26-27). It does make sense that cases of composite construction providing a better protection for the teeth of combs when not in use were especially useful in a man's life full of hazards. Combs decorated with double bands of saltires positioned centrally in the area defined by vertical lines (*B1:3* type) also reveal a close correlation with male graves at Birka. In Novgorod this type of cased combs was most common in the 10th century (Fig. 3.18, 3.24, A227). Apart from Novgorod and Birka, this type is also known in Staraja Ladoga (Davidan 1962, 99, Fig. 3:7, 11), Sarski fort (Eding 1928, Table VI:12), Timerevo and Mikhailovskoe burial mounds (Fekhner 1963a, Fig. 8:2a; Fig. 16:11; Fig. 23:10), and in Pskov¹.

It is reasonable to assume that other cased combs (once cases and one most common type of cased combs are associated with male graves) also belonged to men. Materials from other burial grounds (Shestovitsy (Blifeld 1977, 121-172, Table VI,

¹ The object has not been analysed microscopically.

² TpVII-85 16-624-13 КП 35697/185 (NSM)

³ TpVIII-87 18-733-87 КП 36697/2767 (NSM)

⁴ HepXV-56 30-1119-4 ЭПА 31-113 (SH)

XI), Timerevo (Fekhner 1963a, Fig.8; 23:10) confirm the connection between cased combs and male graves.

It should be highlighted once again that almost all non-cased and cased combs with the raw material identified to species are made out of elk antler. The comparative analysis here is limited, since antler identification to species in finished products has been undertaken only in Birka, revealing that most of the combs from the Black Earth were made of elk antler, which corresponds to the evidence from the comb-making manufacturing waste (Ambrosiani 1981, 36-38). Waste materials in connection with comb-making from Staraja Ladoga were identified as predominantly elk antler (Davidan 1974 and 1977) and most combs seemed to be made of elk antler as well². Seven out of eight combs from Rytic Gorodishche in the collections of the Novgorod State Museum have been identified as elk antler³. In Birka, Staraja Ladoga and Novgorod there are unique objects which are one-piece and carved to look exactly like contemporary composite combs. These items may be called experimental products employing the advantages of elk antler.

When summarising the description of the objects from the first period, for the moment it may simply be said that such evidence as there is seems entirely alike in character to that from the other sites east of the Baltic, revealing the presence of persons of Scandinavian descent. Especially close parallels can be found in materials from the latter half of Birka's life span (10th century), the middle period on Gotland, the later period of the early princely residence in Rytic Gorodishche and horizon D of Staraja Ladoga which, according to the dendrochronological investigations of the late 1980s, is dated from the early 930s to the early 970s (Riabinin and Chernykh 1988, Chernykh 1989).

Around the 980s-990s, which can be called an intermediate period, some new processes were set into movement, resulting in noticeable changes in the repertoire of comb forms (Fig. 3.7, 3.23, 3.59, 3.62, 3.64), decorative styles (Fig. 3.49, 3.50),

¹ Unpublished material.

² Personal communication with the Late O.I.Davidan in 1995.

³ Combs A16, A17, A19, A20 (Nosov 1992, 51, Fig. II.28:1), A21, A22, A23 are elk antler; comb A318 is red deer antler.

composition of raw materials (Fig. 3.51, 3.55), as well as in more subtle features, such as the placement of rivets (Fig. 3.16, 3.17).

Second period (1000-1050)

The second period is characterised by a much less diverse comb repertoire, with the dominance of cased combs. The inflow of cased combs indicative of male ownership started around the 980s, and by the turn of the 11th century they by far outnumbered their non-cased counterparts (Fig. 3.7). Cases with one pair of side-plates appeared in increasing numbers already in the intermediate period and became the most common design in the 11th century (Fig. 3.1, 3.2, 3.45). There are also a few cases featuring single side-plates imitating pairs of contiguous side-plates on both faces (Fig. 3.1:A54, 3.24:A88).

Combs, both non-cased and cased of more elongated proportions (Fig. 3.23, 3.61, 3.62) and with shorter teeth (Fig. 3.64), mainly feature the use of iron rivets piercing the billets sandwiched between shallow side-plates in a totally different manner compared with what was common in the early period (Fig. 3.20). Rivets are placed to pass through the end-plates (and occasionally through the central billet) and through the junctions of middle billets (or even through the junction of every pair of middle billets). This tradition of probably Frisian origin is widely spread in South-West Scandinavia, the South and South East Baltic and at both sides of the North Sea (Andersen 1968, 27-29; Tempel 1969, 66-68; MacGregor et al 1999, 1931; Wiberg 1987, 414-15; Ulbricht 1984, Taf. 27-28, 64-70).

In contrast with the prevailing decorative patterns in the first period, arranged by means of vertical incisions segregating decorative zones, decorative schemes arranged horizontally along marginal lines are dominant, but with terminal vertical incisions persisting. The most common decorative motifs invariably combined with marginal lines are groups of ring-and dot motifs, combined with ring-and-dot bands or stylised interlace (Fig. 3.32, 3.35).

‘Winged’ non-cased combs of especially elongated proportions (Fig. 3.14) are characteristic for the second period, parallels being found in Schleswig (Ulbricht

1984, Taf. 28:5; 64:1-3; 69), Lund (Persson 1976, Fig. 288:2A, 289:20D), Wollin (Cnotliwy 1970, Ryc. 5:a-c), Gdansk (Hilczerovna 1961, Ryc. 45:1, 48), Gniezno (Hensel 1960, Ryc. 112), Kruszwica (Hensel 1958, Ryc. 3:b-c), and on the Isle of Usedom (Mecklenburg) (Lampe 1981, Abb. 13).

It was discussed above (see section 3.2.2b) that this style of decorative tradition originates most likely in Denmark. Numerous parallels to cased combs found in 11th century Novgorod are known in the Southern Baltic: one can see similar objects in the assemblages from Århus (Tempel 1969, Taf 40(6)), Lund (Persson 1976, Fig. 288:4A, 6A, 8A), Fig.289:17B), Trelleborg (Tempel 1969, Taf. 38:6, 40:3), Hamburg (Tempel 1969, Taf 40:5), settlements in Mecklenburg (Lampe 1981, Abb. 8, 11), in Polish Pommeranian towns of Szczecin (Cnotliwy 1973, Ryc. 73), Wollin (Wilde 1953, no. 42, 44), Kołobrzeg (Hilczerówna 1961, 137) and Gdansk (Hilczerówna 1961, Ryc.41, 45, 47), as well as in the more inland towns of Poznan (Hensel 1958, Ryc. 88) and Kruszwica (Hensel and Broniewska 1961, Ryc. 58). Cased combs with marginal lines and ring-and-dot bands are known in Tartu (Luik 1998, 19-33, Fig. 14) and combs with stylised interlace decoration were found in Ehmja (western Estonia) and Lõhavere (Central Estonia) (Luik 1998, Fig. 16-17). Single finds of similar objects were uncovered in the British Isles (MacGregor et al 1999, Fig. 867, 884:7548, 889:7605, 7611; Dunlevy 1988, Fig. 12).

Cased combs with marginal lines and ring-and-dot bands, as well as those with stylised interlaced decoration, are widely distributed in the late 10th –11th century materials from urban centres in the west north-west and north of Old Rus (Fig. 3.69). They were uncovered in Beloozero (Golubeva 1973, 169-173, Fig. 13:8), Pskov¹, Novogradok (Gurevich 1981, 12-19, Fig. 5:8; 8:5), Pinsk (Lysenko 1974, Fig. 30:18), and Lukoml (Shtykhov 1978, Fig. 7). These cased combs are not unknown in the towns further down the Dneper in Kiev (Karger 1958, Table XCIII) and Voinskaia Greblia (Dovzhenok, Goncharov and Iura 1966, Table 2:4,5) and further east in Timerevo settlement in the Upper Volga (Dubov 1982, Fig. 16:5). Eleven cased combs¹ of this type and one cased comb with two pairs of contiguous side-plates decorated with double bands of saltire motifs (Ambrosiani's *B1:3* type) were

¹ Unpublished materials from the site X in Lenin Square, excavated 1989.

found in Sarkel, the main fortress of the Khazars on the Lower Don, which was captured by the Rus some time in the 960s (Artamonov 1958). All the objects come from strata dated to the late 10th – 11th centuries and obviously imply the presence of military milieu.

Another characteristic feature of the combs of the second period is that those in red deer antler by far outnumber their counterparts in elk antler, formerly the absolutely predominant raw material, and one can also see increasing numbers of combs in reindeer antler (Fig. 3.51, 3.55), although still comparatively rare in relation to red deer.

All in all, the assemblage of combs of the second period reveals a new nexus embracing West Scandinavian and Southern Baltic areas and urban centres of the Rus lands.

From around the 1050s, single sided composite combs decrease in numbers sharply and by the 1090s become unknown in Novgorod, reappearing in minute numbers in the deposits of the later 12th century, being specks only in the bulk of totally different products.

3.4 Chronological and Spatial Distribution of Single-sided Composite combs in Novgorod Properties

Single-sided composite combs are unevenly distributed in the cultural deposits in Novgorod. In Table 11 the finds are compiled and quantified by excavation site; there are also areas of the sites and indices of concentration showing the number of finds per 100 sq.m. The index of concentration, making possible the comparative analysis of artefacts from sites of varying sizes, was first used for the study of concentrations of 'bone'-working manufacturing waste in Novgorod (Smirnova 1995). The index of comb concentration calculated for the whole excavated area of

¹ Most of objects are unpublished materials from the collections of the State Hermitage (St.-Petersburg), AVES колл. 2792 (SH)

the town demonstrates that on average three single-sided composite combs are found in an area of 200 hundred square metres.

From the three oldest parts Novgorod, namely The Nerevsky, Liudin and Slavensky Ends, only the former two reveal close to average or higher concentrations of combs. The lack of material in the sites located in the areas later known as the Plotnitsky and Zagorodsky Ends is understandable, since the earliest deposits there are dated to the late 11th –turn of the 12th century (Fig. 1.4).

Table 11 The occurrence of single-sided composite combs on Novgorod sites

Town side	End	Site	Single-sided composite combs	Site size (sq.m)	Index of concentration ¹		
					Sites	Ends	Town sides
St. Sophia's	Nerevsky	Dmitrievsky	0	360	0.0	1.4	2.1
		Kozmodemyansky	0	140	0.0		
		Liudogoshchensky	0	160			
		Nerevsky	134	8840	1.5		
		Tikhvinsky	0	364	0.0		
	Liud.	Troitsky	220	6336	3.5	3.5	
	Zag.	Mikhailo-Arkhangelsky*	1	656	0.2	0.2	
	Kremlin		1	100	1.0	1.0	
Trade	Slavensky	Buyany	1	160	0.6	0.1	0.05
		Duboshin	0	160	0.0		
		Gotsky	0	552	0.0		
		Il'insky	0	1430	0.0		
		Kirovsky	0	320	0.0		
		Mikhailovsky	1	440	0.2		
		Nutny	0	674	0.0		
		Rogatitsky	0	140			
		Torgovy	0	160			
		Plot.	Fedorovsky*	1	2534		
	<i>Casual finds</i>		4	-	-	-	
All		363	23,526	1.5	1.5	1.5	

* The allocation of the earliest deposits on the Fedorovsky and Mikhailo-Arkhangelsky sites to the Plotnitsky and Zagorodsky Ends respectively is in question, since neither of the Ends existed at that time as political and administrative units.

Most striking is the very low number of finds from the Slavensky End. Deposits as old as the early 11th century have been excavated on the Buyany, Il'insky and Nutny sites, and the first construction layer of Mikhailova Street investigated on the

¹ Indices equal or higher than the average (bottom line) are given in bold.

Mikhailovsky site was dated dendrochronologically to the 970s. There are only three combs found on the Trade side of the town at all: the early-mid 11th century A214 (Fig. 3.46) found on the Buyany site, the late 11th century A336 of unique construction from the Fedorovsky site (Fig. 3.9), and a long cased comb A337 with straight side-plates uncovered on the Mikhailovsky site in the deposits dated to the 1160s-1170s (Fig.3.48).

The materials from the Liudin End reveal the highest concentration of single-sided composite combs found in Novgorod (Table 11), which is close to the degree of comb concentration in Staraja Ladoga (104 combs from the excavated area of approximately 2500 sq.m, index 4.2). In some trenches of the Troitsky site (Table 12) the numbers of finds from a 100 sq.m unit are higher than the maximum densities found so far in Ladoga, as shown in E.A.Riabinin's excavations in the main settlement (Zemlianoe gorodishche) in 1973-1985 (15 combs including fragments from the excavated area of 330 sq.m – index 4.5) (Davidan 1999).

Table 12 The occurrence of single-sided composite combs in the trenches of Troitsky site

Troitsky trenches	Number of combs	Excavated area (sq.m)	Index of concentration*
I	1	320	0.3
II	1	144	0.7
III	2	216	0.9
IV	12	480	2.5
V	5	288	1.7
VI	8	504	1.6
VII	20	624	3.2
VIII	32	640	5.0
IX	22	832	2.6
X	33	840	3.9
XI	20	332	6.0
XII	64	1120	5.7
Total	220	6340	3.5

* Indices higher than the average (bottom line) are given in Bold.

The Nerevsky site (excavated in 1951-1962) reveals an average index of the concentration of finds equal to the average index for the whole excavated area of the town, and is more than twice as low as that for the Troitsky site which has been

excavated since 1973. A similar pattern has been noted through the analysis of the spatial distribution of the waste products with regard to the 'bone'-working industry (Smirnova 1997). Although the method of excavation established on the Nerevsky site during investigations in the early 1950s¹ has remained consistent over the years, and both was and to some extent still is based on similar standards of recovery, one can assume that the slower pace of excavation during the last few decades has resulted, somewhat unintentionally, in fewer finds being overlooked in the dig. It is clear from Table 12 that the more recently excavated trenches have consistently produced higher density of single-sided composite combs.

Let us have a closer look at the patterns of distribution of single-sided composite combs on the properties of the Nerevsky and Liudin Ends of Novgorod on the evidence from the Nerevsky and Troitsky sites.

The Nerevsky End

In the earliest (10th -11th century) deposits of the Nerevsky excavation at least eight properties have been revealed, as well as stretches of Velikaia (137m), Kholopia (52m) and Kuzmodemianskaia (60m) streets (Fig. 3.72; 3.73).

Table 13 contains the data on the stratified single-sided composite combs in various contexts of the Nerevsky site. There are also approximate areas of the excavated stretches of properties and streets, and indices of concentration of combs from different contexts showing the number of finds per 100 sq.m.

Areas of properties A and B, which in the 10th century belonged to the same property, reveal the highest indices of concentration of single-sided composite combs as well as the highest concentration of the earliest finds (Fig. 3.72). On property B separated from the property A by Kholopia Street during the first years of the 11th century, combs are less common in the 11th century layers, whereas they are practically unknown on property A during the same stretch of time (Fig. 3.73). On property E (adjacent to property B from the south) most combs were found in the late

¹ The cultural deposits are excavated in levels of 20cm spits in two-meter square blocks, artefacts being hand-collected.

10th – early 11th century deposits (Fig. 3.72-3.73). Late 10th century combs are predominant in the assemblage of finds from property K, separated from property E by Kuzmodemianskaia Street.

Table 13 The occurrence of single-sided composite combs on the properties of the Nerevsky site

Properties	Number of combs*	Excavated area (sq.m)	Index of concentration**
A	13 (12/1)	520	2.5 (2.3/0.2)
Б	24 (21/3)	1200	2.0 (1.8/0.2)
B	4 (1/2/1)	550	0.5 (0.1/0.4)
Г	10 (3/7)	550	1.8 (0.5/1.3)
Д	22 (10/12)	1300	1.7 (0.8/0.9)
E	21 (15/6)	1300	1.6 (1.2/0.4)
И	17 (5/12)	1150	1.5 (0.5/1.0)
K	8 (7/1)	550	1.5(1.3/0.2)
Streets	11 (6/5)	1600	0.7 (0.4/0.3)
Total	130 (80/50)	8720	1.5 (0.9/0.6)

* Two figures in brackets show the numbers of combs from the 10th and 11th centuries and, in case of property B, numbers of combs from the 10th, 11th and 12th centuries (the 12th century find is ignored when calculating the index of concentration)

** Indices of concentration separately for 10th and 11th century finds are given in brackets. All indices higher than the relevant average (bottom line) appear in bold.

Single-sided composite comb users appear to have settled in the areas to the west of Velikaia Street from the late 10th century. Of all properties where the combs were most frequently found in the late 10th -11th century deposits (Г, ДВ¹, И), properties Г and Д reveal higher indices of concentration of finds.

The Liudin End

In the earliest deposits of the Troitsky site 11 individual properties along Chernitsyna (104m), Proboinaia (49m) and Iarysheva (10m) Streets can be distinguished (Fig. 3.74; 3.75). Table 14 demonstrates the occurrence of combs in various contexts of the Troitsky End.

The lower densities of class 1 comb finds can be observed on properties A, Б and B which, only coincidentally, are located within the first trenches of the Troitsky site

(I-IV, VI) excavated in the early 1970s - mid 1980s. The higher concentration of this kind of find on other properties was not a result of improved methods of excavation practiced during the 1980s-1990s. This can be supported by the fact that some properties excavated during the late 1970s – mid 1980s (property Γ to a large extent within trench V (1979-1980), property E within trench VII (mid 1980s)), revealed very high concentrations of these combs. Furthermore, these same properties A, Б and B on the Troitsky site with lowest densities of class 1 combs demonstrate the highest concentrations of other artifacts, such as ‘bone’-working debris, uncovered in the 12th –early 14th century deposits (Smirnova 1995).

Table 14 The occurrence of single-sided composite combs on the properties of the Troitsky site

Properties	Number of combs*	Excavated area (sq.m)	Index of concentration**
A	19 (17/2)	920	2.1 (1.8/0.3)
Б	2 (0/2)	450	0.4 (0.0/0.4)
B	1 (??) ²	70	1.4 (??)
Γ	38 (26/11/1)	950	3.9 (2.7/1.2)
E	29 (16/13)	460	6.3 (3.5/2.8)
И***	19 (14/4/1)	250	7.2(5.6/1.6)
K	40 (21/19)	950	4.2 (2.2/2.0)
юK	12 (2/10)	150	8.0 (1.3/6.7)
M	25 (11/14)	720	3.5 (1.5/2.0)
П	20 (8/12)	590	3.4 (1.4/2.0)
P***	6 (4/2)	80	7.5 (5.0/2.5)
streets	0	750	0.0
Total	211 ³ (119/89/2 +1 undated)	6340	3.3 (1.9/1.4)

* Two figures in brackets show the numbers of combs from the 10th and 11th centuries and, in case of properties И and Γ , numbers of combs from the 10th, 11th and 12th centuries (12th century finds are ignored when calculating indices of concentration)

** Indices of concentration separately for 10th and 11th century finds are given in brackets. All indices higher than the relevant average (bottom line) appear in bold.

*** Properties И and P are likely to constitute one urban estate in the 10th –11th centuries.

Unfortunately, only a fairly small part of property P, neighbouring at the north of property, has been excavated, which makes it difficult to say whether in the earliest

¹ Properties B and Д in the early period (10th-11th centuries) were most likely parts of one big town estate (Zasurtsev 1963, 110-115).

² The object is undated and, therefore, is excluded when calculating the total indices of concentration.

³ Nine finds of a dubious location have been excluded (see Table 11 containing 220 combs from Troitsky site).

period of Novgorod it was part of a bigger property embracing property II adjacent to it from the west. Judging from the layout of other properties in this End of the town, it seems likely that at least for the first few decades (if not longer), areas P and II comprised one property. Both areas reveal the highest concentrations of combs which come from the 10th – early 11th centuries.

Properties E and юK¹ have also provided noticeably larger numbers of combs from an area of 100 sq.m, featuring almost twice as many as the average for this site, although single-sided composite combs were uncovered consistently in the mid 10th to the mid 11th century horizons of the property E, whereas on property юK they were deposited mainly in the layers of the 11th century.

Almost whole areas of properties K and Г adjoining the crossing of Proboinaia and Chernitsina Streets from the west have been excavated, revealing also a higher than average concentration of single-sided composite combs. Most of the earliest combs from this assemblage were found within these two properties, which appear to have been occupied first by the newcomers in this area. They settled down probably in the 940s on the meadow, which had existed on the spot for a few decades following the clearance of the forest. It is probable that the same people ploughed the field to the west of their properties where 15-20 years later new properties were laid out. Plough marks were revealed on the natural soil underlying the deposits on properties M, II and partially II (Aleksandrovsky et al 1999). On both properties M and II, located in the western part of the area excavated at the Troitsky site, single-sided composite combs are fairly common (with the indices of concentration slightly higher than average for this site), especially in the late 10th - early 11th centuries.

Properties to the east of Proboinaia Street reveal lower than average indices of concentration. It is hard to say whether the lack of material from property B is due to the fact that only very small areas adjacent to Chernitsina Street from the north have been excavated. As for the property Б and property A in particular, although having been investigated on a much larger scale, they still reveal fewer combs than other

¹ The property adjacent from the south to the property K has not been allocated a name yet, so in this research it is called юK, which means 'to the south of K'.

properties of the Lyudin End, most of which come from the late 10th century deposits.

3.5 Areas of Origin and Place of Manufacture

The comparative analysis of the assemblages of class 1 combs from Novgorod and other Viking Age and early medieval sites in Northern Europe (see section 3.3) has highlighted the close nexus embracing Novgorod, Staraja Ladoga, Gotland and Birka in the earliest period (ca 950s-980s), and Novgorod and the Southern Baltic lands in the later period (ca 990s-1050s).

3.5.1 Use, Loss and Disposal

All the evidence obtained through the study of the single-sided composite combs in the lands of Old Rus in general, and Novgorod in particular, suggests that they were owned and brought into town by people of Scandinavian descent. This does not mean that all the occupants (or habitués) of early Novgorod were newcomers from Scandinavia, or necessarily of Scandinavian stock at all. There is enough evidence indicating quite mixed elements of the material culture of the first dwellers. The chronological distribution of these objects in Novgorod reveals the presence of the Varangians already among the first dwellers of the town.

To state this is at once to stir up controversy. Throughout the whole academic debate as to the precise status of early Novgorod, its social structure and the combination of ethnic groups, most scholars seem to agree that the evidence of the presence of the Varangians (Scandinavians) in Novgorod is limited to the first half of the 11th century, and connected with the transference of the Prince's residence from Riuric Gorodishche to Novgorod by Prince Iaroslav Vladimirovich (aka Iaroslav the Wise). The Prince and his *druzhina* (men-at-arms) are generally believed to have settled on Slavensky Hill on the Trade side of the town where the Prince's court was set up and the properties of the members of *druzhina* were laid out (Nosov 1999; Sedov 1999; Yanin 1992).

It is not in the scope of this research to linger at the traditional landmarks of the major most debatable scholarly questions. However, in relation to the earliest history of the town, where material evidence is notoriously sparse, the assemblage of dozens of single-sided composite combs cannot remain unnoticed.

Combs of class 1 are unknown on Slavic settlements in the Novgorod region (Nosov 1992) or elsewhere (Liapushkin 1968; Rusanova 1973; Sedov 1982). The Finno-Ugrians, who were supposedly among the medley of peoples who settled down in the area later known as Novgorod, used one-piece combs with an arched back and zoomorphic one-piece combs (Kondrat'eva 1981, Kondrat'eva 1986). Single-sided composite combs are, however, invariably present among the materials from the sites located along the main axes of trade in the lands to the east of the Baltic, which in the 9th-11th centuries lay south-eastwards (the Volga route to the Muslim world of the Middle East and Central Asia) and southwards (The Dnieper route to the Christian world of the East Mediterranean) (see section 3.3).

These combs are definitely the most common and characteristic objects of the Scandinavians (the Varangians as they were called in Old Rus). Most Scandinavian adults of either sex possessed a comb and made frequent use of it for their hair. Ibn-Fadlan, an Arabic traveller who eye-witnessed the Varangians (referred to as *Rus* by the Arabs) during his visit to the Middle Volga in 922, offered a well-observed portrayal of the *Rus*. He describes how the *Rus* washed and combed their hair every morning (Wikander 1978, 84 cited by Ambrosiani 1981, 13). K.Ambrosiani (1981, 13) also cited the written evidence of John of Wallingford's Chronicle (mid 12th century) that 'the English girls appreciated the Danish custom of combing hair every day, of bathing every Saturday and of frequently changing clothes' (Vaughan 1958, 60).

It is generally assumed in Soviet and Russian historiography (archaeological literature) that the Slavs of the Old Rus adopted single-sided composite combs from the peoples of the Western part of Northern Europe (Scandinavians, Frisians) in the 8th-9th centuries, and by the late 9th -10th century these combs become commonly used by the Eastern Slavic peoples. The theory is expounded by Olga Kondrat'eva, who outlines a more detailed picture of the process of adoption of the class 1 combs

by the Slavs of Eastern Europe (Kondrat'eva 1997). According to this theory, up until the 10th century most combs were brought to Old Rus as consignments of products from the manufacturing centres in Scandinavia and the Southern Baltic and some types were copied locally (e.g. non-decorated combs). Some others were manufactured in the late 10th-11th century in a number of towns (in the North-West of Old Rus in particular). Kondrat'eva claims that some combs with saltire motifs were locally made and that single-sided composite combs with bands of ring-and dot elements and stylised interlace are typical local (East Slavic) products (Kondrat'eva 1995; Kondrat'eva 1997, 308).

This conclusion was made on the basis of the presence of debris of skeletal materials in Staraja Ladoga, Novgorod, Pskov, Izborsk, Timerevo non-fortified settlement, Lukoml, Novogradok, Volkovysk, Turov, Pinsk and Kiev. Combs found in the burial mounds of Gnezdovo and Sednevo (near Smolensk), Shestovitsy (near Kiev), Vladimir and Suzdal region and Iaroslavl Volga region (which all are called rural sites by O. Kondrat'eva) are believed to have been made in towns nearest to burial fields (Kondrat'eva 1997, 306-307). The problem is, firstly, that waste elements from the towns referred to, were not necessarily comb-making waste, secondly, that the evidence for the manufacturing waste from the deposits earlier than the 12th century is pathetically sparse and noticeable only in Staraja Ladoga (Davidan 1977), and, thirdly, that the so-called rural sites referred to are precisely the sites which reveal the presence of Variagian men-at-arms, and which, therefore, have acquired the name '*druzhinas' mounts*' in archaeological literature. As for the combs decorated with bands of ring-and-dot motifs and stylised interlace, claimed to be local products, we recollect that they are most common in the late 10th – mid 11th centuries and are made predominantly out of red deer antler, which is obviously the least available antler raw material in the lands east of the Baltic.

Let us have a closer look at the evidence for comb manufacturing on the spot as revealed in Novgorod and other contemporary sites.

3.5.2 Production

Since all single-sided composite combs found in Novgorod are made out of antler, it is worth analysing waste elements in this skeletal material from the 10th-11th century deposits. A notoriously small number of 82 off-cuts of antler has been uncovered from the early deposits on the Nerevsky and Troitsky sites.

The Nerevsky End

A total of 31 antler waste pieces are encountered in the Nerevsky assemblage, none of which can be associated necessarily with comb-making. Production waste is so-called pure debris consisting of sawn-off tines of predominantly elk antler, three pieces having been identified as reindeer and one as red deer antler.

Table 15 demonstrates the higher than average indices of debris concentration on properties A, Д and И. The waste elements, however, cannot be linked with single-sided comb-making activities because of their minute numbers, nor even with the repair of those combs, for they were found in the layers featuring the least occurrence of the combs of class 1.

Table 15 The occurrence of antler¹ debris in the 10th –11th century contexts on the properties of the Nerevsky End

Nerevsky properties	A	Б	В	Г	Д	Е	И	К	Total
mid 10th C	0	1	0	0	1	0	0	0	2
late10th C	0	0	0	0	1	0	1	1	3
early 11th C	1	0	1	1	1	0	2	1	7
mid 11th C	1	1**	0	0	3*	1	1*	0	7
late11th C	1	1	0	0	5*	0	5	0	12
Total	3	3	1	1	11	1	9	2	31
Index of concentration²	0.6	0.2	0.2	0.2	0.8	0.1	0.8	0.4	0.4

¹ A single piece of red deer antler among the waste elements is marked with **, a single piece of reindeer antler being marked with *. All the rest are elk antler.

² Indices of concentration calculated per 100 sq.m of excavated area of a property (see Table 13) appear in bold when equal or higher than the average for the site (rightmost cell).

The Liudin End

The waste elements have been uncovered on several properties of the Liudin End and they reveal a different pattern of chronological distribution in comparison with the Nerevsky site (Table 16). As in the assemblage from the Nerevsky site, elk antler pieces form the majority of the Troitsky assemblage, only four specimens being identified as reindeer antler and one as red deer antler.

Table 16 The occurrence of antler¹ debris in the 10th –11th century contexts on the properties of the Liudin End

Troitsky properties	B	Г	Е	ИР	К	юК	М	П	Total
mid 10th C	0	12	0	2	3	0	0	0	17
late10th C	0	1	1	0	3	0	0	2*	7
early 11th C	0	2	2	1	2	0	2*	2**	11
mid 11th C	1	2*	3	0	2	1	1	3*	13
late11th C	0	1	0	4	1	1	1	1*	9
Total	1	16	6	7	11	2	4	8	57
Index of concentration ²	1.4	1.7	1.3	2.1	1.2	1.3	0.6	1.4	0.9

Properties B, Г, Е, ИР, К, юК and П reveal higher than average concentrations of debris, the chronological distribution of which roughly corresponds to the occurrence of single-sided composite combs. Property П stands out as having a rather unusual composition of antler elements, only half of which were identified as elk antler, the other half being mainly reindeer antler (one piece being red deer antler). Of course, the numbers of waste elements are too small to suggest comb-making activities on the spot. Besides, the nature of debris consisting of sawn-off tines and burrs and discarded off-cuts of palm gives no evidence for which kinds of objects could have been worked on the property. However, the fact that the debris elements of rare raw materials derive from the same chronological contexts as those with highest occurrence of finished products in reindeer antler, can be indicative of the presence of persons with close connections with areas of natural distribution of this species. It is worth noting here that the only hoard of Western European and Byzantine silver

¹ A single piece of red deer antler among the waste elements is marked with **, a single piece of reindeer antler being marked with *. All the rest are elk antler.

² Indices of concentration calculated per 100 sq.m of excavated area of a property (see Table 14) appear in bold when equal or higher than the average for the site (rightmost cell).

coins in Novgorod was found in the deposits of the first half of the 11th century on property II. The hoard consists of 29 German denarii, 21 English pennies, seven Scandinavian (Swedish) imitations of the coin designs of the Anglo-Saxon kings and two Byzantine miliaresions (Gaidukov and Yanin 1995; Yanin and Gaidukov 1998).

Although property II (II, see section 3.4) reveals the highest concentration of antler off-cuts on the excavated area of Troitsky site, half of the waste elements come from the late 11th century deposits with very low numbers of single-sided composite combs. However, property II along with properties Γ and K features the presence of antler debris in the earliest in Novgorod layers of the mid 10th century.

A concentration of 12 waste elements in elk antler which has been uncovered on property Γ, is, in many respects, unique for Novgorod. Firstly, it is the only evidence for single-sided composite comb-making on the spot during the first years after the settlement was founded. Secondly, all the debris derives from the same context and is associated with a log-structure XI-29-170, which is the oldest dwelling excavated in Novgorod up to now (Faradzheva 1999, 91-2). Finally, the nature of this manufacturing complex explicitly demonstrates the model of production which can be traced elsewhere in Northern Europe on the settlements of the 9th-11th centuries.

Among elk antler off-cuts uncovered from inside and just outside the log dwelling there were tine tips, a fragment of a skull with a sawn-off pedicle, a burr sawn off the slaughtered animal and blanks of three billets. Waste elements were limited spatially to the structure XI-29-170 and chronologically to the construction level 29, dated dendrochronologically to the 930s-950s. Some of them are depicted in Figure 3.76 along with combs uncovered on property Γ in construction levels 28 (950-970) and 29 (930-950). The latter belong to the earliest types of eared 'B' combs featuring riveting through the billets, little or no decoration at all and elk antler raw material. Judging from the small amount of debris and its spatial distribution in close connection with the dwelling, which life span was limited to a maximum 20 years, it seems most likely that the comb-making was a seasonal event rather than a more prolonged activity.

The evidence from the earliest complex on property Γ seems identical in character to that from other contemporary sites such as the Gnezdovo settlement (Pushkina 1993), Riuric Gorodishche (Verkhorubova and Shorin 1985) and Staraiia Ladoga (horizon D) (Davidan 1977, 101-105).

Amongst even the most productive of continental sites such as Hedeby, Wollin and Birka it has long been recognised that the volume of industrial output was insufficient to indicate full-time long-term manufacturing (see the summary of discussion in MacGregor 1985, 44-51). It has been persuasively argued by Ambrosiani (1981) and Christophersen (1980a, 1980b) that the dearth of remains from full-time activity should be explained not by postulating that any one craftsman had two or more jobs to perform, but by assuming that he followed only one trade in more than one place. In other words, before the establishment of settlements sufficiently populous to support full-time producers, the majority of antler workers (comb-makers) were itinerant.

For the moment it may simply be said that such evidence as there is in Northern Europe does not contradict the theory of an itinerant mode of making single-sided composite combs up to the early 12th century.

The evidence from Novgorod suggests that the vast majority of combs appeared in the town as personal belongings of outsiders of Scandinavian descent. They were not objects of barter or gift exchange and, as objects of everyday use, were of less value than ornaments of precious metals, which were less often lost and generally not discarded when broken due to the value of the material itself. Occasionally, and only in the earliest stages of the settlement, the combs could be worked up on the spot by a visiting comb-maker who would probably bring finished products, and possibly have some antler raw material in stock, but would use both for comb-making on the spot and for replenishing his stock, locally available raw material from elk which were plentiful in the woodlands of Novgorod hinterland.

There is no evidence for single-sided composite comb-making in Novgorod in the late 10th –mid 11th century. Combs found in the deposits of this period belong to cased types possessed by men (men-at-arms), and appear to be made more

commonly in red deer antler (not available locally) and according to the Southern Baltic tradition of craftsmanship rather than the Eastern Scandinavian tradition revealed in earlier types.

3.5.3 Distribution

We recollect that the earliest types of combs (Ambrosiani's 'B' combs, mid 10th century) were found on the Nerevsky (properties A and Б occupying the north-eastern part of the site) and Troitsky (properties Г, К, and ИР to the west of Proboinaia St.) sites (see section 3.4). These sites reveal a higher than average concentration of combs of class 1 in the town. Characteristically, typical Scandinavian adornments such as an iron neck-ring made from a square-section rod twisted in several places (1), 'Thor hammer' pendants (3) and tortoise-brooches of Petersen's type 51k (2) derive from the Nerevsky and Troitsky excavations (Pokrovskaja 1999). Three hoards of dirhams have been found on properties Б and Д in the Nerevsky End (Yanina 1956, Yanina 1963) and on property Г in the Liudin End (Gaidukov et al 2000).

It is probable that some of those people rendered certain services for a number of Princes. A bone trapezoid pendant bearing Princes' emblems on both sides was found in mid-late 10th century deposits on property Г in the Liudin End (Yanin 1982, 151, Fig. 8). Similar objects (normally metal, more often billon) showing emblems of the Rus Princes (variants on the motifs of prongs or tridents) have been long recognised as being *tamgas*, symbols of credence and authority (Molchanov 1986, Beletsky 1997). This particular bone *tamga* is remarkable for the secondary correction of an image on one of the sides. Originally, the object had a depiction of a double-pointed prong (credited to Prince Sviatoslav Igorevich (d. 972)) on one side and a trident (credited to Sviatoslav's son Vladimir, the Prince of Novgorod in 970-980) on the other side, implying the presence of a representative of both Princes. A secondary element scratched later to Sviatoslav's emblem turned it into Vladimir's trident, thus proclaiming services only for Prince Vladimir. Yanin (1982, 148-149) argued that the archaeological date (954-973) of the find was in perfect accordance with historical events connected with the beginning of internecine dissension between Sviatoslav's sons after his death.

Later types of combs quite indicative of military milieu are clustered in the properties laid out next to the oldest group of properties. In the Liudin End they are most common on properties ЮК and Е (to the south and to the west of property К), as well as on properties М and П lying to the west of properties Г and И (ИР). In the Nerevsky End properties Г, ДВ, Е, and И reveal the presence of mainly male Scandinavians in the late 10th-mid 11th centuries.

That people of Scandinavian stock were present in the quarters of the St. Sophia's part of the town is evidenced by the finds of bone featuring runic alphabet inscription in its Danish 10th-11th century variant (Makaev 1962) in the Nerevsky deposits of the turn of the 11th century (Fig. 3.77), a cast bronze openwork scabbard chape deriving from Troitsky site late 10th – early 11th century (Eniosova 1994) and two 11th century hemispherical gaming pieces of walrus ivory (Smirnova 2001, Fig. 3) relating to the playing of native Scandinavian games such as *hnefetafl* or *halatafl* (McLees 1990, 40-3). A unique lead seal of Iaroslav the Wise deriving from the early 11th century deposits on property И (ИР) of Troitsky site (Yanin 1995), constitutes a pointer to the residence of top officials who received documents sealed with the Prince's mark in the Liudin End of the town.

In striking contrast, there is no evidence for the presence of the Varangians in the period when they supposedly accompanied their sovereign and settled down by the Slavensky Hill, in and around the area known later as Iaroslav's court. As was demonstrated above (see section 3.4) only one single-sided composite comb is known from the 10th-mid 11th century deposits on the Trade side of Novgorod. No objects of indisputable Scandinavian identity have been found there, nor is there archaeological evidence for the location of elite property (Prince's court) in the early 11th century deposits on the Trade side.

A question mark also hangs over the location of the Prince's residence on the Trade side when analysing the chronological and spatial distribution in Novgorod of one highly exclusive category of wooden objects. These were wooden cylinders deriving (with very few exceptions) from late 10th – 11th century layers, which served as locks tying up sacks containing the state revenue. They were also used as 'tally-sticks', markers showing that the sack belonged to the Prince, to the Church or to the tax-

collector himself, who, in accordance with the *Russkaia Pravda*, received a specific percentage of the sums he collected (Yanin 1982). *Russkaia Pravda* was the first written code of civil law credited to Iaroslav the Wise. According to *Russkaia Pravda* the largest part of the taxes went to the Prince, a tenth part went to the Church ('tithe') and a share went to the tax collector himself. One can naturally expect the cylinders as indicators that the revenues were collected and brought to a certain place, to be found in and around the court of the Prince's residence.

A total of 51 wooden cylinder locks has been uncovered in Novgorod. Only three were found on the Trade side of the town on Mikhailovsky (late 11th century), Fedorovsky (late 11th century) and Nutny (early 13th century) sites. With one unprovenanced object, the remaining 47 cylinders were found on the St.Sophia's side, of which only three derived from the Nerevsky End. These consist of two late 11th century objects from property B in Nerevsky site and one 11th century cylinder from the Liudogoshchensky site. The bulk of finds (44 specimens) come from the Troitsky site in the Lyudin End, 40 examples (78% of all finds) deriving from property K adjoining the cross roads of Proboinaia and Chernitsina Streets from the south-west (Yanin 2001c, Yanin 2002b).

Of all excavated properties of the town, only property K fulfills the requirements to claim a truly special status. It features a big area, rather unusual structures, such as an open paved area of 7x12m in the centre of the yard, and an absolutely unique collection of finds from the early – mid 11th century deposits. These include a unique Psalter wax book (Yanin 2001b), a number of ornaments in gold and other precious metals, worked elephant ivory, eight silver denarii, a selection of objects with prince's marks including cylinder wooden seals. The property is also marked by high numbers weapons (spears, arrows) and horse harness (bits, spurs) (Yanin et al 1998, 1999, 2000, 2001). An outstanding collection of over a hundred birch bark documents from the late 11th –early 13th centuries (ten rare late 11th century documents forming a third of all known in the town from 11th century deposits) has produced the evidence for a special public status of this area, where at that time a joint court of the Prince and *Posadnic* (the elected head of Novgorod) was located (Yanin et al 2000; Yanin 2002a). The textual analysis of the birch-bark documents from the property has revealed the highest concentration of collective appeals, as

well as an incomparable number of references to the Prince, *druzhina* and the Varangians.¹

With the evidence from the analysis of the spatial distribution of the early –mid 11th century single-sided composite combs, the hypothesis that the Iaroslav's residence was transferred from Riuric Gorodishche to the Liudin End of the town receives additional support. The Varangian members of the Prince's *druzhina* most likely occupied the neighbouring properties to the west of Proboinaia Street, one of which has revealed a personal lead seal of Iaroslav the Wise in the deposits of the early 11th century.

¹ A.A.Zalizniak and A.A.Gippius, personal communication March 2001, Göttingen. I am very grateful to both scholars for the valuable consultations with regard to birch-bark documents.

Chapter 4

SIMPLE COMBS IN SKELETAL MATERIALS

4.1 Introduction, Chronology.

Simple combs in skeletal materials (class 2a) numbering 1329 finds date from the turn of the 11th to the 15th century and form by far the largest group of combs in the Novgorod collection¹. Included are eight long-toothed combs of bone deriving mainly from the later 12th – first half of the 13th century, but also from early 14th century contexts as well. Since the function of both double-sided (B8, B130, B1315 (all Fig. 4.65), B995) and single-sided (B171, B778 (both Fig.4.65), B1058, and B1268 (Fig. 4.65)) long-toothed combs is still debatable, they are conventionally excluded in tables and charts and dealt with in a separate sub-section (see below, section 4.3).

The range of utilised skeletal materials in a total of 1321 simple combs for combing hair or beards includes antler, ivory and bone. A more detailed picture of the use of raw materials is the subject of a special section (see below section 4.2.3), and for the time being it can simply be said that antler combs (1265 items, 95.7%) by far outnumber those in ivory (50 combs, 3.8%) and bone (6 specimens, 0.5%).

All simple combs in the assemblage are double-sided or, at least were originally manufactured as double-sided. There are eight specimens² which, having had broken (or worn out) teeth on one side (coarse teeth more often), were trimmed, sometimes with a suspension hole drilled through the central zone (B69 (Fig. 4.1)) and reused as single-sided combs. This ploy is encountered most frequently either on the early examples (11th century) of antler combs (B69, B359, B1042 (all Fig. 4.1) and B861 (Fig. 4.2)), or on the youngest combs in the collection made of antler (B865 (Fig. 4.2)) and elephant ivory (B789 (Fig. 4.2) and B1142). Similar objects are known from 11th century contexts at Polish Kruszwica (Hensel and Bronievska 1961, 78, Fig. 57c), Sarkel³ on the Lower Don (see map

¹ Twenty simple combs in skeletal materials from Ruric Gorodishche (collection at NSM) are included in database B

² B69, B359, B789, B861, B865, B1040, B1142 and B1319.

³ A comb from collection 2792 (unpublished) at the State Hermitage (St.-Petersburg), AVES колл. 2792/558 (SH).

Fig. 3.69), Suzdal (see map Fig. 4.64) (Sedova 1997, Fig. 46:1, 66:1), and two specimens were uncovered at the 'Schild' excavation (11th-14th C.) in Schleswig (Ulbricht 1984, Taf. 23:7,10).

A very small minority of finds provides an inkling as to how simple combs were kept and carried around. Since very few examples feature either one (B654, B898 (Fig. 4.3)) or two (B1040 (Fig. 4.3)) suspension holes drilled through one end of the central (solid) zone, and the vast majority of others do not reveal any means for suspension, it can be assumed that most simple combs may well have been stored in leather or textile purses suspended at the waist when not in use. Only two specimens of combs in leather purses (B234 (Fig. 4.3) and B494) were uncovered from 11th century deposits. Both organic materials are very sensitive to soil conditions, and due to the small size of the purse itself fragments of leather or textile comb cases can remain unrecognised even in anaerobic deposits such as in Novgorod. This substantiates the explanation why there are so few actual finds.

The chronological distribution of combs of group 2a (Fig.4.4) demonstrates that the first combs appeared in the town in the late 10th century, at least the first lost or discarded examples became deposited in the construction layer 26 on the Nerevsky site dated dendrochronologically to 989-1006. Simple combs in skeletal materials increase in numbers in the course of the 11th century, and reach their peak of occurrence in the 12th century layers. A slight drop in numbers of these combs has been revealed in mid 12th century deposits, a plausible explanation of which is lacking up to now. From the early 13th century up to the late 14th century one can observe a steady decrease in the occurrence of class 2a combs in Novgorod. Due to the lack of 15th century waterlogged deposits younger than the first third of that century, and due also to the absence of stratified objects of the 16th-18th centuries, it is hard to say whether a slight increase in finds from the early 15th century contexts reveals a tendency towards a recurrence of class 2a combs.

In contrast to numerous typologies of single-sided combs, there are very few classifications of simple combs with varying type-distinguishing criteria.

The most detailed typology of simple combs in skeletal materials by B.A.Kolchin (1958, 100-102) was based on analysis of materials from the

Nerevsky site in Novgorod. The main objective of the work was to demonstrate the range of 125 main mass categories of objects in chronological sequence by means of providing the sequence of construction layers of the three streets, excavated during the period from 1951 to 1954, with absolute dates extracted from 'dating' artefacts such as coins, lead seals etc., as well as from chronicle reports of conflagrations in the Nerevsky End (pre-dendrochronological era). The typology of 251 combs was most likely only a preliminary classification, for the author had to deal with 124 other categories of mass finds.

Later on, thanks to the introduction of dendrochronology in Novgorod, absolute dates of the street construction layers were corrected (Kolchin 1963) and the dendrochronologies of other sites excavated in the 1960s-1970s contributed to a more refined chronology of 140 categories of artefacts, including combs (Kolchin 1982). Although the number of simple combs in the Novgorod collection by the early 1980s outnumbered that of the original assemblage by a factor of 2.5:1, the simple comb typology (widely accepted by Soviet archaeologists) remained unchanged. Since no special research on the simple combs from Novgorod has been undertaken up to now, and the assemblage has almost doubled in size compared to the repeated classification of 1982 and become over five times as big as the original collection (which gave birth to Kolchin's typology of 1958), it seems reasonable to review the classification more closely.

It is, in fact, a rather controversial kind of comb classification in many respects. Six types are distinguished, but the criteria vary. Because of the lack of a detailed description of the typology, one can only assume that the basic form of a comb and the line of its ends are its main distinguishing criteria. In some cases, however, decoration seems to be a decisive factor, and one type is distinguished by form and cross-section. Three early (11th-12th century) types are represented by combs which are elongated along the vertical axis and have either a trapezoid outline with straight (type D¹) or slightly concave (type M) ends, or a rectangular outline with straight ends (type L). Linear decorations seem to be correlated with all early types. Two later types (late 11th-13th century) decorated with ring-and-dot elements are of trapezoid form and have more (type N) or less (type E)

¹ All type names are given in transliterated form.

concave ends. Flat rectangular combs elongated along the horizontal axis form the sixth type (PP)¹ common in the 14th and 15th centuries.

As the assemblage grew larger and larger, forms and decorations appeared which were not covered by Kolchin's typology. Thus, undecorated specimens have been uncovered throughout the whole sequence, and it became apparent that flat rectangular examples were not necessarily devoid of decoration. The most confusing matters were those related to decoration: linear decorations, for example, have also been encountered on younger combs, whereas ring-and-dot decorations appear not to have been uncommon on earlier types. The occurrence of early forms in later deposits and vice-versa is also puzzling, and it now seems clear that Kolchin's typology is out of date and must be abandoned.

A typology by Z.Hilczerówna (1961, 115-119) based on the comb collection from Gdansk is very similar to Kolchin's typology of boxwood combs (Kolchin 1968, 83-84, 176) (see Chapter 5, section 5.1). Simple double-sided combs coincidentally assigned to group 2a are divided into four types, distinguished by comb side lines and comb forms: rectangular combs with straight sides (type 1, 11th-14th century), combs with convex sides (type 2, 14th-15th century), combs with concave sides (type 3, late 12th – early 14th century) and trapezoid combs (type 4, 11th – 13th century). Like Kolchin's typology of simple combs, Hilczerówna's classification is long-established and widely accepted in Poland (Chmielowska 1971, 70-71). Whilst some forms seem to be quite rare and chronologically limited (type 2), others are long lived (types 1, 3 and 4), and due to the lack of detailed specification and mixed type-distinguishing criteria, one encounters difficulties in unambiguously allocating certain combs to given types. Comb decoration is not considered to be of any importance for this classification.

B.Broberg and M.Hasselmo (1981, 72-85), studying materials from seven medieval towns in Central Sweden, distinguished two types of simple combs in skeletal materials. Combs of type 2 are square in outline and derive from the 12th-14th century contexts: earlier examples feature straight ends whereas later ones have concave ends (*op. cit.*, 73, Fig. 49, 53, 59, 63, 64). Combs of type 3,

¹ This type (unlike the other five) was not given a denominating letter by B.A.Kolchin, who referred to it as 'rectangular and flat combs' ('priamougol'nye ploskie grebni' – abbreviated as PP here).

trapezoid in outline and with straight ends (*op. cit.*, 73, Fig 58, 63), tend to be younger than type 2 combs and are more common in the 14th century deposits.

Simple combs in bone, antler and horn form a noticeable group of 227 examples uncovered in the 11th-14th century deposits in Schleswig. I. Ulbricht (1984, 43-45) distinguishes three variants of bone combs on the basis of form and size (trapezoid, rectangular and small combs), and three variants of antler combs on the basis of form and cross-section (flat rectangular combs elongated along the horizontal axis, and two variants of rhomboid cross-sectional rectangular combs with concave and straight ends). Five simple combs of horn seem to belong to one variant of either rectangular or trapezoid form with straight ends.

The most recent approach to classification of simple double-sided combs in skeletal materials is H. Luik's typology of 36 specimens found in Estonia (Luik 1998, 35-63, 163-166). Luik divides the combs into three types on the basis of form and cross-section (rectangular thick (type 1, 11th-13th centuries), trapezoid thick (type 2, 12th-14th centuries) and flat combs of both rectangular and trapezoid forms (type 3, 15th-18th centuries)). In each type further sub-types are distinguished according to the line of comb sides (straight, concave or convex (sub-types 1a-1c)), or line of comb sides (straight, concave, slightly concave and pronouncedly concave), variations of trapezoid form (trapezoid and pronouncedly trapezoid) and size (sub-types 2a-2d), or density of teeth on comb sides (sub-types 3a-3b).

None of the typologies listed above seems to be satisfactorily applicable to the Novgorod assemblage in its modern form. The range of morphological traits even of the least complicated class of combs, such as class 2, is wide enough to discourage from any attempt to cram the great variety of combs into the straight jacket of a typology however sophisticated or simplified it may be.

4.2 Survey of Morphological Traits

Comb styles are, in a way, moving targets: there is simultaneously both constancy and change. The latter may be random or amorphous, but it is exactly our task to track the changes in their sequence and to explore the texture of these changes, rather than to concentrate on the routine and constants. In order to

capture in narrative the sense of process in comb-making throughout adaptability or modification conventions, the exploitation of opportunities as well as improvisations and probes for alternatives, one has to first segregate the various strands of the comb features, which are combined in a finished product.

The survey of morphological traits encompasses observations of comb forms described in terms of face outline, cross-section and size, characteristics of integral parts (such as two sets of teeth and a central zone), comb decoration and the raw material from which it is made.

4.2.1 Comb Outline and Integral Parts

As was shown above (see section 4.1), comb outline was invariably treated as the main criterion in simple comb classifications. To a much lesser extent, some characteristics of comb integral parts came into consideration when distinguishing sub-types and variants of types. It seems worthwhile, therefore, to proceed in describing these traits in more detail in the following order.

4.2.1a Outline

Dimensions and, to a large extent, forms of simple combs made out of skeletal materials were limited by the amount of available compact tissue in raw material.

Front view

All possible variations of forms fall into two basic outlines, either a rectangle or a trapezium of various proportions. Further variations of forms could be distinguished by specifying whether the sides are straight, convex, concave, ornate etc., but let us for the moment ignore this aspect and define basic forms first. Characteristically, rectangular forms have top and bottom edges of equal width ($W_t=W_b$), whilst the lower edge is inevitably wider than the upper edge in combs of a trapezoid form ($W_t<W_b$). In order to avoid subjective definitions such as 'slightly trapezoid' or 'more pronouncedly trapezoid', top width to bottom width ratio showing the degree of side slope (referred to as *dss* further on), has been calculated for all complete or almost complete combs, numbering a total of 1072. The *dss* of combs in this sub-assembly varies from 0.29 to 1. The

steeper the sides, the higher is the degree of side slope, rectangular forms naturally featuring *dss* equal or close to 1.

The frequency of combs throughout the various *dss* is shown in Figure 4.5. There are four obvious peaks revealing various degrees of side slope, or so to say, templates. Most frequently encountered is the form with *dss* varying from 0.86 to 1, with either very steep, almost vertical or completely vertical sides, which can be called rectangular. All three other peaks demonstrate three variants of trapezoid form with steep (*dss* 0.66-0.85), medium (0.46-0.65) and low (0.25-0.45) sloping sides. One should always bear in mind that one-piece combs, being made mainly out of antler, inevitably 'inherited' the natural outline of the raw material, since comb-makers were only able to adapt their designs as far as the peculiarities of the available piece of antler allowed. The selection of forms of blanks for making one-piece combs cut from beams, which are the most valuable (in terms of the amount of compact material) parts of deer antler (Fig. 4.6), is clearly limited to either rectangular or trapezoid forms.

Both rectangular and trapezoid forms are encountered in numerous proportional variations of 'square' or elongated, either along the vertical or horizontal axes. The criterion for distinguishing comb proportion is the comb height to average width ($\sum(Wt, Wb)$) ratio (referred to as *hwr* further on), calculated for 1072 well-preserved combs and varying in this sub-semblage from 0.52 to 1.93. Square proportions can be revealed by a *hwr* close to 1, combs elongated horizontally feature a *hwr*<1, whereas vertically elongated combs have a *hwr*>1. Figure 4.7, showing the occurrence of combs with various *hwr*, demonstrates that most combs in the assemblage tend to be of square or vertically slightly elongated proportions.

A scatter chart in Fig. 4.8 combines all individual variations of comb forms (as revealed by *dss* and *hwr*) with the background, demonstrating outlines of generalised forms. A total of 898 objects come from certain chronological contexts including 170 11th century combs, 486 12th century combs, 200 specimens from 13th century deposits and 42 items from 14th – early 15th century deposits. Scatter charts in Figures 4.9-4.12 demonstrate chronological changes in the range of predominant forms. Earliest combs are predominantly of rectangular outline varying in their proportions between horizontally elongated, almost

exactly square, and some more slender forms with a vertical axis slightly larger than the horizontal (Fig. 4.9). A trend towards trapezoid forms with steep sides can be seen already in the mid 11th century, and becoming especially noticeable in the late 11th century. The next century, which was definitely the heyday of simple combs in skeletal materials, demonstrates the largest diversity of forms with a further move away from rectangular forms and towards trapezoid forms with less steep sides being quite noticeable (Fig. 4.10). This tendency persists in the 13th century (Fig. 4.11) when all types of trapezoid forms become prevalent, with a still further move towards low-sided combs. Among much fewer 14th-15th century combs, rectangular forms of square and horizontally elongated proportions seem to regain popularity and become equally as common as trapezoid forms (Fig. 4.12).

Let us come back to the question concerning the line of comb sides. Convex sides are encountered extremely rarely: of 1313 simple combs, which are neither long-toothed, nor highly modified examples in secondary use (as single-sided) only six (0.05%) feature convex sides. All of them derive from the stratigraphically latest water-logged deposits, which are either dated dendrochronologically to the 14th century (B916 (Fig. 4.13), B970, B1222) and early 15th century (B920), or not dated (B1041 (Fig. 4.13)). These combs form a small fraction (8%, 5 out of 66) in the sub-assembly of all dated specimens from the 14th-15 century layers.

The remaining 1307 simple combs in skeletal materials feature either straight or concave sides, the degree of concavity varying significantly. In order to maximise the objectivity of definitions and avoid ambiguous terminology such as 'slightly concave' or 'pronouncedly' concave, a mini case study has been carried out which involved painstakingly measuring 800 complete combs selected at random from the 1072 complete combs in the collection. The degree of side concavity (*dsc*) has been calculated as a ratio between the depth of the curve and the length of a chord connecting two extremities of a curve. Straight sides would have the degree of concavity equal or close to 0. The degree of concavity in the total assemblage varied from 0 to 0.1, the frequency of objects with differing line of their sides being demonstrated in Figure 4.14.

There are two obvious peaks separating combs with straight or almost straight sides ($dsc < 0.04$) (Fig. 4.15) from combs with sides curved inwardly ($0.04 \leq dsc <$

0.1) (Fig. 4.17). The curve, however, starts becoming optically observable on combs featuring $dsc \geq 0.02$ (Fig. 4.17), which may or may not qualify to be what in other typologies are called 'combs with slightly concave sides'. Whether this subdivision (excessively exploited in comb studies) is correct or not, still remains to be seen. Tentatively, the assemblage of the selected 800 combs was subdivided into three groups of 330 (41%) combs with straight sides ($dsc < 0.02$), 144 (18%) specimens with slightly concave sides ($0.02 \leq dsc < 0.04$) and 326 (41%) examples with concave sides ($0.04 \leq dsc < 0.1$). Scatter charts superimposed in Figure 4.17a reveal forms of combs featuring sides with different degrees of concavity. It is pretty obvious that both straight and concave sides are encountered on rectangular and trapezoid combs of various proportions, with straight sides being slightly more common on rectangular combs and on trapezoid combs with steep sides, whilst trapezoid examples with lower sides outnumber other forms of combs with concave sides. As for the group of specimens with slightly concave sides, they occupy the area of the chart covered mainly by the combs with straight sides, undermining the correctness of separating this group from combs with straight sides.

Table 17 The chronological distribution of three comb groups with different degrees of side concavity¹

Date	Straight sides		Slightly concave sides		Concave sides		Total
	number	%	number	%	number	%	
early 11th C.	8	80.0	2	20.0	0	0.0	10
mid 11th C.	16	61.5	6	23.1	4	15.4	26
late 11th C.	39	60.9	17	26.6	8	12.5	64
early 12th C.	78	58.2	31	23.1	25	18.7	134
mid 12th C.	47	44.8	26	24.8	32	30.5	105
late 12th C.	48	36.4	19	14.4	65	49.2	132
early 13th C.	17	19.3	7	8.0	64	72.7	88
mid 13th C.	8	16.3	2	4.1	39	79.6	49
late 13th C.	1	4.0	0	0.0	24	96.0	25
early 14th C.	0	0.0	1	9.1	10	90.9	11
mid 14th C.	3	60.0	1	20.0	1	20.0	5
late 14th C.	3	100.0	0	0.0	0	0.0	3
early 15th C.	2	100.0	0	0.0	0	0.0	2
Total	270	41.3	112	17.1	272	41.6	654

¹ Percentages higher than those for the whole sub-assemblage (bottom line) are given in Bold. All tables below demonstrating the chronological distribution of combs are formatted in the same manner unless stated otherwise.

Another possibility to argue against a division of statistically defined group of straight-sided combs into two sub-groups could arise through an analysis of the chronological distribution of combs with different degrees of concavity. Table 17 includes 654 combs (82%) from the assemblage of the selected 800 complete combs which come from dated contexts. Combs belonging to the three tentative groups are quantified by chronological period, with the quota of each group shown for every period. Peaks of occurrence of combs of the first two groups in the 11th-early 12th century and mid 14th-early 15th century are strikingly synchronous and differ from the combs featuring concave sides. The latter begin to dominate in the late 12th century and are especially numerous in the 13th early 14th century.

The mid 12th century seems to be a period of transition, a few decades during which one might expect a modification of conventions, improvisations and probes for alternatives, resulting in puzzling decrease in numbers of combs uncovered in mid 12th century contexts (see below section 4.1). In any case, the close examination of combs with differing *dsc* has proven the incorrectness of a separation of the group of 'slightly concave sides' which chronologically, proportionally and, as is shown above (see sub-section 'Size'), by size belong to the group with straight sides. It seems appropriate, therefore, to rearrange the data from Table 17.

Table 18 The chronological distribution of two comb groups with different degrees of side concavity

Date	Straight sides		Concave sides		Total (100%)
	number	%	number	%	
early 11 th C.	10	100.0	0	0.0	10
mid 11 th C.	22	84.6	4	15.4	26
late 11 th C.	56	87.5	8	12.5	64
early 12 th C.	109	81.3	25	18.7	134
mid 12 th C.	73	69.5	32	30.5	105
late 12 th C.	67	50.8	65	49.2	132
early 13 th C.	24	27.3	64	72.7	88
mid 13 th C.	10	20.4	39	79.6	49
late 13 th C.	1	4.0	24	96.0	25
early 14 th C.	1	9.1	10	90.9	11
mid 14 th C.	4	80.0	1	20.0	5
late 14 th C.	3	100.0	0	0.0	3
early 15 th C.	2	100.0	0	0.0	2
Total	382	58.4	272	41.6	654

Table 18 demonstrates the frequency of the resulting two groups of combs with straight ($dsc < 0.04$) and concave ($dsc \geq 0.04$) sides in different chronological slots. It seems that the early tradition of comb-making is characterised by combs with straight ends, most common in the 11th – first half of the 12th century, whereas a later tradition (13th – early 14th century) demonstrates a preference for concave-sided combs. In the late 12th century both groups are almost equally represented in the Novgorod collection. A new trend featuring a revived popularity of combs with straight ends can be seen in the less numerous material from the mid 14th – 15th centuries.

A few remarks concerning concave-sided combs can be made. Mid – late 12th century specimens, which appear to be already fairly common, have evenly curved sides (Fig. 4.18). Their 13th – early 14th century counterparts usually feature the emphasised curve in the upper part of the comb height, resulting in a somewhat bulbous upper end which sticks out (e.g. B311 and B302 (both Fig. 4.19)) Occasionally, the side line adopts an additional twist towards the bottom end, which sticks out as well (e.g. B298 (Fig. 4.75), B12, B299 (both Fig. 4.19)). There are also a few 13th-early 14th century combs encountered with the side line curving inwardly in the upper part of the comb height and outwardly in the lower part (B271, B311 (Fig. 4.19)). Another characteristic feature of the 13th century concave-sided combs is a much more commonly encountered convex line of the bottom edge (fine teeth side) (e.g. B73, B931 (both Fig. 4.16), B299, B311, B302 (all Fig. 4.19)). Most of the mid – late 12th century concave-sided combs have a straight lined bottom edge.

Cross-section

Only three specimens in the assemblage of hair combs survived in such small fragments as not to allow to register the form of cross-section. The remaining 1318 objects unambiguously reveal the form of cross-section.

Lentoid

A total of 1277 examples (96.8%) have a lentoid cross-section, with both sides forming evenly curved lines. A variation of this form with one side straight and

the other curved (plano-convex) has been encountered on 22 antler combs¹. Most of the stratified examples derive from the late 12th - 13th century (e.g. B54, B87, B211, B217, B266 (all Fig. 4.20)). Invariably, the flat face of the comb reveals the woven texture of the antler's porous core, whereas the bulging face has the characteristic texture of antler compacta. It is best to avoid calling this form of cross-section plano-convex, for it is somewhat unintentional and more reflective of the natural curve of antler (see also section 4.2.3 below).

Rhomboid

There are combs with both faces sloping towards the tooth tips from the centre of the solid zone forming, when viewed in cross-section, obtuse angles (slightly rounded or acutely defined) at the middle of comb height. There are 19 specimens (1.4%) in the collection², with 13 out of 14 stratified objects deriving from 11th-early 12th century layers (e.g. B29, B176, B1026 and B1044 (all Fig. 4.21)). Comb B816 (Fig. 4.45), belonging to a rare type with decorative metal sheeting (see section 4.2.2a), comes from a context dated to the latter 12th century.

Combs with rhomboid cross-sections are known in the 11th-12th century contexts in Schleswig (Ulbricht 1984, 44-5, Taf. 25:2; 26:1,4; 62:3-5; 63:1-6), Ribe (Andersen 1968, 31, Fig. 11a, 11b), Lund (Persson 1976, Fig. 291:28C, 29C, 32C, 33C) and Tommarp (Thun 1967, 30-2, Fig. 28:a) in Scone, Lödöse, Nyköping, Söderköping and Uppsala in Central Sweden (Broberg and Hasselmo 1981, 75-85, Fig. 49:7; 53:4,6; 58:8; 59:1; 64:7), as well as in burials on Gotland (Thunmark-Nylén 1991, 119, Bild 12:a,b). Finds of rhomboid cross-sectional combs in the South Baltic also derive from the 11th-12th century contexts. They are known in the Mecklenburg area (Lampe 1981, 177-181, Abb. 7:a, c, d; 9:a,b; 10:h) and Pommerania (Hilczzerowna 1961, 116, Ryc. 51b). A comb from Trondheim illustrated by D.Long (1975, 26, Fig. 9k) by all its features (size, proportions, decoration, rhomboid cross-section) belongs to the 11th-early 12th century products, although it was found in the filling of a 16th century well.

¹ B54, B78, B87, B111, B211, B215, B217, B266, B377, B454, B619, B625, B626, B696, B803, B805, B825, B998, B1051, B1157, B1298, B1323.

² B29, B176, B343, B379, B385, B774, B816, B852, B921, B1026, B1040, B1044, B1045, B1165, B1203, B1226, B1227, B1302, B1344.

Rhombolentoid

Five (0.04%) undecorated combs (B773, B790, B974, B975 and B1134) deriving from the youngest deposits of the 14th-early 15th century¹, have a peculiar cross-section in the form of a rhombolens with one side of angular outline and the other evenly curved.

Rectangular

When viewed in vertical cross-section, some combs have sides which are parallel for most of its height and which curve inwardly to a point only at the tips of the teeth. All combs in a total of 19 objects² are either occasional finds (e.g. B1136 (Fig. 4.22)), artefacts deriving from upper layers dated to the mid 14th-15th centuries (e.g. B594, B617, B689, B782, B1221 (all Fig. 4.22), or undated (B552 (Fig. 4.22), B789 (Fig. 4.2)).

It is worth noting that the material of 15 combs in this group has been identified as ivory, either with a further identification to species of walrus (B1136 (Fig. 4.22)) and elephant (B617, B689 (both Fig. 4.22), B711, B782 (Fig. 4.22), B789, B1142, B1143, B1144, B1200, B1221 (Fig. 4.22)) or without (B481, B552, B594 (both Fig. 4.22), B1133). Two combs in the group of rectangular cross-sectional items are antler (B599, B604) and one (B214) is made of bone. All 19 objects are very slender when viewed cross-sectionally, making the whole object look flat.

Table 19 Average depth and relative depth of combs in different skeletal materials

Raw material	Number of combs	Average relative depth $\sim rd$	Average depth (mm) $\sim d$
antler	978	0.11	6.7
ivory	36	0.10	4.8
bone	4	0.09	5.3
Total	1018	0.11	6.7

In order to define this feature in a less subjective manner, an index of relative depth (*ird*) has been calculated for 1018 objects of maximal completion of both

¹ B1134 is an occasional find.

² B214, B481, B552, B594, B599, B604, B617, B689, B711, B782, B789, B1133, B1136, B1142, B1143, B1144, B1146, B1200, B1221.

form and dimensional data¹. The index is a ratio of comb depth either to comb height (for vertically elongated objects with $hwr \geq 1$), or to average width (for combs elongated in horizontal plane with $hwr < 1$). The occurrence of combs with indices of relative depth varying from 0.04 to 0.24 is shown in Figure 4.23.

Table 19 demonstrates that the average depth of combs varies from approximately 5mm in combs of ivory and bone to nearly 7mm in their antler counterparts which, being far more numerous, set the average depth for combs in the assemblage. The average relative depth is higher in ivory combs than in bone specimens, but lower than in antler objects.

Table 20 Chronological changes in average depth and relative depth of combs

Date	Number of combs	Average relative depth $\sim rd$	Average depth (mm) $\sim d$
e.11th C.	28	0.12	6.6
m.11th C.	44	0.12	6.7
l.11th C.	88	0.12	7.0
e.12th C.	151	0.11	6.9
m.12th C.	131	0.10	6.6
l.12th C.	175	0.10	6.3
e.13th C.	108	0.10	6.4
m.13th C.	56	0.10	6.7
l.13th C.	32	0.09	7.0
e.14th C.	17	0.10	6.8
m.14th C.	7	0.11	7.6
l.14th C.	9	0.10	6.4
e.15th C.	6	0.10	6.0
Total	852	0.11	6.7

The occurrence of 852 well stratified combs in this assemblage (from the total of 1018 items) from different chronological periods is shown in Table 20. The 11th century combs are on average thicker, and one can observe a chronological trend towards proportionally thinner combs persisting from the early 12th to the late 13th century, whereas the actual width of combs decreases only up to the late 12th century and increases again noticeably in the course of the 13th century, when large combs become very common (see section 'Size' below). No trend towards cross-sectionally slender combs can be registered in the 14th-15th century, partially because of the paucity of complete objects from the youngest deposits.

¹ Some combs from the early years of excavations exist only in drawings or photos with no

To examine this phenomenon further we have divided the assemblage of 852 dated combs into three groups: relatively thin (*ird* 0.04-0.08, which is less than any average variables), medium (*ird* 0.09-0.12, average variables) and thick (*ird* 0.13-0.24, higher than any average variables).

Figure 4.24 shows that up until the early 12th century relatively thick combs form no less than a third of contemporary combs, whereas later on up until the late 13th century medium thick combs form the majority, probably revealing certain proportional standards of that time. The youngest combs of the 14th-15th century are more diverse. Coming back to the rectangular cross-sectional combs predominantly in ivory, which derive exactly from 14-15th century (or later) contexts, it is worth noting that their average *ird* is 0.05.

Size

Simple combs in skeletal materials have been encountered in different sizes, with comb height varying from 25mm to 102mm and comb width – from 21mm to 128mm. Comb size, like no other feature, is dependent on the amount of compacta in the raw material. In order to make combs of numerous forms and proportions be comparable to each other, a comb size variable (*S*) is introduced, which is an area (sq.mm) of comb face ($S=H \times 0.5(W_t+W_b)$)¹. Objects in the Novgorod assemblage feature sizes from 765sq.mm to 9129sq.mm. Table 21 demonstrates numbers of antler, ivory and bone complete combs, also expressed as a percentage of the totals in each type of skeletal materials.

The average comb size² ($\sim S=3218$ sq.mm) is largely determined by the average size of antler combs predominant in the assemblage, which can be also observed in Figure 4.25 revealing four clear peaks of the most commonly encountered sizes.

Only four complete bone combs are too few to make any serious conclusions, but they are on average smaller than antler combs and slightly bigger than ivory specimens ($\sim S_b=2422$ sq.mm).

evidence for comb depth.

¹ The formula for *S* of trapezium forms is suitable for rectangular forms with top and bottom edge of equal width.

² Abbreviated as $\sim S$, with $\sim S_a$ for antler, $\sim S_i$ for ivory and $\sim S_b$ for bone combs.

Ivory combs, being more numerous than bone objects, are on average smaller than both their bone and antler counterparts (~Si=2011sq.mm). When their numbers are expressed as a percentage of the total, they reveal peaks roughly synchronous to those for antler within the range of sizes known in both skeletal materials (Table 21, Fig. 4.26). How to interpret these peaks, will be described later on.

Table 21 The frequency of simple antler, ivory and bone combs in varying sizes

Size (sq.mm) S	Number of combs in antler	% of a total of 1032 combs	Number of combs in ivory	% of a total of 36 combs	Number of combs in bone	% of a total of 4 combs	Number of combs in skeletal materials	% of a total of 1072 combs
500-749	1	0.1	0	-	0	-	1	0.1
750-999	0	-	3	8.3	0	-	3	0.3
1000-1249	7	0.7	3	8.3	1	25.0	11	1.0
1250-1499	24	2.3	4	11.1	0	-	28	2.6
1500-1749	49	4.7	7	19.3	0	-	56	5.2
1750-1999	39	3.8	2	5.6	0	-	41	3.8
2000-2249	64	6.2	5	13.9	0	-	69	6.4
2250-2499	114	11.0	4	11.1	1	25.0	119	11.1
2500-2749	84	8.1	1	2.8	1	25.0	86	8.0
2750-2999	101	9.8	2	5.6	0	-	103	9.6
3000-3249	107	10.4	2	5.6	0	-	109	10.2
3250-3499	87	8.4	1	2.8	0	-	88	8.2
3500-3749	64	6.2	1	2.8	1	25.0	66	6.2
3750-3999	58	5.6	0	-	0	-	58	5.4
4000-4249	41	4.0	0	-	0	-	41	3.8
4250-4499	42	4.1	0	-	0	-	42	3.9
4500-4749	32	3.1	1	2.8	0	-	33	3.1
4750-4999	25	2.4	0	-	0	-	25	2.3
5000-5249	22	2.1	0	-	0	-	22	2.1
5250-5499	14	1.4	0	-	0	-	14	1.3
5500-5749	18	1.7	0	-	0	-	18	1.7
5750-5999	5	0.5	0	-	0	-	5	0.5
6000-6249	9	0.9	0	-	0	-	9	0.8
6250-6499	9	0.9	0	-	0	-	9	0.8
6500-6749	3	0.3	0	-	0	-	3	0.3
6750-6999	3	0.3	0	-	0	-	3	0.3
7000-7249	3	0.3	0	-	0	-	3	0.3
7250-7499	2	0.2	0	-	0	-	2	0.2
7500-7749	0	0.0	0	-	0	-	0	0.0
7750-7999	3	0.3	0	-	0	-	3	0.3
>8000	2	0.2	0	-	0	-	2	0.2
Total	1032	100.0	36	100.0	4	100.0	1072	100.0
Average S	3264		2011		2422		3218	

The dynamics of chronological changes in the average size of simple combs in skeletal materials can be seen in Table 22. One can observe a steady increase in the average size of combs almost constantly up to the late 13th century, when combs in skeletal materials become less numerous than even in the early 11th

century, but exceptionally large in size. The average sizes of combs in different chronological periods varying from 2476sq.mm to 4323sq.mm cluster around the third peak on the charts in Figures 4.25 and 4.26 and may be called medium sized (496 combs, 55.2% of the dated objects), those less than 2476sq.mm being small sized (266 items, 29.6%) and those over 4323sq.mm qualifying as large sized (136 examples, 15.2%). In the group of small combs a sub-group of miniature combs ($S < 1750$ sq.mm: 83 combs, 31% of all small-sized) can be distinguished (Table 21, Fig. 4.25, 4.26).

Table 22 Chronological changes in the average size of simple combs in skeletal materials

Date	Number of combs	~S (sq.mm)
e.11th C.	30	2476
m.11th C.	47	2486
l.11th C.	93	2642
e.12th C.	168	2986
m.12th C.	140	3313
l.12th C.	178	3256
e.13th C.	111	3613
m.13th C.	56	3761
l.13th C.	33	4323
e.14th C.	18	3851
m.14th C.	8	3362
l.14th C.	9	3163
e.15th C.	7	3338
Total	898	3212

The dynamics of chronological changes in the occurrence of different size groups is shown in Figure 4.27. Small combs are demonstratively more common in the 11th century (e.g. B324, B444, B1207, B1269 (all Fig. 4.28), during which they account for around 50% of all objects in the sub-assembly, up to 57% being the maximum quota in the mid 11th century. In the course of the 12th and 13th centuries the percentage of small combs gradually decreases and the lowest quota (less than 10%) of small combs is encountered among the late 13th - early 14th century specimens (e.g. B103 (Fig. 4.28). Small combs appear to have become common again in the late 14th century, but the late combs are known in such small numbers that one should not rely too much on the statistics.

The dynamics of chronological changes in numbers of miniature combs ($S < 1750$ sq.mm) expressed as a percentage of all 83 almost complete items is

shown in Figure 4.29. Two peaks of their occurrence are clearly seen in the late 11th (e.g. B1042 (Fig. 4.1)) and late 12th centuries (e.g. B717 (Fig. 4.15)), however, these combs are as common among the earliest objects (e.g. B898 (Fig. 4.3)) as they are among the 13th century artefacts (e.g. B92 (Fig. 4.15)).

Large combs are practically unknown in the 11th century material and become especially common among the 13th-early 14th century specimens (e.g. B54, B217, (both Fig. 4.20), B312 (Fig. 4.19) and B913 (Fig.4.16)). It is not surprising that the maximum quota of large combs (42%) is found in the late 13th century combs, featuring also the highest average size.

Medium size combs at all times (apart from the late 14th century) form the largest group among contemporary combs, taking 48-62% in the 11th-13th century (e.g. 11th century combs B176 (Fig. 4.21) and B234 (Fig. 4.3), 12th century specimens B29 (Fig. 4.21), B914 (Fig. 4.17) and B944 (Fig. 4.18), and 13th century objects B73 (Fig. 4.16), B211 (Fig. 4.20), B299 and B311 (both Fig. 4.19)) and over 75% in the mid 14th and early 15th century (e.g. B594 (Fig. 4.22), B914 (Fig. 4.17) and B920 (Fig. 4.13)). The low percentage of medium size combs in the late 14th century (e.g. B916 (Fig. 4.13)) is probably due to the paucity of objects from the late deposits at all.

4.2.1b Teeth

Class 2a combs have two rows of teeth, with the usual division of fine teeth on one side and more widely spaced coarse teeth on the other. With only one exception (B957 (Fig.4.42)), where there is a slight difference in the width of tooth sides, fine teeth are invariably cut on the wider side¹ of combs in the Novgorod assemblage. This pattern also seems to be common elsewhere (e.g. Schleswig, Lund, Ribe, Gdansk), although it is difficult to say whether or not this is just a common belief, since the matter has never been discussed explicitly. The fact that nearly half the combs from the Schleswig sites examined by the author² feature coarse teeth cut on the wider side, warns against potential wrong conclusions drawn from illustrated materials in publications.

¹ Since all trapezoid forms are positioned in the illustrations with the wider fine tooth side at the bottom, the chosen upright position for all rectangular forms is also with fine teeth at the bottom.

² The author has examined 87 out of 145 11th-12th century objects from 'Plessenstraße' and 44 out of a total of 82 11th-14th century simple combs from 'Schild'.

As a basic rule, teeth in each row are cut with a saw held at an angle to each face, first from one face and then from the other resulting in a characteristically triangular cross-sectional tooth base. Straight cut teeth are featured on an unfinished comb B862 (Fig. 4.72), unfortunately an unstratified find from the Nerevsky site, demonstrating a somewhat clumsy attempt to make a comb. The triangle of uncut material remaining at the base of each tooth provides for the stability of teeth both during the manufacturing process (demonstratively shown by Galloway and Newcomer (1981, 80-82) throughout the experimental comb-making) and against wear-and-tear.

Nearly all combs have teeth cut perfectly parallel to the vertical axis, which implies that before cutting teeth, a comb-maker would first make sure that the direction of grains in the blank comb ran parallel to the vertical axis. Only a handful of combs in the collection (e.g. B63, B94, B125 and B322 (all Fig. 4.30)) feature teeth cut obliquely to either top or bottom edges or to the central zone, revealing probably some miscalculation concerning the direction of grains. The early 11th century comb B842 has fine teeth cut in a fan-shaped manner and, judging by its other features, was most likely discarded unfinished. As a rule teeth base lines are parallel to the straight top edge and to the bottom edge, which is either straight or slightly curved outwardly, with a few exceptions featuring either an arched top line (B1082 (Fig. 4.46)) or both lines evenly curved inwardly (B348 (Fig. 4.46)). This means that guides for the depth to which the teeth were to be sawn were marked some way or another.

The scratched guidelines marking the height of teeth can be observed on 104 combs (7.9%), most of which (91 items, 87.5%) are undecorated (e.g. B73 (Fig.4.16), B94 (Fig.4.30), B103 (Fig.4.28), B302 (Fig.4.19), B594 (Fig.4.22), B913 (Fig.4.16), B914 (Fig. 4.17)). Most of the remaining 13 decorated objects feature various types of ornamentation with ring-and-dot motifs (e.g. B11 (Fig. 4.49), B33, B88, B405 (all Fig. 4.31), B898 (Fig. 4.3)). As a rule, both rows of teeth on both faces are marked with guidelines, however, some specimens feature guidelines incised only for coarse (e.g. B302 (Fig.4.19)) or fine (e.g. B88 (Fig. 4.31)) sets of teeth. Comb B1166 (Fig. 4.49), a casual find from the Slavensky End of the town, features one face with an exquisitely carved decoration of vegetable motifs and the other face undecorated with scratched guidelines for both sets of teeth.

A total of 91 dated specimens featuring guidelines demonstrates that visible guidelines (or one guideline in the centre of the solid zone (B976 (Fig. 4.33)) are least frequently encountered on the 11th century combs (4 examples, 1.9% of 213 11th century objects) (e.g. B155, B405 (both Fig. 4.31) and B898 (Fig. 4.3)). They are fairly rare on the 12th century combs (42 items, 3.6% of 596 contemporary combs) (e.g. B803 (Fig. 4.40)), becoming more common in the 13th century (42 out of 257 combs, 16.3%) (e.g. B73 (Fig.4.16), B94 (Fig.4.30), B103 (Fig.4.28), B302 (Fig.4.19)), but being encountered most often on the 14th-15th century objects (16 out of 66, 24,2%) (e.g. B814 (Fig. 4.31), B913 (Fig.4.16), B914 (Fig. 4.17), B916 (Fig. 4.13)).

The paucity of visible guidelines (especially among the 11th-12th century objects) does not imply that marking the base line of teeth was not practiced. On the contrary, judging by the fact that only a handful of combs feature a noticeably uneven tooth base line (e.g. B246, B430, B1012 (all Fig. 4.32)), one can assume that the guidelines were possibly either scratched with a delicate line easily removable throughout shaping of teeth and final polishing of comb faces, applied by some other means, or concealed somehow.

One of the easiest ways to conceal guideline markings is to deepen them into grooves and exploit them decoratively as linear ornamentation. This was most likely the ploy widely used in the 11th and 12th centuries with a marked preference for all sorts of linear decorations on combs and very few examples of visible guidelines. Rare finds of unfinished combs with unsawn or partially sawn teeth known from Sarkel¹ and Novgorod (B113 (both Fig. 4.33)), demonstrate that the grooves of linear decoration provided perfect guidelines, which most of the time guaranteed perfect results (e.g. B234 (Fig. 4.3), B427 (Fig. 4.33)). A few combs, however, feature tooth saw marks cutting through the guidelines of linear decoration (e.g. B43, B415 and B443 (all Fig.4.33)).

One comb with linear decoration (B47 (Fig. 4.38)), deriving from the context dated to the late 11th-turn of the 12th century on the Troitsky site, features a fashion of tooth shaping, which is extremely rarely encountered on combs in skeletal materials, but is fairly common on the earliest (10th-11th century) boxwood combs (see below Chapter 5, section 5.3.1b). These boxwood combs

reveal a striking conformity with the East Mediterranean tradition of making boxwood and ivory combs. This tradition is characterised by a marked difference in gauge between the fine and coarse rows of teeth which were cut, tapered and rounded individually in a highly distinctive fashion. The space between teeth at the very base is accurately slightly chipped out in the manner, which leaves a set of U-shaped or V-shaped indentations, which seems to be a common ploy intended to conceal guidelines for cutting teeth. Quite often similar incisions are cut alternately to the first row at the base of every tooth, producing a meander pattern. All these features can be seen on comb B47, also featuring a marked difference in the density of coarse and fine teeth, which, as will be shown below, is very unusual for the combs of that date.

The vast majority of combs feature a fairly equal height of coarse and fine teeth, although a few specimens reveal a certain discrepancy in the heights of the tooth rows. It is worth noting that all combs with fine teeth (bottom) noticeably higher than the coarse ones (top) derive from late 11th-12th century contexts (B6 (Fig. 4.34), B14 (Fig. 4.17), B96, B98 (both Fig. 4.34), B395, B447), whereas specimens with coarse teeth (top) higher than fine teeth (bottom) invariably come from 13th century layers (B13, B53, B82, B145, B165, B180, B237 (all five Fig. 4.35)).

Another interesting feature of combs in connection with teeth appears to be the degree of division in density between coarse and fine teeth. In order to examine chronological changes concerning this variable, 250 combs were selected at random for precise measurement of the teeth density. The density of coarse teeth varies from 2 to 10 teeth per 10mm, with fine teeth varying in density from 6 to 14 teeth per 10mm. The degree of division in density between coarse and fine teeth is expressed as a coarse to fine teeth density ratio (referred to further on as *tdr*) and varies from 0.22 to 0.91 (the lower the *tdr*, the more marked is the division between coarse and fine teeth). The average *tdr* is equal 0.54, which means that coarse teeth are spaced approximately twice as widely as fine teeth. A total of 195 combs from the selected group deriving from dated contexts are quantified by date in Table 23.

¹ Unpublished materials from the collections of the State Hermitage (St.-Petersburg), AVES колл. 2792/16 (SH)

Table 23 Class 2a combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth

Date	Number of combs	Average coarse teeth density (per 10mm)	Average fine teeth density (per 10mm)	Average coarse/fine teeth density (per 10mm) ratio <i>tdr</i> *
e.11th C.	6	5.6	8.7	0.64 (0.56-0.72)
m.11th C.	11	5.5	8.5	0.64 (0.40-0.89)
l.11th C.	26	6.3	9.4	0.67 (0.50-0.88)
e.12th C.	32	5.5	8.7	0.63 (0.33-0.91)
m.12th C.	27	5.1	9.4	0.54 (0.28-0.78)
l.12th C.	33	4.8	9.1	0.54 (0.30-0.78)
e.13th C.	21	4.0	9.3	0.43 (0.25-0.75)
m.13th C.	7	3.6	9.4	0.39 (0.25-0.78)
l.13th C.	8	3.2	9.5	0.34 (0.28-0.44)
e.14th C.	8	3.4	8.4	0.41 (0.29-0.64)
m.14th C.	6	3.8	9.0	0.42 (0.30-0.56)
l.14th C.	4	3.9	10.0	0.39 (0.30-0.50)
e.15th C.	6	4.6	10.5	0.44 (0.27-0.83)
Total	195	4.9	9.1	0.54 (0.25-0.91)

* A range of *tdr* within each chronological group is given in brackets.

As can be clearly seen, the earliest combs up until the early 12th century feature a less marked than average division between coarse and fine teeth, which appears to be at its lowest in the late 11th century. That was quite assonant with the Baltic-Scandinavian tradition of fine-coarse teeth slight differentiation and unlike a marked difference in gauge between the fine and coarse rows of teeth on the earliest boxwood combs from Novgorod, revealing a striking affinity with the Southern, Byzantine tradition of comb-making. In the course of the 12th and 13th century the difference in density grows, becoming most pronounced in the late 13th century. It decreases again slightly in the 14th-15th, centuries mainly because coarse teeth become less widely spaced, with fine teeth showing a trend towards becoming more densely spaced. On the other hand, 15th century elephant ivory comb (B1200) features fine teeth on either side with very little difference in gauge (10 and 12 teeth per 10mm, *tdr*=0.83), which appears to have been a new trend registered on some other combs deriving from similar chronological contexts (Ambrosiani 1981, 128-131, Fig. 80:3; Luik 1998, 60-63, Fig. 45-49).

4.2.1c Central zone

A zone of solid space between two rows of teeth, reserved either as a decorative belt or as a blank area, is called the central zone in this paper. Its height, or rather relative height (relating to comb height: $rh = H_{cz}/H$), due to combs of varying sizes being known (see above section 4.2.1a, 'Size'), is a subtle variable, which appears to be a distinctive chronological indicator.

Table 24 Simple combs in skeletal materials. Chronological changes in the relative height of the central zone

Date	Number of combs	Average relative height ($\sim rh$)
e.11th C.	8	0.26
m.11th C.	31	0.26
l.11th C.	70	0.22
e.12th C.	153	0.19
m.12th C.	98	0.19
l.12th C.	116	0.19
e.13th C.	78	0.21
m.13th C.	43	0.25
l.13th C.	24	0.30
e.14th C.	11	0.29
m.14th C.	3	0.31
l.14th C.	5	0.30
e.15th C.	5	0.35
Total	645	0.21

A total of 700 combs have been selected at random from those revealing both comb height and the height of the central zone. The rh ranges significantly from 0.07 to 0.50, the latter implying that the central zone is half the height of the comb. Figure 4.36, which demonstrates the frequency of combs featuring various rh , reveals a few peaks, the highest peak at around 0.20 (proportional module 1:5, $rh = 0.19-0.22$). Other peaks strikingly coincide with certain proportional modules: one can see peaks aligned with modules 1:10 ($rh < 0.14$), 1:6 ($rh = 0.14-0.18$), 2:7 ($rh = 0.27-0.29$), 1:3 ($0.30-0.34$), 2:5 ($rh = 0.35-0.41$) 1:2 ($rh > 0.41$) and, possibly, module 1:4 ($rh = 0.24-0.26$). A total of 645 dated combs from the selected 700 examples are quantified by date in Table 24, which also shows the average rh for combs in each chronological slot.

As can be clearly seen, the average rh (which in the early-mid 11th century is higher than the total $\sim rh$) in the late 11th century reveals a tendency to decrease

constantly up to the late 12th century, and to increase again in the course of the 13th century. The maximum $\sim rh$ (the highest central zone), which is also noticeably higher than any other $\sim rh$ variations, is featured on the early 15th century combs.

Combs with rh ranging from 0.19 to 0.31 can be assigned to the group of objects with a medium wide central zone. Coming back to the assemblage of 700 combs, it is possible to examine the peaks of frequency of 363 combs with a medium wide central zone in more detail. Table 25 clearly demonstrates three peaks of comb occurrence aligned with modules 1:5 ($rh = 0.20$), 1:4 ($rh = 0.25$) and 2:7 ($rh = 0.28$).

Table 25 Frequency of combs with a medium wide central zone

rh	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	All
Σ	35	46	43	41	30	21	26	21	21	26	23	15	15	363

Combs featuring $rh < 0.19$ are allocated to the group of objects with a narrow central zone, whereas the group of combs with a wide central zone can be identified by featuring $rh > 0.31$. Chronological changes in the proportion of combs with narrow, medium and wide central zones are shown in Figure 4.37, which is quite demonstrative of certain chronological trends. Relatively narrow central zones are pretty common on combs deriving from the mid-11th to the early 13th century, with the peak of their occurrence in the late 12th century (Fig. 4.38). They are much less often encountered on the earliest (early-mid 11th century) specimens (e.g. B9, B39, B952, B454, B1213) and combs from mid-late 13th century deposits (e.g. B92 (Fig. 4.15), B180 (Fig. 4.35), B246 (Fig. 4.32)), and are unknown among the 14th-15th century objects. An early 11th century comb B557 (Fig. 4.63) in walrus ivory and a mid 13th century specimen B237 (Fig. 4.35) in antler, both featuring virtually no central zone between two sets of teeth, demonstrate a fiasco of a comb, being more likely rejects rather than deliberate designs.

Medium wide central zones are rare only on the 15th century combs (B920 (Fig. 4.13)); they are featured on 48-63% of the 11th century combs (e.g. B234 and B898 (both Fig. 4.3), B176 (Fig. 4.21), B324, B1207 and B1269 (all Fig. 4.28), B1026 (Fig. 4.31), B43 and B415 (both Fig. 4.33)), on 41-52% of the 12th century combs (e.g. B717 and B1235 (both Fig. 4.15), B14 (Fig. 4.17), B944 and

B1272 (both Fig. 4.18), B1012 (Fig. 4.32) and B427 (Fig. 4.33) and on 47-58% of the 13th century objects (e.g. B73 (Fig. 4.16), B299 (Fig. 4.19), B211 and B217 (both Fig. 4.20), B103 (Fig. 4.28), B165 (Fig. 4.35)). A vast majority of the 14th century combs (67-80%) have medium wide central zones (e.g. B12 (Fig. 4.19), B913 (Fig. 4.16), B914 (Fig. 4.17) and B916 (Fig. 4.13)).

Table 26 Simple combs in skeletal materials. The chronological distribution of combs featuring central zones assigned to various proportional modules*

Module Date	1:10	1:6	1:5	1:4	2:7	1:3	2:5	1:2	Total (100%)
e.11th C.	0	1 (12.5)	3 (37.5)	0	2 (25.0)	1 (12.5)	1 (12.5)	0	8
m.11th C.	4 (12.9)	3 (9.7)	4 (12.9)	3 (9.7)	8 (25.8)	3 (9.7)	5 (16.1)	1 (3.2)	31
l.11th C.	10 (14.3)	14 (20.0)	19 (27.1)	8 (11.4)	8 (11.4)	7 (10.0)	3 (4.3)	1 (1.4)	70
e.12th C.	28 (18.3)	36 (23.5)	52 (34.0)	16 (10.5)	10 (6.5)	8 (5.2)	3 (2.0)	0	153
m.12th C.	19 (19.4)	23 (23.5)	35 (35.7)	7 (7.1)	9 (9.2)	5 (5.1)	0	0	98
l.12th C.	21 (18.1)	38 (32.8)	26 (22.4)	11 (9.5)	11 (9.5)	7 (6.0)	2 (1.7)	0	116
e.13th C.	10 (12.8)	22 (28.2)	18 (23.1)	7 (9.0)	12 (15.4)	5 (6.4)	4 (5.1)	0	78
m.13th C.	4 (9.3)	4 (9.3)	10 (23.3)	4 (9.3)	6 (14.0)	10 (23.3)	3 (7.0)	2 (4.7)	43
l.13th C.	0	1 (4.2)	3 (12.5)	3 (12.5)	2 (8.3)	7 (29.2)	7 (29.2)	1 (4.2)	24
e.14th C.	0	0	2 (18.2)	4 (36.4)	1 (9.1)	3 (27.3)	0	1 (9.1)	11
m.14th C.	0	0	0	0	1 (33.3)	2 (66.7)	0	0	3
l.14th C.	0	0	1 (20.0)	0	3 (60.0)	0	0	1 (20.0)	5
e.15th C.	0	0	0	0	1 (20.0)	1 (20.0)	2 (40.0)	1 (20.0)	5
Total	96 (14.9)	142 (22.0)	173 (26.8)	63 (9.8)	74 (11.5)	59 (9.1)	30 (4.7)	8 (1.2)	645

* Percentages given in brackets are in bold print when being equal to or more average (bottom line).

Specimens with a wide central zone dominate among the 15th century combs, accounting for 80% of the not very numerous objects (e.g. B594 and B689 (both Fig. 4.22), B814 (Fig. 4.31)). They are least common among the early 12th – early 13th century combs (e.g. B13 (Fig. 4.43), B29 and B1044 (both Fig. 4.21), B1088 (Fig. 4.58)), where they account for less than 10 % of the objects, but are as frequently encountered in the group of earliest specimens (e.g. B444 (Fig.4.28), B33, B155 and B405 (all Fig. 4.31), B113 and B443 (Fig. 4.33), B112, B409,

B410, B492 and B953 (all Fig. 4.39)), as among the mid 13th –14th century objects (e.g. B88 (Fig. 4.31), B129 (Fig. 4.41), B159, B173, B233, B240, B288, B294, B702, B782 (Fig. 4.22)).

A more detailed chronological fluctuation of the relative height of the central zone can be seen in Table 26, containing the same 645 dated combs quantified by the proportional modules (numbers also expressed as a percentage of a total in each chronological slot).

It is worth noting here that the chronological fluctuation of the relative width of the central zone on combs in skeletal materials seems to be in accordance with that of the boxwood simple counterparts, which are known from mid 10th-12th century layers and from the 13th-15th century contexts (section 5.1, Table 59; section 7.1, Fig. 7.2). Boxwood combs of the early wave, revealing a striking adherence to the East Mediterranean (Byzantine) tradition of craftsmanship, commonly have proportions and constituent features carefully planned on certain mathematical modules, with the central zone relative height designed most often on modules 1:3 and 2:5 (see below section 5.3.1c, Table 59). It seems obvious that early boxwood combs, reaching their peak in the mid-late 11th century, gave an impetus to the proportions of early combs in skeletal materials, which feature the most common relative heights (on modules 2:7 and 2:5) precisely in the mid 11th century. Boxwood simple combs of the second wave, which began dominating in class 2 (simple combs) from the late 13th century (Fig. 5.3) and in the whole comb repertoire in Novgorod from the early 14th century (Fig. 7.3), had different proportions of constituent features with almost invariably medium wide central zones (modules 1:5, 1:4 and, less often 2:7 and 1:3). Those, probably, had an impact on the proportions of simple combs in skeletal materials.

4.2.2. Decoration

Decorative enhancement of simple combs is emphasised on the central zone, but can also occur on the side ends of the faces as well as on the side edges. Of 1321 simple combs for hair and beards, 1046 objects have decorated central zones, including four specimens (B129 (Fig. 4.41), B182, B790, B851 from 13th-15th century contexts) which feature a rather botched scratched secondary decoration.

Ten objects are either too fragmented or too poorly preserved on the surface layer to judge whether they were decorated or not.

Table 27 Chronological distribution of combs with undecorated central zones

Date	Combs with undecorated central zones		Combs with side edge decoration only		Combs with side edge decoration		Total of all dated combs
	Number	% of all dated combs	Number	% of all combs with side edge decoration	Number	% of all dated combs	
e.11th C.	0	-	0	-	0	-	36
m.11th C.	1	1.5	0	-	0	-	65
l.11th C.	1	0.9	0	-	1	0.9	112
e.12th C.	4	1.9	1	5.9	17	8.3	206
m.12th C.	12	6.9	2	6.7	30	17.3	173
l.12th C.	29	13.4	4	8.9	45	20.7	217
e.13th C.	47	32.4	6	23.1	26	17.9	145
m.13th C.	39	59.1	4	40.0	10	15.2	66
l.13th C.	35	76.1	3	42.9	7	15.2	46
e.14th C.	21	84.0	0	-	1	4.0	25
m.14th C.	9	75.0	0	-	1	8.3	12
l.14th C.	9	90.0	0	-	0	-	10
e.15th C.	11	64.7	0	-	0	-	17
m.15th C.	1	100.0	0	-	0	-	1
l.15th C.	1	100.0	0	-	0	-	1
Total	220	19.4	20	14.5	138	12.2	1132

A total of 265 combs (20.2% of 1311 combs with unambiguous blank or ornamented central zones) have undecorated central zones, with some featuring side edge decoration only. To examine the chronological distribution of undecorated combs, a total of 220 dated examples have been analysed. The data is compiled in Table 27, where the numbers of specimens are also expressed as percentages of various totals.

Undecorated central zones are uncommon during the 11th and 12th centuries, and particularly rarely encountered on 11th-mid 12th century objects. Quite a few specimens found are suspects to being either unfinished products or rejects. Mid 11th century comb B155 (Fig. 4.31) seems to have been left undecorated and then rejected due to its asymmetrical outline; mid 12th century combs B803, B963, B967, B1287 (all Fig. 4.40), appearing not to have been used at all, were probably broken during the final stages of the manufacturing process and then discarded. Specimen B963 has a hole drilled half way through the comb depth in the side end of one face, which most likely caused the breakage.

Undecorated central zones became common from the early 13th century, and from the mid 13th century onwards are featured on the majority of combs (e.g. B12 (Fig. 4.19), B54 (Fig. 4.20), B180 (Fig. 4.35), B617 and B782 (both Fig. 4.22), B913 (Fig. 4.16), B916 and B920 (both Fig. 4.13), B1221 (Fig. 4.22)).

As is clearly seen in Table 27, a central zone free of decoration combined with decorated side edges is highly characteristic amongst the 13th century specimens (e.g. B4, B162, B223, B233, B237 (Fig. 4.35), B590, B890), and encountered only rarely amongst those from 12th century contexts (e.g. B803 (Fig. 4.40), B1272 (Fig. 4.18)). Two of the 13th century combs with decorated side edges have owner's marks (a highly rare feature on simple combs in skeletal materials) carved within the blank central zone: a prince's emblem on one face of comb B1325 and the letter 'H' on one face of specimen B4 (Fig. 4.41), the other face being marked with a bird-shaped incision.

4.2.2a Decoration of the central zone

Decoration of the central zone comprises one or more decorative motifs arranged in certain set patterns.

Decorative motifs

Linear decorations

Lines¹

Saw cut single or multiple lines are the most frequently encountered decorative element on simple combs in skeletal materials (see the range of patterns in Fig. 4.50-4.52). A total of 779 combs (74.5% of decorated specimens) feature linear incisions running parallel to both teeth base lines, being either the only decorative element filling the whole area of the central zone (e.g. B406 (Fig.4.38)) or the margins (e.g. B43, B113, B415, B427, B443 and B976 (all Fig. 4.33), or being incorporated as marginal lines in various patterns along with other decorative motifs (e.g. B47, B390 and B1106 (all Fig. 4.38)).

Horizontally incised lines are a common decorative element occurring on the side edges (see below section 4.2.2c, Fig. 4.60).

¹ Abbreviated as L in the coding system for decorative patterns.

*Fillets*¹

A fillet is a carved element running parallel to the teeth bases resembling the half of a flute split longitudinally, with the convex side facing outwards. The height of the fillet is from 1mm to 3mm, with the depth up to 2mm. Fillets are encountered on 25 combs, all of which apart from one (early 15th century comb B814 in elephant ivory (Fig.4.31)) coming from 11th-12th century deposits. The distinctive feature of these combs is invariably a combination of a single fillet element with marginal linear incisions (patterns L.Ft (Fig. 4.50)), occasionally with ring-and-dot (RDB-motifs (pattern L.RDB.Lo.Ft (Fig. 4.52), see below in this section) (e.g. B816 (Fig.4.45)) and meander (IVMB-motifs (pattern L.IVMB.Ft (Fig. 4.50), see below in this section) (e.g. B541) ornamentation.

Comb B814 typifies the late usage of the fillet motif, which, being the only decorative element of the central zone, occupies the marginal position along the teeth base of both rows.

*Flutes*²

A flute is a carved decorative element in the form of a furrow resembling the half of a flute split longitudinally, with the concave side facing outwards. It is a rare decorative element featured only on two late 11th –early 12th century combs B583 and B957 (Fig. 4.42) in combination with marginal linear incisions (pattern L.Fl (Fig. 4.50)).

*Oblique lines*³

On the central zone as well as on the face sides (see below section 4.2.2b) this is an extremely rare motif, featured only once as primary decoration on the 12th century comb B816 (Fig. 4.45) in combination with other decorative elements (pattern L.RDB.Lo.Ft (Fig. 4.50) and twice as a secondary decoration on the 14th century combs (B198 and B851). On specimen B851 multiple scratched oblique lines fill triangular figures outlined by meandering and marginal lines which are

¹ Abbreviated as Ft in the coding system for decorative patterns.

² Abbreviated as Fl in the coding system for decorative patterns.

³ Abbreviated as Lo in the coding system for decorative patterns

also scratched, and on comb B198 pairs of oblique lines are linked by perpendicularly cut multiple short incisions.

Oblique lines are, however, very common decorative elements enhancing the side edges (see below section 4.2.2c, Fig. 4.60).

Meander (linear)¹

A meandering line consisting of a series of short knife cut incisions inclined at angles in alternate directions is encountered only once as a secondary decoration being scratched as opposed to incised on the late 14th century specimen B851, and appearing as a primary decoration combined with linear marginal incisions on one face of the mid 11th comb B46 (Fig. 4.44), the other face being decorated with double linear marginal incisions.

Hatching²

Short vertical multiple closely set lines cut with a knife are always combined with marginal lines and incorporated in the space between the lines (L.H and L.IVMB(IIMB).H patterns (Fig. 4.50) and L.RDB.IV(IU, II).H patterns (Fig. 4.52)). This motif can be seen on 110 combs mainly from the late 11th – 12th century contexts in combination either exclusively with the linear elements (e.g. B464 (Fig. 4.42)) or with other decorative elements filling the space outlined by marginal lines (e.g. B96 and B98 (both Fig. 4.34), B390 (Fig. 4.38), B717 and B928 (both Fig. 4.15)).

Cross-hatching³

A cross-hatching motif, scratched rather than incised, is known as a secondary decoration on the mid 13th century specimen B129 (Fig. 4.41).

¹ Abbreviated as LM in the coding system for decorative patterns

² Abbreviated as H in the coding system for decorative patterns.

³ Abbreviated as CH in the coding system for decorative patterns.

Chevrons¹

Single chevron motifs are encountered only once along with ring-and-dot motifs and terminal linear decoration on comb B861 (Fig. 4.2), which was in the past trimmed and reused as a single-sided comb. Multiple chevron motifs are occasionally featured on the side edges (see below section 4.2.2c, Fig. 4.60).

Interlaced linear decoration²

Interlaced linear decoration with terminal scrolls is featured on one face (the other being undecorated) of the early 13th century comb B818.

Non-linear decorations

V-, U- and I-shaped incisions³

Repeated incisions rest upon an incised line with one end (which in case of V- and U-shaped incisions is always the broad end) producing various indented patterns. These are very common motifs encountered on central zones of 178 combs; most of 142 dated specimens come from 12th century contexts (106 examples, 74.6%: e.g. B928 (Fig. 4.15), B950 (Fig. 4.17), B944 (Fig. 4.18), B96 and B98 (both Fig. 4.34), B47 and B390 (both Fig. 4.38)), however, these decorative elements are not uncommon on the mid-late 11th century (16 examples, 11.3%: e.g. B436, B1001, B1252) and early-mid 13th century (20 examples, 14.1%: e.g. B166, B455, B757) objects.

When incised on both sides of a line the motifs are either matched (e.g. pattern L.IVB1//2a (Fig. 4.50)) or off-set (e.g. L.IIB1//2b (Fig. 4.50)). More common are patterns featuring V-, U- and I-shaped incisions in the space between two horizontal lines, combining the background for a decorative belt. When the incisions are set matched opposite to one another, they outline a belt with symmetrically indented borderlines often enhanced with multiple ring-and-dot motifs (patterns L.RDB.IV(IU, II) (Fig. 4.52)). Being off-set in a cogged fashion, V- and I-shaped incisions (and occasionally U-shaped incisions) combine the

¹ Abbreviated as CV in the coding system for decorative patterns.

² Abbreviated as IL(L) in the coding system for decorative patterns.

³ Abbreviated as IV, IU and II in the coding system for decorative patterns.

background for a meandering decorative belt (patterns L.IVMB (IIMB) (Fig. 4.50) and pattern L.RDB.IU3//(1)//1a (Fig. 4.52)).

Multiple meandering belts outlined by V-shaped incisions is an extremely rare type of side edge decoration (see below section 4.2.2c, Fig. 4.60).

Dots¹

Multiple dot elements between horizontal linear incisions (pattern L.RDB.D (Fig. 4.52)) are encountered only twice, once on casual find B1168 and again on the strange specimen B842, which derives from the deposit dated to the turn of the 11th century. The latter, featuring a peculiar fan-shaped outline of teeth, is probably unfinished, the shallow dots most likely being guides for the location of ring-and-dot elements.

Ring-and-dot

Ring-and-dot motifs applied with a centre-bit are the second most common decorative elements, with 405 combs (38.7% of all decorated specimens) in the Novgorod assemblage featuring them. It can be distinguished between bands of repeated ring-and-dot motifs located next to one another (RDB), single elements arranged in certain patterns (RDE), ring-and-dot motifs combined in flowery patterns (RDF) and carpet patterns of ring-and-dot elements covering almost all space of the central zone (RDC). Six combs decorated with ring-and-dot elements survived as small fragments and do not reveal the exact type of ring-and-dot ornamentation².

Ring-and-dot bands³

Horizontally arranged ring-and-dot bands are encountered on 117 combs, and almost always being incorporated in patterns combining marginal lines (114 items, 94.7%). Only three combs feature ornamental patterns consisting exclusively of ring-and-dot bands: mid 11th century specimens B33 (Fig. 4.31)

¹ Abbreviated as D in the coding system for decorative patterns.

² B510, B517, B526, B591, B648, B712.

³ Abbreviated as RDB in the coding system for decorative patterns.

and B903, and mid 13th century comb B299 (Fig. 4.19) with an undecorated other face.

Most of dated specimens (95 objects) featuring L.RDB patterns (Fig. 4.52) derive from 12th century contexts (74, 77.9%) (e.g. B96 and B98 (both Fig. 4.34), B390 (Fig. 4.38), B462 (Fig. 4.43), B928 (Fig. 4.15), B944 (Fig. 4.18), B950 (Fig. 4.17)), with nine specimens (9.5%) found in mid-late 11th century layers (e.g. B953 (Fig. 4.39), B1220 (Fig. 4.43)) and 12 combs (12.6%) from early 13th century deposits (e.g. B13 (Fig. 4.43)).

Ring-and-dot bands are the most common decoration on the end parts of comb faces (see below section 4.2.2b).

Ring-and-dot elements¹

Patterns incorporating marginal lines and ring-and-dot motifs (L.RDE patterns Fig. 4.51) are encountered much less frequently than patterns combining ring-and-dot motifs only (RDE patterns Fig. 4.46, 4.53)(30 and 158 examples respectively). The former appear to be more common on combs uncovered in 11th century contexts: in the group of 27 dated objects decorated with L.RDE patterns, 17 specimens (63%) come from 11th century layers (e.g. B492 (Fig. 4.39), B861 (Fig. 4.2), B898 (Fig. 4.3)), the remaining ten combs deriving mainly from the early 12th century layers (e.g. B943 (Fig. 4.43)).

RDE patterns, however, are most frequently encountered on the 12th century combs: 101 combs from the group of 140 dated specimens (72.1%) (e.g. B14 (Fig. 4.17), B1012 (Fig. 4.32), B125 (Fig. 4.30), B194 (Fig. 4.38), B200, B1079 and B1082 (all Fig. 4.46), B1080 (Fig. 4.28), B1244 (Fig. 4.18)). This type of ring-and-dot decoration is not uncommon among the early-mid 13th century comb finds (33 items, 23.6%) (e.g. B246 (Fig. 4.32), B1084 (Fig. 4.46)), but it can be rarely seen on the 11th century combs (four finds, 2.9%) (e.g. B405 (Fig. 4.31), B1042 (Fig. 4.1) and on specimens deriving from 14th century layers (two finds (B520 and B664), 1.4%).

¹ Abbreviated as RDE in the coding system for decorative patterns.

The most common RDE patterns incorporating bigger elements (5-6 mm in diameter), often accompanied with smaller elements (2-3 mm in diameter), are shown on combs depicted in Figure 4.46. Patterns incorporating only smaller ring-and-dot motifs are rare (e.g. B11 (Fig. 4.49)).

Occasionally ring-and-dot motifs are incorporated in the decoration of the sides of comb faces and edges of comb sides (see Fig. 4.60, sections 4.2.2b and 4.2.2c).

Ring-and-dot florets¹

Patterns of ring-and-dot elements arranged in florets (Fig. 4.54) are encountered on 63 combs, almost all 50 dated specimens (with an exception of mid 14th century comb B88 (Fig. 4.31)) deriving from 12th –13th century contexts (e.g. B56, B77, B202, B225 (all Fig. 4.47)).

No combs with this type of decoration are known from the 11th century deposits and only four examples come from early 12th century layers. 29 dated combs (58%) were uncovered from the late 12th –early 13th century deposits.

Ring-and-dot carpet decoration²

This type of most lavish ornamentation covers almost all space of the central zone (Fig. 4.48, 4.55), various patterns comprising single elements either of smaller size only (2-3 mm in diameter) (e.g. B219 and B227 (both Fig. 4.48), B168 and B1088 (both Fig. 4.58)), or of bigger sized (5-6 mm in diameter) motifs (commonly in the centre) flanked by rows of smaller ring-and-dot elements (e.g. B165 (Fig. 4.35), B316, B321 and B1004 (all Fig. 4.48)). Ring-and-dot carpet decorations are featured on 31 combs, 28 specimens deriving from stratified contexts dated to the 12th-13th centuries.

Only one comb (B1257) comes from the early 12th century context, most objects (18 items, 62.1%) being dated to the late 12th-early 13th centuries (B219, B316, B321, B1004 (all Fig. 4.48), B168 and B1088 (both Fig. 4.58)).

¹ Abbreviated as RDF in the coding system for decorative patterns.

² Abbreviated as RDC in the coding system for decorative patterns.

Foliate carved decoration¹

This type of intricately carved decoration of scrolling leaves flanked by marginal lines along the tooth bases is extremely rare and is encountered only twice: on casual comb find B1166 and on fragmented comb B1015 originating from disturbed contexts on the Fedorovsky site (both Fig. 4.49). A peculiar feature of both specimens is that only one face of each comb is enhanced with carved foliate decoration, the other remaining undecorated (B1166) or featuring marginal lines along the tooth bases (B1015). It is not clear whether these combs are somewhat unfinished products (in terms of decoration) or were meant to have a right face and a wrong face (obverse and reverse). It seems worthy, however, to examine combs with certain irregularities in decoration.

Irregularities in decoration

There are a few other combs with either one face undecorated (13th century specimens B299 (Fig. 4.19) and B818, and unstratified combs B11 (Fig. 4.49) and B1013) or with considerable differences in facial decorations (three 11th century combs B46 (Fig. 4.44), B1227 (Fig. 4.58) and B1308, and three 13th century combs B168 and B1088 (both Fig. 4.58), B1092).

Further 34 combs reveal quite noticeable variations of facial decoration, although still within the same patterns, most of which are ring-and-dot decorative patterns (28 items, 82.4%). All dated combs with some errors in decoration of central zones, including not only differences in facial decoration and asymmetry, but also other ornamental defects (e.g. B1244 (Fig. 4.18), B405 (Fig. 4.31), B246 (Fig. 4.32), B348 and B1082 (both Fig. 4.46)), are compiled in Table 28.

The objects are also quantified in terms of a percentage of all contemporary decorated combs. No serious decorative errors have been encountered on objects from deposits younger than the early 14th century. Among the remaining 887 specimens the quota of combs with some errors in decoration is higher than average (Table 28, bottom row) in the early 11th century combs and in the sub-assemblages of the late 12th-13th centuries.

¹ Abbreviated as F in the coding system for decorative patterns.

Table 28 The occurrence of combs with irregularities in decoration of central zones

Date	All decorated combs	Facial decorative differences		Decorative asymmetry or defects	
		Number of combs	% of all contemporary combs	Number of combs	% of all contemporary combs
e.11th C.	36	2	5.6	2	5.6
m.11th C.	64	1	1.6	1	1.6
l.11th C.	110	2	1.8	0	0.0
e.12th C.	201	4	2.0	5	2.5
m.12th C.	159	4	2.5	4	2.5
l.12th C.	185	7	3.8	18	9.7
e.13th C.	93	11	11.8	9	9.7
m.13th C.	26	3	11.5	5	19.2
l.13th C.	10	0	0.0	1	10.0
e.14th C.	3	2	66.7	2	66.7
Total	887	36	4.1	47	5.3

The implications of this phenomenon are discussed in below in sections 4.3-4.5. At the moment it is probably worth noting that higher numbers of products with faulty decorations may occur either at the beginning of manufacturing of new products when the patterns are only just being created and are thus far from being perfect (which appears to have happened in the earliest period), or at the stage of well established manufacture when standard patterns could be copied by either less proficient comb-makers or apprentices, which was probably the case in the late 12th – 13th centuries.

Decorative patterns

Most combs with decorated central zones feature an even, fairly symmetrical arrangement of one or more decorative motifs forming certain patterns. Those based on linear horizontal incisions as the only decorative element, or in combination with other motifs, are predominant (Fig. 4.50 – 4.52).

Table 29 demonstrates the frequency of combs featuring various decorative patterns, also expressed as a percentage of all decorated contemporary combs (given in brackets). Where the quota of the combs with certain patterns is higher than the average quota among all decorated specimens (bottom row), the figures are printed in bold. The most numerous group of linear based patterns has been subdivided into four subgroups: L – patterns featuring only linear incisions, L+ – patterns combining linear incisions with other (non-RD) elements, L.RDE –

patterns incorporating ring-and-dot motif with linear incision, and L.RDB – patterns featuring a combination of linear incisions with ring-and-dot bands. Ring-and-dot patterns are subdivided into four groups discussed above (see subsection ‘Non-linear decorations’ in this section).

Table 29 Simple combs in skeletal materials. The chronological distribution of main decorative patterns

Date	Decorative patterns									
	All ¹	L	L+	L. RDE	L. RDB	RDE	RDB	RDF	RDC	Others
e.11th C.	36	27 (75.0)	3 (8.3)	4 (11.1)	0	2 (5.6)	0	0	0	0
m.11th C.	64	44 (68.8)	6 (9.4)	9 (14.1)	3 (4.7)	0	2 (3.1)	0	0	0
l.11th C.	110	82 (74.5)	16 (14.5)	4 (3.6)	6 (5.5)	2 (1.8)	0	0	0	0
e.12th C.	201	120 (59.7)	29 (14.4)	6 (3.0)	19 (9.5)	22 (10.9)	0	4 (2.0)	1 (0.5)	0
m.12th C.	159	68 (42.8)	21 (13.2)	2 (1.3)	27 (17.0)	26 (16.4)	0	9 (5.7)	5 (3.1)	1 (0.6)
l.12th C.	185	52 (28.1)	21 (11.4)	2 (1.1)	28 (15.1)	53 (28.6)	0	18 (9.7)	9 (4.9)	2 (1.1)
e.13th C.	93	27 (29.0)	12 (12.9)	0	9 (9.7)	24 (25.8)	0	11 (11.8)	8 (8.6)	2 (2.2)
m.13th C.	26	3 (11.5)	4 (15.4)	0	3 (11.5)	7 (26.9)	1 (3.8)	5 (19.2)	2 (7.7)	1 (3.8)
l.13th C.	10	3 (30.0)	0	0	0	2 (20.0)	0	2 (20.0)	3 (30.0)	0
e.14th C.	3	1 (33.3)	0	0	0	1 (33.3)	0	0	0	1 (33.3)
m.14th C.	2	0	0	0	0	1 (50.0)	0	1 (50.0)	0	0
l.14th C.	1	0	1 (100.0)	0	0	0	0	0	0	0
e.15th C.	6	3 (50.0)	2 (33.3)	0	0	0	0	0	0	1 (16.7)
Total	896	430 (48.0)	115 (12.8)	27 (3.0)	95 (10.6)	140 (15.6)	3 (0.3)	50 (5.6)	28 (3.1)	8 (0.9)

Almost half of all decorated combs (48%) have central zones decorated with linear patterns which in earlier examples (11th-early 12th centuries) take 60-75% of all patterns, but are least common among the mid 13th century objects.

RDE patterns are the second most common in the range of comb ornamentation. Being especially popular from the mid 12th century up to the mid 14th century,

¹ Within the total of 1132 dated combs 220 are undecorated (see Table 27). From the remaining 912 combs 16 combs have been excluded due to their poor preservation which makes impossible

these patterns coincide with the period of maximal occurrence of simple combs in skeletal materials in Novgorod and were most likely locally designed. It is not uncommon to see ornamental defects on combs featuring RDE patterns (Fig. 4.46).

Patterns combining linear incisions with other (non ring-and dot) motifs (L+, Fig. 4.42) gain in popularity from the late 11th century and remain common (with a slight drop in the late 12th century) up until the mid 13th century.

Combinations of ring-and-dot bands with linear incisions are known from the mid 11th century (e.g. B953 (Fig. 4.39), B1220 (Fig. 4.43)). It is worth remembering here that the early L.RDB patterns are stylistically similar to most common ornamentation (decorative scheme 6) featured on side-plates of cased single-sided composite combs, which became especially popular in the late 10th-mid 11th century (section 3.2.2c, Table 7, Fig. 3.42). Later L.RDB patterns incorporating IV-, IU and II-shaped incisions and hatching (e.g. B928 (Fig. 4.15), B950 (Fig. 4.17)) are most common types of L.RDB patterns featured on combs of class 2a and their highest popularity can be seen from the mid-late 12th century up until mid 13th century.

RDF and RDC patterns are most common in the mid 12th – 13th centuries (Fig. 4.47, 4.48), whereas patterns incorporating linear incisions and ring-and-dot motifs (e.g. B930 and B943 (both Fig. 4.43)) are unknown among the combs from layers younger than the 12th century, being most popular in the 11th-early 12th century. The former patterns (RDF and RDC) appear to be local designs. Other patterns including RDB patterns belong to rare types.

As clearly seen in Figures 4.56 and 4.57, there is certain correlation between decorative patterns and comb forms. Thus, patterns based on linear decorations are commonly found either on rectangular comb forms or on trapezoid forms with steep sides. Of all these patterns, only L.RDB patterns are not uncommon (mainly in 12th-13th centuries) on the classical trapezoid forms. RDE patterns tend to occur on trapezoid forms with steep sides or on rectangular forms, but RDF and RDC patterns are typified on trapezoid forms with fairly low sides, which are also fairly common on undecorated combs.

to judge whether they were decorated at all (10 specimens) or to identify specific decorative patterns (6 specimens).

Metal sheeting

Only one comb (latter 12th century B816 (Fig. 4.45)) in the Novgorod assemblage of simple combs appears to have had an additional enhancement to carved or sawn decorations in the form of bronze sheets. The sheets were attached to the upper and lower margins of the central zone by means of pressing the longitudinal edges folded at right angles into the saw-cut grooves. These decorative, square bracket cross-sectional bindings survived only partially as thin metal strips inlaid into the sawn grooves along the tooth bases, but green-stained areas of antler between the pairs of grooves with surviving inlaid metal strips in them indicate that they were covered formerly with metal.

The decorative techniques combining skeletal materials with metal sheets (mainly in the form of metal sheets backing bone (antler) plates pierced with large-diameter holes or other form openings) are known on a variety of objects including casket mounts, gaming pieces (MacGregor 1985, 91, 199, 207) and both single- and double-sided composite combs from 12th –early 13th century Northern European contexts (see Chapter 3, *Openwork decoration*).

Combs with decoration almost identical to the specimen B816 with inlaid strips of metal sheets in the grooves were found in the 12th-13th century layers at Schleswig (Ulbrich 1984, Taf. 25: 6-6a, 63: 2, 6), and Tommarp in Skåne (Thun 1967, 84, Fig. 28:c). Parallels to this decoration are unknown on the combs found in other towns of Old Rus.

4.2.2b Decoration of sides of comb faces

Most combs feature plain spaces along the face sides. A total of only 14 examples (1.1% of 1313 combs complete enough to reveal face sides) have facial ends decorated with either RDB motifs (e.g. B35, B222, B267 and B452 (all Fig. 4.59) or RDE elements (e.g. B299 (Fig. 4.19), B434 (Fig. 4.44). B930 and B943 (both Fig. 4.43), B1227 (Fig. 4.58)). On specimen B1166 (Fig. 4.49) RDE motifs are incorporated into two vegetable florets occupying the comb sides beneath a lavishly decorated central zone. On comb B943 (Fig. 4.43) RDE elements are combined with short oblique lines shooting out from the ring-and-dot motifs.

Eleven objects in this group coming from the dated deposits, demonstrate that decoration of the sides of comb faces was more common in the 12th century (four examples: B35 (Fig. 4.59), B434 (Fig. 4.44), B930 and B943 (both Fig. 4.43)) and 13th century (6 examples, e.g. B299 (Fig. 4.19), B222, B267 and B452 (all Fig. 4.59)), with only one specimen B1227 (Fig. 4.58) deriving from the late 11th century context.

In general, RDE decoration of the sides of comb faces is more often encountered on the late 11th-12th century combs, whereas RDB ornamentation is featured on the objects uncovered from the latter 12th – 13th century deposits.

4.2.2c Decoration of side edges

A total of 168 combs (12.8% of 1313 combs complete enough to reveal side edges) feature decoration on the side edges, with 138 stratified specimens deriving from the late 11th – mid 14th century. Table 30 compiling dated combs demonstrates that side edge decoration becomes fairly common in the mid 12th century and remains popular up to the late 13th century. With the exception of the late 13th century, side edge decoration is a decorative feature complementary to ornamentation of the central zone, but we recollect that in the 13th century side edge decoration becomes quite common on the combs with undecorated central zones (Table 27). The early 13th century marks the beginning of changes in comb decorative styles, with an increase in the proportion of undecorated combs and a decrease in the percentage of decorated combs featuring side edge decoration. These tendencies persist into the 13th century, although it is also worth noting that all four dated examples out of the six most heavily decorated combs (ornamented in central zone, sides of comb faces and comb side edges)¹ come from 13th century layers (e.g. B222, B267 and B452 (all Fig. 4.59)).

All variations of side edge decoration are shown in Fig. 4.60. The rarest types are decorations based on repeated chevron motifs, multiple meandering belts formed by V-shaped incisions and ring-and-dot elements, which have been encountered on six objects.

¹ B222, B267, B452, B887, B1167, B1331.

Table 30 Chronological distribution of combs with side edge decoration

Date	Decorated combs		Decorated combs featuring side edge decoration		Combs with side edge decoration		Total of all dated combs
	Number of combs ¹	% of all dated contemporary combs	Number of combs	% of all contemporary combs with side edge decoration	Number of combs	% of all dated contemporary combs	
e.11th C.	36	100.0	0	-	0	-	36
m.11th C.	64	98.5	0	-	0	-	65
l.11th C.	110	98.2	1	100.0	1	0.9	112
e.12th C.	201	97.6	16	94.1	17	8.3	206
m.12th C.	159	91.9	27	90.0	30	17.3	173
l.12th C.	185	85.3	42	93.3	45	20.7	217
e.13th C.	93	64.1	18	69.2	26	17.9	145
m.13th C.	26	39.4	6	60.0	10	15.2	66
l.13th C.	10	21.7	3	42.9	7	15.2	46
e.14th C.	3	12.0	1	100.0	1	4.0	25
m.14th C.	2	16.7	1	100.0	1	8.3	12
l.14th C.	1	10.0	0	-	0	-	10
e.15th C.	6	35.3	0	-	0	-	17
m.15th C.	0	-	0	-	0	-	1
l.15th C.	0	-	0	-	0	-	1
Total	896	79.2	115	83.3	138	12.2	1132

Chevron motifs covering edges from top to bottom are featured on specimens B887 (unstratified object) and B912 (early 13th century), both with undecorated central zones. The latter, unlike most typical combs with somewhat rounded edges, has faces tapering towards sharp edges. When viewed from the side the rib runs vertically through the middle of chevron elements. Sharp edges are featured on late 11th century B684, with linear marginal decoration of the central zone and two pairs of *RDE motifs* adjacent to both sides of sharp edges (variant RDE.Lv (Fig. 4.60)). Late 12th century comb B525 features multiple chevrons, RDE elements, and marginal lines extending from the central zone (L.RDB.IV.H pattern (Fig. 4.52)). Two RDE elements occupy the central zone of the edge outlined by linear incisions, the chevron elements, with the points towards the middle, covering the remaining space towards the comb top and bottom (L.CV.RDE (Fig. 4.60)).

¹ Within the total of 1132 dated combs, 220 are undecorated (see Table 27). From the remaining 912 combs, 16 combs have been excluded due to their poor preservation which makes it impossible to judge whether they were decorated at all (10 specimens), or to identify any specific decorative patterns (6 specimens).

Multiple meandering belts formed by *V-shaped incisions* between pairs of linear incisions (L.IVMB (Fig. 4.60)) enhance the side edges of the late 12th century B1120, with the central zone decorated also with a L.IVMB pattern (Fig. 4.50).

A *saltire* cross executed with double lines in the central zone and outlined by marginal lines extending from the central zones (L.Ft pattern (Fig. 4.50)) is featured on comb B1345. The areas of the side edges outside the centre contain three *RDE* elements linked by oblique linear incisions (L.S.RDE.Lo (Fig. 4.60)).

The most common type of side edge decoration consists of *multiple incisions of oblique lines* carved with a knife to imitate a twisted rope as it appears when seen from the side. This decoration has been encountered on 105 combs (Lo pattern (Fig. 4.60)). A total of 29 combs have side edge decoration combining carved oblique lines with horizontal linear incisions at half of the comb height (L.Lo patterns (Fig. 4.60)) and 28 specimens feature side edges enhanced with horizontal incisions (L patterns (Fig. 4.60)). The horizontal linear incisions are usually cut with a knife and in both L.Lo and L patterns most often link the saw-cut linear incisions incorporated into the decoration of the central zone on both faces. When the grooves of saw-cut lines on the faces happen to be executed at slightly different heights, the linear incisions in the edges are consequently not cut perfectly horizontally (L3 pattern (Fig. 4.60)).

Linear incisions in the middle zone of the side edges occasionally occur on combs with no corresponding linear elements in the ornamentation of the central zone (RDE patterns: B108, B351, B984 and B1346; RDF patterns: B204, B238, B355 and B792), and also on those with undecorated central zones (B99, B162, B175, B233, B312, B590 and B1158). Only one comb in elephant ivory (casual find) belonging to the group of flat rectangular combs (B1143) features multiple saw-cut horizontal incisions covering the side edge from top to bottom.

Almost all combs featuring side edge decoration (with the exception of four poorly preserved specimens) are quantified in Table 31, which shows the correlation of various side edge ornamentations either with different decorative patterns on central zones or with undecorated central zones.

Table 31 The occurrence of different patterns of side edge decoration on combs featuring ornamented and blank central zones

		Side edge decoration									
		L		L.Lo		Lo		Others		Total	
		Number of combs	% of a total of 28 combs	Number of combs	% of a total of 29 combs	Number of combs	% of a total of 101 combs	Number of combs	% of a total of 6 combs	Number of combs	% of a total of 164 combs
Decoration of the central zone	RDE	0	-	4	13.8	11	10.9	0	-	15	9.1
	RDF	1	3.6	3	10.3	36	35.6	0	-	40	24.4
	RDC	0	-	0	-	20	19.8	0	-	20	12.2
	L	2	7.1	0	-	3	3.0	1	16.7	6	3.7
	L+	6	21.4	1	3.4	2	2.0	2	33.3	11	6.7
	L.RDE	0	0.0	1	3.4	0	0.0	0	-	1	0.6
	L.RDB	12	42.9	20	69.0	13	12.9	1	16.7	46	28.0
	others	0	-	0	-	2	2.0	0	-	2	1.2
	no-dec.	7	25.0	0	-	14	13.9	2	33.3	23	14.0
Total	28	100.0	29	100.0	101	100.0	6	100.0	164	100.0	

Table 31 demonstrates that side edge decoration occurs most often on combs with L.RDB and RDF patterns on the central zone, and is fairly common on combs with RDF ornamentation and on undecorated objects. L.RDB patterns reveal the highest correlation with L and L.Lo ornaments of the side edge decorations (e.g. B98 (Fig. 4.34), B462 (Fig. 4.43) and B950 (Fig. 4.17)), Lo edge decoration being fairly common also (e.g. B13 (Fig. 4.43), B390 (Fig. 4.38), B928 (Fig. 4.15) and B944 (Fig. 4.18)). Most often, however, Lo edge decoration occurs on combs with RDF patterns on the central zone (e.g. B931 (Fig. 4.16), B88 (Fig. 4.31), B430 (Fig. 4.32), B56, B77 and B225 (all Fig. 4.47), B222 and B452 (both Fig. 4.59)). RDC patterns also demonstrate a high correlation with Lo edge ornamentation (e.g. B165 (Fig. 4.35), B219, B316 and B321 (all Fig. 4.48), B1088 (Fig. 4.58) and B267 (Fig. 4.59)).

4.2.3 Raw Material

The vast majority of simple combs in skeletal material are made out of antler (1265 items, 95.7%), with ivory (50 combs, 3.8%) and especially bone (6 specimens, 0.5%) providing only a small portion of the bulk of raw materials utilized by comb-makers.

A total of 1132 dated combs in antler, ivory and bone are compiled in Table 32 which demonstrates the predominance of antler practically continuously. The number of simple bone combs is very small and no combs in bone are known

from deposits older than the late 12th century. Their quota increases slightly in the early 13th century, but no bone combs have been found in the layers dated from the mid 13th to the mid 14th century. The late 14th century was the last episode of a recurrence of bone specimens, forming up to 10% of contemporary combs. The 3-4% quota of ivory simple combs drops slightly in the late 11th-early 12th century and again in the early 13th century. All ivory combs older than the 14th century are made out of walrus ivory. No ivory combs have been found in the late 13th - early 14th century deposits. Almost all ivory combs (except those which are too fragmented for precise identification of ivory) from the mid 14th – 15th century layers are made out of elephant ivory.

Table 32 Chronological distribution of antler, ivory and bone simple combs

Date	Antler		Ivory		Bone		Total
	Number of combs	% of a total of contemporary combs	Number of combs	% of a total of contemporary combs	Number of combs	% of a total of contemporary combs	
e.11th C.	35	97.2	1	2.8	0	-	36
m.11th C.	63	96.9	2	3.1	0	-	65
l.11th C.	111	99.1	1	0.9	0	-	112
e.12th C.	202	98.1	4	1.9	0	-	206
m.12th C.	165	95.4	8	4.6	0	-	173
l.12th C.	208	95.9	8	3.7	1	0.5	217
e.13th C.	139	95.9	3	2.1	3	2.1	145
m.13th C.	63	95.5	3	4.5	0	-	66
l.13th C.	46	100.0	0	-	0	-	46
e.14th C.	25	100.0	0	-	0	-	25
m.14th C.	11	91.7	1	8.3	0	-	12
l.14th C.	8	80.0	1	10.0	1	10.0	10
e.15th C.	11	64.7	6	35.3	0	-	17
m.15th C.	0	-	1	100.0	0	-	1
l.15th C.	1	100.0	0	-	0	-	1.0
Total	1088	96.1	39	3.4	5	0.4	1132

It is worth comparing the chronological distribution of simple combs (class 2a), which are the most numerous products from skeletal materials, with the chronological distribution of waste elements in antler, bone and walrus ivory (Table 33). Only four fragments of worked elephant ivory (not included in the table) were found on the probably most wealthy properties in Novgorod. Two trial pieces with randomly applied ring-and-dot motifs derive from the early 11th century deposits on property K (Liudin End), which has revealed substantial evidence of special connections with the Princes of Novgorod, and even of the

possible location there of the residence of Prince Iaroslav the Wise (see discussion below in section 3.5.3). Two other pieces of sawn-off tips of tusks were uncovered in the early 15th century layers on property Д (Nerevsky End), belonging to *posadnik* Iury Ontsforovich.

Table 33 Chronological distribution of waste elements in skeletal materials in the 11th-15th century deposits

Date	Antler		Walrus ivory		Bone		Total
	Number	% of a total of contemporary waste elements	Number	% of a total of contemporary waste elements	Number	% of a total of contemporary waste elements	
e.11th C.	18	66.7	1	3.7	8	29.6	27
m.11th C.	20	80.0	1	4.0	4	16.0	25
l.11th C.	24	52.2	5	10.9	17	37.0	46
e.12th C.	23	71.9	7	21.9	2	6.3	32
m.12th C.	32	72.7	4	9.1	8	18.2	44
l.12th C.	67	55.8	18	15.0	35	29.2	120
e.13th C.	107	76.4	4	2.9	29	20.7	140
m.13th C.	71	71.7	2	2.0	26	26.3	99
l.13th C.	53	68.8	0	-	24	31.2	77
e.14th C.	18	50.0	1	2.8	17	47.2	36
m.14th C.	13	44.8	0	-	16	55.2	29
l.14th C.	14	29.8	0	-	33	70.2	47
e.15th C.	28	35.9	0	-	50	64.1	78
m.15th C.	27	29.0	0	-	66	71.0	93
Total	515	57.7	43	4.8	335	37.5	893

The late 12th- 13th centuries were obviously the period of a flourishing 'bone'-working industry in the town, coinciding with the second peak of the occurrence of simple combs of class 2a. Matters concerned with the production of these combs in the town are discussed in section 4.5.2 below, and at the moment it is worth noting that the 11th early 12th century layers in which over 400 simple combs in skeletal materials were deposited have produced very low numbers of pure waste in antler, bone and walrus ivory.

Antler

Antler simple combs have not been identified to species microscopically. On the basis of preliminary examination by naked eye, they were assigned to groups of 'elk antler objects' or 'probably elk antler objects'. Some distinctive features of elk antler observable on combs, namely the specific texture of woven porous core

and the enormous amount of compact material, make the identification unambiguous (e.g. B1235 (Fig. 4.15), B1227 (Fig. 4.58)). A few combs (20 specimens) feature partially preserved areas of highly characteristic long ‘gutters’ of elk antler outer surface. Some combs without any visible distinctive features of elk antler can nevertheless be unmistakably identified as being of elk antler purely on the grounds of comb size or comb depth. Blanks for simple combs in the Novgorod assemblage which are classified as big or medium sized simply can not have been cut from anything but elk antler. Taking into account the thickness of compacta in antlers of the three species (elk, red deer and reindeer), one can assume that small sized combs consisting entirely of compact material and with a depth of more than 6 mm are also most likely from elk antler (Fig. 4.61).

Table 34 Chronological distribution of small antler combs with low depth

Date	Number of antler combs	Number of small sized combs with low depth	% of small combs
e.11th C.	35	4	11.4
m.11th C.	63	8	12.7
l.11th C.	111	11	9.9
e.12th C.	202	17	8.4
m.12th C.	165	12	7.3
l.12th C.	208	23	11.1
e.13th C.	139	10	7.2
m.13th C.	63	2	3.2
l.13th C.	46	2	4.3
e.14th C.	25	0	0.0
m.14th C.	11	0	0.0
l.14th C.	8	3	37.5
Total	1076	92	8.6

Due to a fairly thin outer layer of compacta and also a highly characteristic sharp border line between compacta and spongy porous core, red deer antler is far from being a perfect material for simple combs, and can provide enough compacta only for small and thin comb blanks. Reindeer antler, being smaller in circumference and flatter, often also curve shaped, even with a wider transition area between the compacta and the spongy inner tissue (which can be partially utilised), can offer material for only small comb blanks, and thus is an inferior medium for manufacturing simple combs (Fig. 4.6).

As was demonstrated above (see section 4.2.1a), the high proportion of small combs occurs in the groups of 11th- early 12th century combs and in the group of

much less numerous late 14th century combs, with the highest quota in the mid 11th century group (Fig. 4.27). A total of 102 antler combs in the Novgorod assemblage are both small sized (S<2478) and have depths (dependent on the available amount of compacta in raw material) of less than 6mm, which can theoretically be indicative of the use of red deer or reindeer antler. The chronological distribution of 92 dated combs is shown in Table 34.

Table 35 The occurrence of decorative patterns on small antler combs with low depths

Decorative patterns	Small sized combs with low depths		Totals
	Number	% of a total with the same decoration	
L	65	13.1	498
L+	10	7.2	139
L.RDE	4	13.3	30
L.RDB	2	1.9	107
RDE	10	6.3	158
RDF	1	1.6	63
no-dec.	10	3.8	265
Total	102	8.1	1260

The highest percentages of small sized combs with a low depth can be seen in the groups of the 11th century combs (with the higher quota in the mid 11th century), among late 12th century specimens, and among late 14th century combs. This compares interestingly with the occurrence of miniature combs found in 12th century deposits, discussed above (see Fig. 4.29).

The correlation between certain decorative styles and combs which may have been made of antlers exotic to the Novgorod environment might help in future when the small sized simple combs are analysed microscopically.

Most of the small sized antler combs featuring depths of no more than 5mm are decorated (90.2%). Table 35, compiling the selected 102 specimens, shows the occurrence of various decorative patterns as well as blank central zones of the combs. When expressed as a percentage of totals of objects with the same decorative style, the numbers are noticeably higher amongst combs featuring either linear patterns (L) or L.RDE patterns.

Both RDF and L.RDB patterns do not appear to correlate with low depth small sized combs, and undecorated combs are rarely found in small sizes. Slightly higher is the percentage of small sized combs featuring RDE and L+ pattern, most of the latter being L.IVMB variants.

Table 36 The occurrence of elk, red deer and reindeer antler elements in antler waste materials.

Date	Antler waste elements						Total
	Elk		Red deer		Reindeer		
	Number	% of a total of contemporary antler waste	Number	% of a total of contemporary antler waste	Number	% of a total of contemporary antler waste	
e.11th C.	16	88.9	1	5.6	1	5.6	18
m.11th C.	15	75.0	1	5.0	4	20.0	20
l.11th C.	21	87.5	0	-	4	16.7	24
e.12th C.	21	91.3	2	8.7	0	-	23
m.12th C.	29	90.6	2	6.3	1	3.1	32
l.12th C.	66	98.5	1	1.5	0	-	67
e.13th C.	101	94.4	0	-	6	5.6	107
m.13th C.	62	87.3	4	5.6	5	7.0	71
l.13th C.	46	86.8	2	3.8	5	9.4	53
e.14th C.	17	94.4	0	-	1	5.6	18
m.14th C.	11	84.6	0	-	2	15.4	13
l.14th C.	11	78.6	1	7.1	2	14.3	14
e.15th C.	19	67.9	3	10.7	6	21.4	28
m.15th C.	23	85.2	2	7.4	2	7.4	27
Total	458	88.9	19	3.7	39	7.6	515

Of course, neither small size, nor low depth (even in combination) speak against elk antler, but the peaks of occurrence of identifiable waste pieces of both red deer and reindeer antler in the early-mid 11th and late 14th – early 15th centuries (Table 36), is another indication for the possible presence of combs in red deer and reindeer antler in some numbers. Whether this hypothesis can be proven or not, is the subject of further research.

Ivory

In the group of 50 ivory combs, 34 objects were identified as walrus ivory, twelve specimens as elephant ivory and four combs with slender rectangular cross-section as ivory (probably elephant ivory). Two of the latter (B481, B594 (Fig. 4.22)) derive from dated contexts of the early 15th century, which also

brings them close to the group of elephant ivory combs both chronologically and stylistically.

A very characteristic feature of elephant ivory combs is their rectangular form (with a few exceptions in trapezoid form with steep sides), elongated in the horizontal plane, and straight sides. Also very characteristic is the high density of fine teeth (10-12 teeth per 10mm) with coarse teeth density around 4-5 teeth per 10mm (e.g. B594, B689, B782, B1221 (all Fig. 4.22)). Unlike some 11th century combs with $tdr > 0.7$, some early 15th century elephant ivory combs feature fine teeth on both sides with little variation in density (e.g. B1200).

A total of seven dated elephant ivory specimens come from mid 14th – 15th century contexts, and all twelve feature a slender rectangular cross-section and either no decoration at all (e.g. B617, B782 and B1221 (all Fig. 4.22)), or simple linear patterns (e.g. B689 (Fig. 4.22), B789 (Fig. 4.2), B814 (Fig. 4.31)) on a wide central zone ($rh > 0.31$).

Among the 16 elephant ivory¹ combs, eight objects come from the Nerevsky site (unstratified finds B552 (Fig. 4.22) and B789 (Fig. 4.2) and specimens B594, B617, B689, B782 (all Fig. 4.22), B711 and B814 (Fig. 4.31) deriving from two properties (properties ДВ, И located to the west of Velikaia Street) and Velikaia Street, two specimens were uncovered on two properties (A and Г) of the Iliinsky site (B1200 and B1221 (Fig. 4.22)) and one (B481) on property K of the Troitsky site, five combs being casual finds (B1133, B1142, B1143, B1144 and B1146).

Walrus ivory combs precede their elephant ivory counterparts and are unknown in layers younger than the mid 13th century (Table 32). Apart from a casual find B1136 (Fig. 4.22) and a comb found in the Duboshin site (Slavensky End), all the remaining combs come from the Troitsky site (eight finds from six properties² e.g. B92 (Fig. 4.15)), the Fedorovsky site (nine finds from three properties: B1017, B1021, B1022, B1023, B1053, B1054, B1055, B1056, B1057 (last seven in Fig. 4.62)) and the Nerevsky site (15 objects³ from six properties and street context (e.g. B523, B527, B528, B551, B553-B555, B557, and B781)) (spatial

¹ Including the four specimens identifies as 'probably elephant ivory'.

² B27, B58, B92, B114, B148, B309, B332 and B333.

³ B523, B527, B528, B551, B553-B557, B563, B564, B574, B745, B781 and B864.

and chronological distribution of walrus ivory combs on these properties is discussed below in section 4.4).

Walrus ivory combs feature certain characteristic morphological traits. They are known in either rectangular ($0.86 \leq dss \leq 1$) or steep sided trapezoid forms ($0.66 \leq dss \leq 0.85$) of either square proportions ($0.9 \leq whr \leq 1.1$) (e.g. B528, B555, B557, B781 (all Fig. 4.63), B1055 (Fig. 4.62)) or (more often) elongated in the vertical plane ($whr > 1.1$) (e.g. B551, B523 (both Fig. 4.63), B1022, B1053, B1056 and B1057 (all Fig. 4.62)). With a few exceptions of medium sized objects (e.g. B1055 (Fig. 4.62)) walrus ivory combs are small sized ($S < 2476$ sq.mm) with widths varying from 23mm to 63 mm and heights from 25mm to 61mm. It is also worth noting that the proportion of miniature combs is high (51.7% of a total of 29 almost complete specimens).

Small size along with straight sides featured on almost all walrus ivory combs are strongly assonant with the attributes of walrus tusks. Morphological characteristics of walrus tusk (apart from secondary dentine which fills the tusk cavity as an animal matures) can rarely be seen due to careful removal during the manufacturing process. Specimens B333, B553 (Fig. 4.63), B556, B557 (Fig. 4.63), B563, B1021, B1022 and B1056 (both Fig. 4.62), however, feature on one face a concave surface of tusk cavity tips, which can be free of secondary dentine even in the tusks of mature animals. The oldest comb in the Novgorod assemblage (specimen B557 (Fig. 4.63)) uncovered in the early 11th century layers on property E of the Nerevsky site, has preserved both a concave surface of cavity on one face and a convex outer surface of tusk on the other face. It well might be a reject, for the comb is far from being perfect in many respects (uneven surfaces, clumsy linear decoration, teeth on both sides cut through the decoration too close to each other and leaving virtually no central zone). Most combs, however, reveal only a marble-like texture of secondary dentine, making them unambiguously identifiable as walrus ivory (e.g. B523, B551 (both Fig. 4.63), B574, B1023, B1053, B1055 (all three Fig 4.62)).

Walrus ivory combs have a lentoid cross-section of medium depth ($\sim d = 5$ mm, $\sim rd = 0.10$). The density of coarse teeth varies from 4 to 8 teeth per 10mm (average 6 teeth per 10mm), with fine teeth varying in density from 6 to 13 teeth per 10mm (average density 10 teeth per 10mm). The degree of division in density

between coarse and fine teeth (*tdr*) varies from 0.44 to 0.83 with the average division (*tdr*=0.62) being less pronounced than the overall assemblage average coarse to fine teeth density ratio (*tdr*=0.54).

A very characteristic feature of walrus ivory combs is the occurrence of only two patterns on a narrow central zone ($\sim rh(walrus)=0.14$ versa $\sim rh=0.21$, Table 24). With only one specimen (early 13th century B574) featuring a blank central zone, a total of 24 combs (72.7% of all decorated objects) are decorated with linear incisions running parallel to the tooth bases (predominantly in L1 variant (Fig. 4.50) (e.g. B523, B527, B555 and B781 (all Fig. 4.63), B1022, B1053, B1054 and B1055 (all Fig. 4.62). Nine specimens (27.3%) are enhanced with RDE3 patterns, combining three large motifs with a number of small motifs (Fig. 4.53) (e.g. B528, B551 and B554 (all Fig. 4.63), B1023, B1056 and B1057 (all Fig. 4.62). RDE patterns are unknown on the 11th century objects and, up until the late 12th century, are outnumbered by the L patterns by the factor of 1:3, becoming almost as popular as linear patterns in the late 12th-13th century. Density division even on contemporary specimens is more pronounced on combs with RDE decoration (*tdr*=0.5-0.6) than on their counterparts with linear ornamentation (*tdr*=0.6-0.7).

Outside of Novgorod, three simple walrus ivory combs of the styles described above are known only from Pskov¹ and Rytic Gorodishche². Pskov comb with L2 decoration derives from the late 12th - early 13th century context. Two specimens from Rytic Gorodishche with L1 decoration (judging from the pronounced tooth density division (*tdr*=0.5)) can be dated to the latter 12th century. Another example of 'probably 11th century walrus ivory comb' from Trondheim is only referred to by C.D.Long without either a description or a depiction of it (1975, 26-27).

One miniature comb, a casual find B1136 (Fig. 4.22), despite being made out of walrus ivory, stylistically belongs to the younger group of elephant ivory combs. It has a slender rectangular cross-section, a wide central zone, a very pronounced division in the density of coarse and fine teeth and is probably dated to the 15th century (earliest).

¹ Unpublished material: ПЛ-89-ХІ К23-19.4-13 №90

² B1174 and B1175 in database B.

Bone

The paucity of simple combs in bone in the Novgorod assemblage clearly shows that the raw material was inferior for manufacturing combs of class 2a, and with locally available elk antler being in abundance, skeletal bone was not sought-after by comb-makers.

Four combs come from late 12th - early 13th century (B206, B213, B216) and undated (B214) contexts on two neighbouring properties (M and H) in the south-west of the excavated area on the Troitsky site, one comb being uncovered on each of the Fedorovsky (early 13th century B1089) and the Nerevsky (late 14th century B547) sites. Specimens B214 and B547 have undecorated central zones and poorly preserved comb B1089 was probably undecorated too. The remaining three late 12th - early 13th century combs (B206, B213, B216) feature RDE ornamental patterns. Bone combs tend to have straight ends, have trapezoid or rectangular forms elongated in the vertical plane, and be small sized with medium or low depth.

4.3 Review of the Main Stylistic Groups of Class 2a Combs with Comparative Analyses of Assemblages from Contemporary Sites in and outside Russia

Strikingly, simple combs in skeletal materials appear simultaneously in Northern European lands around the Baltic at the turn of the 11th century and steadily gain their favour over combs of composite construction in the course of the 11th and early 12th centuries. In Novgorod, simple combs of class 2a appear to have become as common as single-sided composite combs by the mid 11th century. By the late 11th century they outnumbered by far their counterparts of composite construction, to reign almost completely in the early-mid 12th century.

The analysis of morphological traits of class 2a combs has revealed certain tendencies of predominant trends characteristic for different chronological periods. Single traits can be similar in chronologically different comb groups, but the combination of certain characteristics appears to be unique and thus chronologically distinctive. These characteristics are comb size, forms and

proportions, relative height of the central zone and its decorative styles (ornamental patterns or absence of these), line and decoration of comb sides and the difference in gauge between coarse and fine teeth.

Four periods, which partially overlap chronologically, can be distinguished with characteristic repertoires of simple comb forms and decorative styles: First Period (1000-1140), Second Period (1130-1250), Third Period (1230-1350) and Fourth Period (1340-1450).

First Period (1000-1140)

The earliest comb material from Novgorod (up to and including the early 12th century) reveals a range of forms and decorative styles which are totally in accordance with the assemblages from elsewhere.

The vast majority of the earliest combs are of small or medium-sized rectangular or trapezoid forms with steep straight sides and feature *linear decorations* along the margins of central zones, these tending to be medium or wide. A very characteristic trait prevailing on these combs is a fairly low tooth density division ($tdr=0.6-0.7$), which is typical for Northern (Balto-Scandinavian) tradition.

Of all variations of L patterns L1, L2 and L3 dominate with L2 patterns (Fig. 4.28) most common in the early-mid 11th century and L3 pattern (Fig. 4.15, 4.28 and 4.39), prevailing in the late 11th-early 12th century, L1 pattern being also fairly common throughout the period (all Fig. 4.33). Other variants of L patterns, including those with linear incisions covering the whole height of the central zone, with (e.g. L3x3x3, L3x2x3) or without (L(No.)¹ patterns) (Fig. 4.63) gaps, are encountered less frequently.

L1, L2 and L3 patterns are also the most common types of decoration in the 11th-12th century assemblages from other sites around the Baltic, with other patterns being known as well. The most numerous collection as well as the best production evidence come from Schleswig, where these combs are encountered in antler and bone (Ulbricht 1984, Taf. 22: 4, 5; 23: 1-3, 6, 7, 9, 10; 26: 3; 25: 5; 61: 3, 7, 11-13). Similar objects are known from other sites in the Southern Baltic

¹ A bracketed number next to the letter L in the code indicates the number of lines covering the whole height of the central zone (see Fig. 4.50).

further east in the Mecklenburg area (Lampe 1981, 177, Abb 7ab, 8. 9a) and in Gdansk (Hilczerowna 1961, 116, Ryc. 51), as well as further north in Jutland, in Ribe (Andersen 1986, 31, Fig. 11b, 12ab; 33, Fig.14a) and Århus (Andersen and Madsen 1985, 70-73, Fig. 40:JT). In the Scandinavian peninsular, combs of similar proportions and decoration have been found in Oslo (Wiberg 1987, 418, Fig. 4: g), Lund (Persson 1976, Fig. 291: 29C, 31C; 292: 37C, 40C, 42C, 43C) and Tommarp (Thun1967, 84, Fig. 28: b, d) in Skåne, as well as in Nyköping, Söderkoöing, Örebro and Lödöse in Central Sweden (Broberg and Hasselmo 1981, 72-85, Fig. 49: 7; 53: 3, 6; 63: 1, 2; 64: 7). They are also present in the assemblage from Gotland (Thunmark-Nylén 1991, 119, Bild 12).

These combs are well known from chronologically similar deposits in the areas to the east of the Baltic, from Ostepää and Tartu in south-east Estonia (Luik 1998, Plate II:3, Fig. 25, 26, 28) and further east as far as Suzdal (see map in Fig. 4.64) (Sedova 1997, Fig. 19:7; 21:11; 24:18; 29:12; 41: 4, 7; 42:5) and Sarkel - Belaia Vezha (Old Rus name of the town that succeeded Sarkel (see map in Fig. 3.69)) (Artamonov 1952, 58-63, Fig. 12) in the Rus lands. Combs of these stylistic groups have been found in many Russian settlements with preserved 11th-12th century layers such as Novogradok (Gurevich 1981, 33, Fig. 21:2), Staraiia Ladoga (Davidan 1962, Fig. 4:6), Rytic Gorodishche (Verkhorubova and Shorin 1985, 55, Fig. 2:3)¹, Beloozero (Golubeva 1973, Fig. 13:6; 62: 9, 11, 12) Riazan (Darkevich and Borisevich 1995, Table 6: 8; 69: 1, 2; 99: 6; 103: 5-7; 104: 7) and Kiev (Shovkopliias 1954, 31, Fig.2), as well as in some burial grounds in the North Rus lands such as Nefed'evo, Nikol'skoe Krokhinskie Peski eastwards of Lake Onega with 11th-13th century burials (Makarov 1990, 56, Table XV: 5, 11, XXV: 7; Makarov 1997, Table 131: 8, 36; 140: 16, 17).

With the majority of the combs under consideration having lentoid cross-sections of medium and high depth, there is a certain proportion of combs with a very high depth and a rhomboid cross-section found commonly on contemporary combs in the assemblages from the Southern Baltic and Scandinavia (see above '*Cross-section*' in section 4.2.1a). Rhomboid or lentoid cross-sections can be also observed on combs featuring **L.Ft patterns** on central zones, combining marginal linear incisions with a fillet, a decorative element formed as a convex moulding carved in between the lines (Fig. 4.3, 4.21, 4.29, 4.39, 4.42 and 4.58).

¹ See also B1178-B1181 in Database B.

These are fairly common among the 11th-early 12th century combs in Novgorod, but unknown from other Russian towns, with the exception of Rytic Gorodishche where two combs featuring a combination of a fillet with marginal lines have been found¹. L.Ft patterns, however, are frequently encountered on contemporary combs from Schleswig (Ulbricht 1984, Taf. 24: 2, 3; 25:1; 26: 1, 4; 61:8; 62: 3, 5, 7-9; 63: 1, 3, 4), Ribe (Andersson 1968, 31, Fig. 11a), Trondheim (Long 1975, 26-7, Fig. 9:k), Lund (Mårtensson and Wahlöö 1970 1970, 61, Fig. 84; Persson 1976, 320-28, Fig. 289:18C; 291: 23C, 33C; 292: 38C, 39C, 41C) and Gotland (Thunmark-Nylén 1991, 119, Bild 12). Characteristically, in the Schleswig assemblages the number of combs with fillets is higher in the collection from Plessenstraße (11th-12th century deposits) than in the one from 'Schild' (11th-14th century deposits). The latter, however, had produced a few specimens featuring an L.Ft pattern on one face and an L pattern on the other (Ulbricht 1984, Taf. 24:2; 26:4).

Specimen B1227 (Fig. 4.58) combines L.Ft and L.RDE patterns on its faces, which indicates the occurrence of both patterns on contemporary combs. **L.RDE patterns**, as was shown above (section 4.2.2a), are practically unknown on the Novgorod combs younger than the 11th – early 12th centuries (Fig. 4.3, 4.39 and 4.43), although even then they formed only a small portion (11-14% in the early-mid 11th century and 3-4% in the late 11th – early 12th centuries) of contemporary combs decorated predominantly with L patterns. Parallels to these combs are known in Schleswig (Ulbricht: Taf. 25:3; 62:4; 63:5), Söderkoöing in Central Sweden (Broberg and Hasselmo 1981, Fig. 53:4), Tartu in south-east Estonia (Luik 1998, 48-9, Fig. 27), as well as in Novogrudok (Gurevich 1981, 66, Fig. 51:6) and Pskov (Kharlashov 1994, 57-59, Fig. 17:7) in west and north-west Rus.

L.RDB patterns are encountered on very few early combs in Novgorod, mainly in L.RDB2x2x2//1 (Fig. 4.43), L.RDB2//1 and L.RDB4//1 variants (Fig. 4.39 and 4.52), which find parallels in Schleswig (Ulbricht 1984, Taf. 26:2), Polish Kruszwica (Hensel and Broniewska 1961, 77-79, Ryc. 57:c), insular areas of Mecklenburg (Lampe 1981, Fig. 7:c; 8, 9:b) and Uppsala (Broberg and Hasselmo 1981, Fig. 59:2).

¹ B1182 and B1183 in database B.

Around the mid 11th century new **L.IVMB** patterns appear to have become popular (e.g. B434, B946, B149 (all Fig. 4.44)). These either combined along the margins lines with meandering belts formed by V-shaped incisions carved alternately between a pair of lines (L.IVBM2//1, L.IVBM4-6//1 variants), or have a single meandering belt in a free zone of the central zone outlined by marginal lines (L.IVMB3x2x3//(1) variant) (Fig. 4.50). This type of ornamentation, often incorporated within the intricate interlaced decoration, was widely exploited in the Nordic tradition of decoration of a variety of objects, including combs of class 1 and spoons (see above sections 3.2.2a, 3.3). Simple combs with this decoration, however, are practically unknown outside the Old Rus lands: there is one comb in the Plessenstraße assemblage from Schleswig¹, one from Polish Kruszwica (Hensel and Broniewska 1961, 77-79, Ryc. 57:d) and one fragmented comb from the western part of Estonia (Luik 1998, 56-57, Fig. 35), the latter two featuring variants of the pattern which in Novgorod are found commonly in the latter 12th – early 13th century.

Combs enhanced with the early **L.IVMB** patterns have been found in many Russian medieval towns such as Kiev (Shovkoplias 1954, 31, Fig. 2) and Vshchizh² in the south, Belaia Vezha in the south-east (Artamonov 1952, Fig. 12), Suzdal in the north-west (Sedova 1997, Fig. 24:20, 66:7), and Rytic Gorodishche (Verkhorubova and Shorin 1985, 55, Fig. 2:1)¹ in the north-west.

Second Period (1130-1250)

The Second Period can be rightly called the hey day of making simple combs from skeletal materials. It was the time of the emergence of local styles which constantly gained in popularity and eventually all but forced out designs predominant during the First Period. The Second Period coincides with the Novgorod independence from Kiev and with the emergence of the *boyars'* state system. Concerning the comb repertoire, a few characteristic tendencies of this period should be mentioned here. With regard to forms, a continuous trend towards trapezoid forms and away from rectangular forms occurs throughout the whole period (Fig. 4.10-4.11), with the comb sides becoming less steep. Steadily growing numbers of concave sides which by the late 12th century were as popular

¹ Unpublished find. It is with much gratitude that I thank Dr. I.Ulbricht from Schleswig-Holsteinisches Landesmuseum for the opportunity to work with the collection.

² Vshchizh-1948, 1115/2086. Unpublished. Materials from the archive of A.F.Medvedev.

as straight ones, by the early 13th century became even more common (Table 18). With the increasing numbers of large sized combs the latter trend can be also seen as a result of adaptation of the forms of locally available elk antlers to the needs of comb-makers. Growing demand for simple combs would force the craftsmen to optimise the utilisation of antlers by means of using not only traditionally valued parts of beams right above the burrs, but also upper parts of beam expanding into the palm (Fig. 4.61).

Another trend is that the average difference in gauge between the fine and coarse rows of teeth becomes more and more marked ($tdr=0.4-0.5$). Although there are still certain designs revealing adherence to the Baltic-Scandinavian tradition of moderate tooth density division ($tdr\geq 0.6$), there appear styles with a classical (Southern, i.e Byzantine) ($tdr\leq 0.5$) high tooth density ratio. Comb teeth become noticeably longer at the expense of the height of the central zone (relative height designed mainly on modules 1:6 and 1:5, Table 26).

In the course of the 12th century one can see a decline in the proportion of combs featuring L patterns (Table 4.29). Amongst those, L1 variants of linear patterns with single lines along the tooth bases outlining a narrow (modules 1:6, 1:10) central zone become most common (66 dated specimens plus another 25 undated combs) and can be called a local (NW Russian at least) variety of L patterns, the Baltic-Scandinavian legacy being retained in a less marked difference in gauge between the fine and coarse rows of teeth. L1 patterns on narrow central zones can be seen on antler and walrus ivory combs (Fig. 4.15 and 4.62). Combs of similar style are known in Pskov², Soontagana (west Estonia) (Luik 1998, 47-48, Fig. 24) and Rytic Gorodishche, which once again became the residence of the Princes of Novgorod from the early 12th century onwards³.

A distinctively numerous group of 83 combs (67 dated specimens) decorated with L.RDB.IV (II, IU) patterns (Fig. 4.15, 4.17, 4.18, 4.34 and 4.43), quite often also with side edge decoration (see above section 4.2.2c), appears to have been designed locally, parallels at least being unknown outside the Novgorod State. These products have been found in Pskov (Kharlashov 1994, 59, Fig.

¹ B1185 in database B.

² Unpublished material: ПЛ-89-XI K23-19.4-13 №90

³ B1174, B1175 and B1184 in database B.

18:3), Staraja Ladoga (Davidan 1962, 102-103, Fig. 4:9), Staraja Russa¹ and Rytic Gorodishche². Moderate tooth density division ($tdr \geq 0.6$) is characteristic for combs of this group. It is possible that the decoration has its roots in some L.RDB patterns, which were popular from the late 10th century in the areas around the Baltic, where they were commonly encountered on single-sided composite combs prior to the time when simple combs were introduced and became noticeable in the comb repertoire (see sections 3.2.2, 3.3 and 3.5).

L.IVMB patterns, which appear to have originated somewhere in the Old Rus lands, were known in the town in the First Period. In the Second Period new variants of the patterns became popular in Novgorod, which were probably refashioned in the town (44 dated specimens and 12 undated combs). Unlike early 'breathy' L.IVMB patterns executed on a medium wide central zone (module 1:5), later L.IVMB patterns (variants L.IVMB2-3//(1) (Fig. 4.28 and 4.44)), and L.IVMB.H3//(1)//1) characteristically cover all the space of a narrow central zone (module 1:6, 1:10), but combs with this ornamentation retain their affinity to the 'Northern' tradition of moderate tooth density division ($tdr = 0.6-0.7$). Objects of this group very rarely feature additional intensive decoration on the side edges (L.IVMB and L.Lo). Combs decorated with later variants of L.IVMB patterns are known also in Staraja Russa³ and in the burial grounds eastwards of Lake Onega (Makarov 1990, 206 Table XXI: 22).

The Second Period is also marked by the emergence of some original Novgorod designs, distinctive Novgorod style combs, known outside the metropolis only in Staraja Ladoga (Davidan 1962, 102-103, Fig. 17:10), Staraja Russa (see the footnote referred to in the previous paragraph) and Rytic Gorodishche⁴. Singular combs belonging to the group of rare finds are also known in the burial mounds in the Kostroma Volga region, which are believed to have been left by the colonists from the Novgorod lands (Ryabinin 1986, 85, 101, Table VII: 18). Most numerous and variable are combs decorated with **RDE patterns** (all variants of **RDE3** pattern in particular) and combining three (rarely four or five) big motifs with a number of smaller motifs. This group is, so to say, a genuine localism in

¹Unpublished material from the excavations of the 1960s-1990s by A.F.Medvedev and V.G.Mironova (NGM; and NGM(SR) affiliate)

² B1186 and B1187 in database B.

³Unpublished material from the excavations of the 1960s-1990s by A.F.Medvedev and V.G.Mironova (NGM; and NGM(SR) affiliate).

⁴ B1189 in database B.

the simple comb repertoire revealing a very hybrid mixture of morphological traits (raw material, outline). In a total of 155 combs assigned to this group 143 objects (92.3%) are made of antler, nine of walrus ivory (5.8%) and three (1.9%) of bone, the quotas of the latter two raw materials being higher than in the whole assemblage and in any other stylistic groups (see section 4.2.3).

RDE combs feature the most diverse range of straight or concave sided rectangular and trapezoid forms of various proportions (Fig. 4.57) and sizes, from miniature (Fig. 4.59, 4.63) to large. Although the majority of RDE patterns are executed on narrow central zones (of most commonly module 1:6 and 1:10) (Fig. 4.17, 4.18, 4.30 and 4.32), about 20% of them feature medium wide central zones (module 1:5) (Fig. 4.32 and 4.46). Both moderate ($tdr \geq 0.6$) and marked ($tdr = 0.3-0.5$) tooth density division can be seen on the combs of this group.

About 9% of RDE combs feature side edge decoration, which is most often a Lo type (Fig. 4.32 and 4.46). An L.Lo type of side edge decoration which occurs on some mid 12th century combs highlights the hybrid nature of combs of this group. L.Lo side decoration, obviously designed for combs with linear incisions incorporated into the decoration of the central zone on both faces (L., L+, L.RDB patterns), looks odd on specimens with no corresponding linear elements in the ornamentation of the central zone. The plausible explanation of this phenomenon is that L.Lo side decorations were simply copied from other popular types of combs.

RDE combs reveal the highest percentage of irregularities in decoration (35 combs, 22.6%), from ornamental asymmetry (Fig. 4.18 and 4.46), and noticeable variations of patterns on the comb faces, to inaccuracy in the execution of ornamental elements (Fig. 4.32). Faulty decorations are most noticeable in the later stages (late 12th –13th century) where they account for up to 27% of contemporary examples.

Finally, a standard RDE pattern is featured once on an early 13th century long-toothed double-sided comb B995 (Fig. 4.65), which appears to be a local copy of a foreign product (see ‘Long-toothed combs’ below in this section).

Combs with **RDF patterns** appear in the town a little later than RDE-patterned combs and are most likely derivative from the RDE designs. These feature most

often basically the same three larger motifs as centres of floret compositions, shaped by the lavish application of the smaller motifs. RDF patterned combs have stable morphological features: trapezoid forms (Fig. 4.57) with evenly curved concave sides of medium or big sizes, a medium wide central zone (modules 1:5, 1:4, 2:7) and an invariably clearly denoted difference in gauge between the fine and coarse rows of teeth, often marked with guidelines ($tdr=0.3-0.5$) (Fig. 4.16 and 4.47).

Examples featuring either straight sides (Fig. 4.47), or small size (Fig. 4.47), or a narrow central zone (module 1:6) (Fig. 4.47 and 4.59), are rare exceptions.

Most combs in this group of 63 objects are additionally enhanced with side edge ornamentation (41 specimens from a total of 63, 65.1%), which is predominantly (38 combs, 92.7%) Lo decorated. There are, however, a few combs featuring (similarly to some RDE patterned combs) a rather strange occurrence of L.Lo ornamentation on the edges, most probably mechanically copied from other designs with corresponding linear elements in the ornamentation of the central zone.

Although the percentage of ornamentally faulted combs is not as high as in the group of RDE patterned combs (9 examples (14.3%)), it is still higher than in other groups, ornamental asymmetry being the most common defect in decoration (Fig. 4.47 and 4.59). As with RDE patterned combs, those with RDF ornamentation have been found almost exclusively within the state of Novgorod in the dependent towns of Staraja Russa¹ and Staraja Ladoga (Davidan 1962, 102-103, Fig. 4:10) and in the Princely residence on Rytic Gorodishche². This type is also known in Suzdal dependent Beloozero, situated close to the north-east frontiers of the Novgorod state (Golubeva 1973, 169-172, Fig. 62:7, 8) (see map in Fig. 4.66).

RDC patterned combs with a most lavish carpet style ornamentation, covering almost all space of the central zone terminate the evolution of combs with ring-and-dot decoration. They are most common in the late 12th –13th centuries and demonstrate a standard range of distinctive traits (Fig. 4.35, 4.48, 4.58 and 4.59).

¹ Unpublished material from the excavations of the 1960s-1990s by A.F.Medvedev and V.G.Mironova (NGM; and NGM(SR) affiliate).

² B1188 in database B.

These combs are large sized (more rarely medium sized (Fig. 4.48)) and of trapezoid outline, often with a convex bottom edge. The concave sides feature the emphasised curve in the upper part of the comb height, resulting in a somewhat bulbous upper end which sticks out. Occasionally the side line adopts an additional twist towards the bottom end which sticks out as well. Medium wide or wide central zones (modules 1:4, 2:7, 1:3) are often marked out by guidelines denoting the height of rows of coarse and fine teeth with marked difference in gauge ($tdr=0.3$). Finally, up to two thirds of these combs feature Lo ornamentation on the side edges.

Certain irregularities in decoration are registered on up to 20% of these combs, but most of them concern ornamental differences on the comb faces (Fig. 4.58). Although RDC patterned combs of similar forms are known in the 13th century layers of other Old Russian towns such as Smolensk (Astashova 1993, 57) and Suzdal (Sedova 1997, Fig. 66:6), the patterns there, which form various figures, are more 'airy' with a less intense use of RD elements. Parallels to Novgorod combs with central zones brimful with RDC decoration have been found in Pskov, which was at this stage semi-dependent on Novgorod (Kharlashov 1994, 57-59, Fig. 17:10).

The Second Period in the history of class 2a comb occurrence in Novgorod is also marked with the presence of combs recognisable as being unique, one-off objects, or simply being stylistically alien to the mass of common designs. Among the unique foreign objects should be mentioned a latter 12th century specimen B816 (Fig. 4.45) with inlaid metal strips in the grooves of marginal incisions. Certain distinctive features, such as a rectangular form elongated in the vertical plane with evenly concave sides, a rhomboid cross-section, ornamental patterning combining metal sheeting, fillet element and ring-and-dot bands with incorporated oblique tangential lines, suggest that the object was brought into town (property E the Nerevsky End) from the Baltic lands around Jutland and Southern Scandinavia (Ulbricht 1984, Taf. 25: 6-6a, 63: 2,6; Thun 1967, 84, Fig. 28:c).

Comb B1015 as well as, probably, a casual find B1166 (both Fig. 4.49) with exquisite foliate decoration flanked by marginal linear incisions were most likely brought from the lands somewhere east of Novgorod. Parallels to these combs are

known in Suzdal (Sedova 1997, Fig. 66:3) and Belaia Vezha (Artamonov 1952, Fig. 12).

Eight bone combs with extremely long teeth (Fig. 4.65) deriving from the late 12th - 14th century layers of Novgorod, which were omitted in the analysis above, deserve special consideration.

Long-toothed combs

High rectangular long-toothed combs are a very distinctive type of simple comb which became common in Baltic countries in the 12th century and remained noticeable in the comb repertoire up to the 14th century. These combs are cut from long bones, most often from the metapodials of cattle and horses, and can be both single- and double-sided (with additional row of short fine teeth), although the former type is more common. Many specimens have no decoration at all and L3-5 patterns are most popular, often with an additional saltire motif between linear incisions or (less frequently) ring-and-dot motifs. It is not uncommon to see a suspension hole, either drilled or as an adaptation of the natural foramina (a characteristic of cattle metapodials).

The function of long-toothed combs is not absolutely clear. The spectra of identifications is wide ranging from implements used in tapestry weaving (Prof. B. Almgren (MacGregor 1985, 190)), wool carding tools (Roes 1963, 28), to ripples (Westhusen 1958, 199-200) and even tools used for pottery decoration (Luik 1998, 133). A few experts have argued that long-toothed combs are just cheap objects for combing hair (Birk Hansen 1978, 88; Ulbricht 1994, 42-43; Richter 1990, 39).

The most numerous collections of these combs are known from the towns in the kingdom of Denmark and the coastal parts of North Germany, where they survived well into the 15th century (Arbman 1939; Birk Hansen 1978; Gralow 1988; Lampe 1981, Persson 1976; Richter 1990; Schoknecht 1986, 1992, 1994; Ulbricht 1984; Westhusen 1958) and from where they probably spread out among the Hanseatic urban communities around the northern and eastern Baltic at this time (Caune 1983; Cnotliwy et al 1983; Gihl 1927; Luik 1998; Zerpe 1989). For some reason, however, these objects have never been treated as an

index of cultural exchange with mercantile communities across the Baltic Sea and beyond.

It is hardly coincidence that the earliest long-toothed combs in bone, a material very rarely seen on combs in the Novgorod assemblage, appear in the town in the late 12th century, exactly around the time when German merchants based on the island of Gotland monopolised the trade between Novgorod and European countries (Rybina 1986, 26-56).

The numbers of long-toothed combs in Novgorod are very low in comparison with other Hanseatic centres in the eastern Baltic, such as Tallin (Luik 1998, 127-128, Fig. 115-119), Tartu (Luik 1998, 129-131, Fig. 120-123) and Riga (Caune 1983, 93-116, Abb. 8:14-15; 18:15-18; 39:11), with a much lesser scale of excavation. Similarly, it has been argued that imported ceramics from western Europe account for a tiny percentage of the overall ceramic corpus collected from medieval Novgorod in contrast to other urban sites in the eastern Baltic where the imports make a far greater numerical impact and even dominate the local ceramic market in some instances (Brisbane et al 1999).

Long-toothed combs derive from the sites situated within the Liudin (B8, B130, B171 from the Troitsky site), Nerevsky (B778 from the Nerevsky site and B1315 from the Tikhvinsky site), Slavensky (B995 from the Duboshin site and B1268 from the Il'insky site) and Plotnitsky (B1058 from the Fedorovsky site) Ends of the town. It is worth noting that all three sites in the Trade side of the town are located in a fairly close proximity to the two substantial communities of western merchants and artisans in the Gotland quarter (complete with a Church of St. Olaf) and the German quarter (complete with a Church of St. Peter).

Seven long-toothed combs from Novgorod excavations feature quite standard forms and decorations, whereas an early 13th century specimen B995 (Fig. 4.65) has a traditional Novgorod style decoration (RDE3 pattern) highly unusual on long-toothed combs. It is debatable, however, whether the object is a hybrid local product combining foreign forms and conventional decoration or an imported blank object with secondary decoration made on the spot. The latter option seems possible, since the practice of completed decoration applied on prefabricated boxwood combs has been argued to take place in Novgorod in the 13th-14th centuries (see section 5.5).

Third Period (1230-1350)

The Third Period marks the decline of the class 2a comb-making tradition. L1 (and others), IVMB, RDE, RDF and RDC patterned combs were still in use, but they appear to be residual products from the Second Period. Certain changes in aesthetic tastes can be traced back to the first decades of the 13th century. Around the mid 13th century undecorated combs became predominant in the comb repertoire, and by the late 13th century they comprised no less than 75% of all contemporary simple combs.

The most characteristic products of this period are medium and large-sized combs, which are of almost identical forms to RDC and RDF patterned trapezoid combs with concave sides (Fig. 4.16, 4.19, 4.20 and 4.35). Like their lavishly decorated counterparts of the earlier period, undecorated trapezoid combs have a marked difference in density of coarse and fine teeth and usually a medium or wide central zone, often with visible guidelines denoting the height of teeth, however, combs with narrow central zones are not uncommon either (Fig. 4.35). Like RDF and RDC patterned combs, some combs with undecorated central zones feature side edge decoration of Lo (Fig. 4.35 and 4.41) or L types, but this is encountered on no more than 8% of objects.

Another noticeable trend is a reappearance of rectangular and steep-sided trapezoid forms (Fig. 4.11-4.12) featuring more gentle curves of the sides (Fig. 4.17 and 4.19).

Occasionally these combs carry secondary scratched decoration applied in a rather careless manner, or an accurately carved owner's mark (Fig. 4.41) which on specimen B1325 happens to be a Prince's emblem.

It might well be that simplification of the simple comb production was a result of an all-Russian crisis during the latter 13th century in connection with the Tartar invasion. At least similar forms of large and medium sized trapezoid combs with concave sides are known not only in Pskov (Labutina 1983, 21 Fig. 11: 1), Rytic Gorodishche¹ and Staraiia Ladoga (Davidan 1962, 102-103, Fig. 4:7,11), but in a number of Russian towns such as Beloozero (Golubeva 1973, 169-172, Fig. 15:13; 62:6), Smolensk (Astashova 1993, 72), Pronskoe Gorodishche near

Riazan², Vshchizh near Chernigov³, Belaia Vezha (Artamonov 1952, Fig. 12) as well as in some burial grounds in the North Rus lands eastwards of Lake Onega (Makarov 1990, 56, XXVI: 23, XXVII: 9). Outside Russia similar combs have been found in Tartu (Luik 1998, 50-51, Fig. 32) and Ostepää (Luik 1998, 50-51, Fig. 30) in south-east Estonia.

Fourth Period (1340-1450).

Only very low numbers of simple combs in skeletal materials are known from this Period, which coincides with the last stages of the greatness of the Novgorod Republic, at the height of its fame and on the threshold of the tragedy of its lost independence from the powerful Moscow Principality. The Black Death epidemic which badly hit Novgorod, Pskov, Smolensk and other towns in the west and north-west of Russia in 1350-1351, may have contributed to the further decline of the industry. It is also probable that most combs of this period were made out of horn. The paucity of simple combs can be due to the fact that the celebrated waterlogged cultural deposits of Novgorod, which preserve well most organic materials, relentlessly destroy keratins.

Antler combs, which still outnumber their counterparts in bone and ivory, have predominantly undecorated medium wide (module 2:7) central zones, and are most often encountered in rectangular forms with gently curved or straight sides (Fig. 4.16). Guidelines often mark the height of two rows of teeth with a marked difference in gauge. In contrast to the Second and Third period, combs of trapezoid forms are few and feature somewhat convex sides (Fig. 4.13). Occasionally, antler combs of this period carry secondary scratched decorations.

Around the late 14th century, flat rectangular combs in elephant ivory appear on some of the most wealthy properties of the town. Similar combs (in bone and ivory) are known in many Western European towns where they usually are dated from the beginning of the 15th century onwards (Ambrosiani 1981, 128-131, Fig. 80:3; Dunlevy 1988, 370-371; Luik 1998; MacGregor 1985, 81-82; Margeson 1993, 65-68; Sarfatij H. 1990, 111; Ulbricht 1984, Taf. 62:2), although a recent find from Southampton is dated to the 1380s by the excavator (Andrew Russel,

¹ B1176, B1177, B1190 and B1191 in Database B.

² RGM 514/2 (from the archive of A.F.Medvedev).

³ Vshchizh-49, 1149/10867 (from the archive of A.F.Medvedev).

personal communication). Stratified flat elephant ivory combs have been uncovered in Pskov in much higher numbers than found in Novgorod (Kildiushevsky 1983, 109, Fig. 3: 30)¹. It seems plausible that these combs were brought into town by foreign or local merchants involved in Hanseatic trade.

4.4 Chronological and Spatial Distribution of Simple Combs of Skeletal Materials in Novgorod Properties.

Simple combs of class 2a are unevenly distributed within excavated areas of Novgorod. In Table 37 the finds are compiled and quantified by excavation site; there are also areas of the sites and indices of concentration showing the number of finds per 100 sq.m. With the average for Novgorod concentration of finds being five to six finds per 100 sq.m, one can see somewhat varying figures of indices for the sites and the Ends. The indices of concentration cannot be taken at face value in the case of class 2a combs, since the chronological margins of their occurrence are very wide and only a very few sites represent the whole sequence of the relevant deposits. In fact, only the Nerevsky and the Troitsky sites can be compared directly, being fairly equal in both the scale of excavation and the chronological sequences. The two major sites, however, represent different eras in the long history of large scale excavations in the town and, as was already discussed above (see Chapter 3, section 3.4), the higher concentration of finds on the Troitsky site is most likely a result of improved methods of excavation practised during the 1970s-1990s compared to the 'speedy' large scale excavations of the 1950s-early 1960s.

The depth of cultural layers could be taken into consideration if the intensity of their deposition was proven to be approximately equal for different parts of the town and different chronological periods. The intensity of deposition of waterlogged cultural remains varies within the town and within chronological sequences on the same sites. It has been argued (Kolchin and Yanin 1982, 55; Gaidukov 1997, 66) that in some areas of the Slavensky End a natural depression around a stream, which was enclosed in a drainage pipe-line referred to as 'The Pipe' in the 16th century written sources, caused a more intensive deposition of

¹ 27 combs have been identified as elephant ivory by the author. I am grateful to the former head of the Pskov Archaeological Unit (PGM) E.E.Koroleva for the opportunity to work with unpublished material from recent excavations.

cultural layers. The Duboshin and Kirovsky sites located close to the stream both feature over six meters of waterlogged layers deposited from the turn of the 12th to the mid 15th century, compared with just over five metres of waterlogged deposits on the Troitsky site covering the period from the mid 10th to the mid 15th century.

Table 37 The occurrence of simple combs in skeletal materials on Novgorod sites

Town side	End	Site	Number of class 2a combs	Site size (sq.m)	Index of ¹ concentration		
					Sites	Ends	Sides
St. Sophia's	Nerevsky	Dmitrievsky	1	360	0.3	5.0	5.9
		Kozmodemyansky	6	140	4.3		
		Liudogoshchensky	5	160	3.1		
		Nerevsky	454	8840	5.1		
		Tikhvinsky	22	364	6.0		
	Liud.	Troitsky	502	6336	7.9	7.9	
	Zag.	Mikhailo-Arkhangelsky*	15	656	2.3	2.3	
	Kremlin	0	100	-	-		
Trade	Slavensky	Buyany	8	160	5.0	3.7	4.4
		Duboshin	21	160	13.1		
		Gotsky	0	552	-		
		Il'insky	91	1430	6.4		
		Kirovsky	8	320	2.5		
		Mikhailovsky	15	440	3.4		
		Nutny	10	674	1.5		
		Rogatitsky	1	140	0.7		
		Torgovy	3	160	1.9		
	Plot.	Fedorovsky*	130	2534	5.1	5.0	
	<i>Casual finds</i>	37	-	-	-	-	
	Total	1329	23,526	5.6	5.6	5.6	

*The allocation of the earliest deposits on the Fedorovsky and Mikhailo-Arkhangelsky sites to the Plotnitsky and Zagorodsky Ends respectively is in question, since neither of the Ends existed at that time as political and administrative units.

In order to examine the chronological and spatial distribution of simple combs in skeletal materials on properties located in different parts of the town, the four most numerous sub-assemblages have been studied in detail which naturally derive from four larger sites (Nerevsky, Troitsky, Fedorovsky and Il'insky), suitably representing both sides of the town and at least three Ends of Novgorod.

¹ Index of concentration shows number of finds per 100 sq.m of excavated area and it is given in Bold when equal or higher than the average (bottom line).

The margins of chronological Periods, defined in section 4.3, overlap by a few decades. In order to allocate the few combs deriving from the deposits dated to those 'grey' decades to a particular Period, and thus to compare chronological changes in spatial distribution of class 2a combs in different parts of the town, crucial historical events with specific dates have been chosen, each lying within the overlapping margins of the Periods.

1136 – detention and expulsion of Prince Vsevolod Mstislavich by the Novgorodians, who gained the right to elect their own *posadniks*

1240 – capture of Kiev by the Tartars and the beginning of the so-called 'Tartar-Mongol yoke'

1350-1351 –Novgorod, Pskov, Smolensk and other Russian towns with close links with western Europe succumbed to the plague as the pestilence went on in Northern Europe and reached Scandinavia and Russia via Hanseatic sea ways

Table 38 contains 1132 dated combs from the town quantified by four chronological Periods, and demonstrates indices of average concentration of simple combs calculated for each Period.

Table 38 The concentration of class 2a combs within the four chronological Periods

Period	Number of class 2a combs	Index of concentration	Excavated area (sq.m)
First Period (1000-1135)	419	1.8	23,526
Second Period (1136-1239)	535	2.3	
Third Period (1240-1349)	149	0.6	
Fourth Period (1350-1450)	29	0.1	
Total	1132	4.8	

Let us have a closer look at the patterns of chronological and spatial distribution of simple combs in skeletal materials in different parts of the town.

The Nerevsky End

One of the most numerous sub-assemblages of 454 simple combs has been retained from the Nerevsky site, with 414 dated specimens quantified in Table 39 by date and Period. The dynamics of changes in the concentration of the class 2a

combs in the site is in accordance with the overall pattern in Novgorod, featuring the peak of occurrence during the Second Period.

Table 39 Chronological distribution of 2a combs from the Nerevsky site

Date	Number of combs	Period	Number of combs	Index of concentration	
				This site*	Total
e.11th C.	30	First	138	1.6	1.8
m.11th C.	24				
l.11th C.	39				
e.12th C.	45				
m.12th C.	63	Second	208	2.4	2.2
l.12th C.	94				
e.13th C.	51				
m.13th C.	20				
l.13th C.	12	Third	43	0.5	0.6
e.14th C.	6				
m.14th C.	5				
l.14th C.	9				
e.15th C.	14	Fourth	25	0.3	0.1
m.15th C.	1				
l.15th C.	1				
Total dated	414				
Undated combs	40 (8.8%)				
Total	454			5.1	5.6

* Indices equal or higher than those for the total sub-assembly (rightmost column) are given in Bold.

It is worth noting that the concentration of class 2a combs in the First Period, in the town in general and in the Nerevsky End in particular, is similar to that of combs of class 1 (single-sided composite), which occurred during roughly the same length of time but approximately fifty years earlier. In order to compare the spatial distribution of simple combs in skeletal materials within the chronological margins of the four periods, a total of 413 dated combs¹ quantified by the context within each Period have been compiled in Table 40. Arbitrary boundaries of the Nerevsky properties have been drawn for each Period compromising the differences between construction layers within Periods (Fig. 4.67). This allows the assessment of the excavated areas of various contexts, properties and streets alike, and the calculation of the indices of concentration of simple combs.

¹ From the total of 414 dated combs from the site, one comb (B951) has been excluded due to the ambiguity of its context.

Table 40 Chronological and spatial distribution of class 2a combs on the properties of the Nerevsky End (Nerevsky site)

First Period				Second Period				Third Period				Fourth Period			
Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)
A	20	3.8	520	A	8	1.5	520	A	0	0.0	520	A	1	0.2	520
Б	39	3.3	1200	Б	30	2.3	1330	Б	3	0.2	1330	Б	3	0.2	1330
Г	4	0.7	550	Г	16	2.9	550	Г	2	0.4	550	Г	1	0.2	550
В	19	1.0	1850	В	4	0.7	550	В	1	0.2	550	В	4	0.2	1850
Д				Д	47	3.6	1300	Д	6	0.5	1300	Д			
Е	24	1.8	1300	Е	32	2.7	1170	Е	5	0.7	720	Е	2	0.2	980
								Е1	1	0.2	450	Е1	0	0.0	190
И	9	0.8	1150	И	58	5.0	1150	И	18	1.6	1150	И	10	0.9	1150
К	15	2.7	550	К	8	1.5	550	К	4	0.7	550	К	2	0.4	550
streets	7	0.4	1600	streets	5	0.3	1600	streets	3	0.2	1600	streets	2	0.1	1600
Total	137	1.6	8720	Total	208	2.4	8720	Total	43	0.5	8720	Total	25	0.3	8720

* Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

During the First Period, higher concentrations of simple combs in skeletal materials have been revealed on properties A, Б, Е and К situated to the south of Velikaia Street (Fig. 4.67). It is worth recollecting that all these are properties, where in striking contrast to the 10th century layers, the 11th century deposits preserved very few single-sided composite combs (section 3.4, Table 13, Fig. 3.73). Simple combs, therefore, dominate in the comb repertoire on these properties throughout the whole 11th century. Five out of eight walrus ivory combs deriving from 11th - early 12th century contexts in the town were found on the Nerevsky properties, with only one comb uncovered on property Д (ДВ) (B555 (Fig. 4.63)), the other four coming from properties А (B554 (Fig. 4.63)), Б (B781 (Fig. 4.63)) and Е (B523 and B557 (both Fig. 4.63)).

One can only speculate what the implication of this patterning is. However, the evidence from property А (at this stage the richest one) provides some glimpse. Property А belongs to one of the oldest areas of the town, inhabited in the 950s, probably, by people of Scandinavian descent (see Chapter 3, sections 3.4-3.5). There appears to have been continuous development under unchanged ownership

over decades, and even the sparse archaeological evidence from the earliest period, and especially the plentiful evidence from the 11th – early 12th centuries, leaves no doubt that the property was owned by traders involved in long-distance trade from as far west as the Southern Baltic and Scandinavia to as far south as Kiev, Cherson (aka Korsun (Old Rus)) and, probably, Byzantium. Property A presents a perfect example of the early medieval culture in its specific Varangian-Russian-Byzantine context.

Among various artefacts deriving from the deposits of the First Period, there are bowls from two different scales and a fragment of a miniature balance of another set of scales, a denarius, silver, lead and copper ingots, numerous objects in amber and cornelian as well as walnut shells (Zasurtsev 1963, 92-93). A fragment of a whiteware pottery jug with bichromatic decoration painted with green and brown glaze, deriving from the 11th century context on the property, has been recently identified as an example of Byzantine pottery, extremely rare in Russian lands, and known as singular fragments only in Vyshgorod (near Kiev) and at the Dnieper rapids (Koval 2000, 130, Fig. 1:2).

There is some evidence that the owners of property E were traders as well, but of a slightly smaller calibre (Zasurtsev 1963, 115-120). As for dwellers of the property Б, their probable involvement in collecting taxes is suggested by the find of a wooden cylinder seal in the late 11th century context. It is more difficult to comprehend the *raison d'être* of the family who occupied property K, but there is no doubting in their substantial wealth during the First Period.

During the First Period (especially in the early-mid 11th century) properties И, ДБ and Г revealed the dominance of single sided composite combs in the repertoire of combs in use (section 3.4, Table 13, Fig. 3.73), which were at that stage cased combs rather indicative of the presence of military milieu. It seems plausible that these properties were occupied by members of Prince Iaroslav's Varangian *druzhina*. It is, therefore, not surprising that both metal *tamgas* found on the Nerevsky site derive from properties И and Г. The oldest of these metal trapezoid pendants bearing the symbol of Prince Vladimir Sviatoslavich and a scratched inscription consisting of five runic letters (unreadable) was uncovered from early 11th century deposits (construction layer 25, 1000s-1020s) on property Г (Yanin 1956, 158, Table 5:A; Sedova 1981, 36, Fig. 11:1). The other metal

tamga featuring Prince Iaroslav's emblem on one side and the emblem of his brother Mstislav on the other side¹ was found on property И in the construction layer 24 dated to 1020s-1050s (Kolchin 1958, 93; Beletsky 1998, 198-200, Fig. 3:7; Sedova 1981, 36, Fig. 11:2).

The pattern of spatial distribution of simple combs in skeletal materials changes completely during the Second Period, with the focus primarily on property И occupying the area adjacent from the south-west to the crossing of Velikaia and Kuzmodemianskaia Streets, and to a certain extent on properties Д and Е (in different boundaries) at the same crossroads (Fig. 4.67). Of the remaining properties, only property Г adjoining the cross-roads of Velikaia and Kholopia Streets from the north-west, reveals a moderately high concentration of simple combs. During the Second Period, the highest concentration of combs has been revealed on property И. Property К was abandoned as a living area after a conflagration and was turned into an orchard during the 1160-1190s, so the paucity of combs from this area is quite understandable. Property Е retains its moderately high concentration of simple combs, but properties А and Б demonstrate a certain diminution of finds which, in the case of property А, appears to be quite substantial.

Eight out of 19 walrus ivory combs (Second Period), which always indicate wealthy owners, were found on Nerevsky properties Д (B527, B551, B553 (all Fig. 4.63)), И (B574 and B745), Е (B556 and B563) and К (mid 12th century comb B564).

During the Third and the Fourth Periods, property И remains the key area in terms of the concentration of simple combs in skeletal materials. It was argued by Yanin (1979), who thoroughly analysed all available written sources including the complex of birch bark documents, that during the stretch of time which is referred to as the Third and Fourth Periods here, properties Д, И, Е and К constituted hereditary property of a large *boyar* family called the Mishiniches who, from the late 13th century up to the second quarter of the 15th century, were at the top of the political power in the town.

¹ The combination of Iaroslav's and Mstislav's emblems on the *tamga* indicates the period of accord and shared power between the two brothers (1026-1036) after years of fighting over the succession to Kiev and up to Mstislav's death in 1036.

During the Third Period, all four properties adjacent to the crossroads of Velikaia and Kuzmodemianskaia Streets reveal significant concentrations of simple combs, and properties И and К, the former in particular, retain the leading position during the Fourth Period. Two out of three walrus ivory combs from mid 13th century contexts of Novgorod come from the Nerevsky site, one having been uncovered on the pavement of Velikaia Street (B864) and the other deriving unsurprisingly from property И (B528 (Fig. 4.63)). As for the luxury goods of the Fourth Period in the comb repertoire, namely elephant ivory combs, six out of nine stratified specimens from the Novgorod excavations were uncovered from the Nerevsky site, three deriving from property И (B594 and B617 (both Fig. 4.22), B711), two from related property ДВ and one from the stretch of Velikaia Street adjacent to the property ДВ (B814 (Fig. 4.31)).

The Liudin End

The sub-assemblage of class 2a combs from the Troitsky site demonstrates a higher than average concentration of finds, but, as can be seen in Table 41, the dynamics of chronological change in the density of simple combs, expressed in indices of concentration, is similar to the overall and the Nerevsky patterns. The only noticeable difference concerns the smaller numbers of combs from the layers assigned to the Fourth Period. There are at least two explanations for this, one from a historical point of view and the other from an archaeological point of view.

The historical explanation concerns the social structure of the population of the Liudin End in the 14th-15th centuries. After the detention and expulsion of the Miroskiniches boyar family in 1209, with the following confiscation of their urban properties, the area of the End excavated within the Troitsky site ceased to be actively involved in the political life of Novgorod, and its population no longer belonged to the wealthy and mighty. The archaeological reason for the paucity of finds is the relatively poor preservation of organic materials in the upper waterlogged layers on the site.

Table 42 presents a detailed picture of chronological changes (in terms of Periods) in patterns of spatial distribution of simple combs in skeletal materials on the properties of the Liudin End. In a similar way as was done for the Nerevsky site, arbitrary property boundaries compromising differences between

construction layers within each Period are shown in Fig. 4.68, which, due to the stable property divisions during the Third and Fourth Periods and the paucity of comb finds from the late 14th – early 15th centuries explicitly compiled in Table 42, demonstrates the spatial distribution of simple combs within the first three Periods.

Table 41 Chronological distribution of class 2a combs from the Troitsky site

Date	Number of combs	Period	Number of combs	Index of concentration	
				This site	Total
e.11th C.	6	First	166	2.6	1.8
m.11th C.	24				
l.11th C.	42				
e.12th C.	94				
m.12th C.	71	Second	220	3.5	2.3
l.12th C.	85				
e.13th C.	64				
m.13th C.	43				
l.13th C.	29	Third	87	1.4	0.6
e.14th C.	13				
m.14th C.	2				
l.14th C.	1				
e.15th C.	2	Fourth	3	0.05	0.1
m.15th C.	0				
l.15th C.	0				
Total dated	476				
Undated combs	26 (5.2%)	-	-	-	-
Total	502	-	-	7.9	5.6

* Indices equal or higher than those for the total sub-ensemble (rightmost column) are given in Bold

The First Period is marked by a moderately dense distribution of simple combs on a number of properties and extremely dense concentrations of finds on properties B and юK, both investigated only very marginally within the Troitsky site. It is noteworthy to mention that only one comb from either property (B and юK) derives from mid 11th century layers, all the remaining being uncovered in the early 12th century deposits. The same pattern of early 12th century combs outnumbering the rest of the combs from the First Period has been revealed for properties A (18/10), K (26/10) and П (10/6), and only properties Г (3/8), M (12/16), ИР (4/9) and E (5/6) demonstrate either higher (or only slightly higher) numbers of 11th century specimens. In most of the former and the latter properties, late 11th century combs predominate over early-mid 11th century

counterparts, however, on property A more simple combs became deposited in the early-mid 11th century than in the late part of it.

Table 42 Chronological and spatial distribution of class 2a combs on the properties of the Liudin End (Troitsky site)

First Period				Second Period				Third Period				Fourth Period			
Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)
A	28	3.0	920	A	29	3.6	800	A	0	-	300	A	0	-	300
								A1	3	0.9	350	A1	0	-	350
Б	2	0.4	450	Б	4	0.7	570	Б	2	0.6	350	Б	0	-	350
В	6	8.6	70	В	1	1.4	70	В	0	-	70	В	0	-	70
Г	11	1.2	950	Г	25	3.0	840	Г	14	1.9	720	Г	1	0.1	720
E	11	2.4	460	E	27	<u>5.9</u>	460	E	6	1.4	440	E	0	-	440
								Ж	0	-	170	Ж	0	-	170
K	36	3.8	950	K	24	2.5	950	K	10	1.3	800	K	1	0.1	800
ю	10	<u>6.7</u>	150	ю	1	0.7	150	ю	2	1.3	150	ю	0	-	150
K				K				K				K			
M	28	3.9	720	M	56	9.3	600	M	21	4.2	500	M	0	-	500
				H	4	1.7	230	H	5	1.5	330	H	0	-	330
P	13	3.9	330	P	11	<u>13.8</u>	80	P	4	5.0	80	P	0	-	80
И				И	30	4.8	630	И	4	1.8	220	И	0	-	250
П	16	2.7	590	П				П	10	2.4	410	П	1	0.3	380
				O	4	1.9	210	O	3	1.4	210	O	0	-	210
other prop.	0	-	0	other prop.	0	-	0	other prop.	0	-	490	other prop.	0	-	490
streets	1	0.1	750	streets	3	0.4	750	streets	0	-	750	streets	0	-	750
Total	162	2.6	6340	Total	219	3.5	6340	Total	84	1.3	6340	Total	3	0.05	6340

* Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

It is worth recollecting here that the area of property A is marked by very low numbers of single-sided composite combs per unit of excavated area, most of those being uncovered from the late 10th century layers (section 3.4, Table 13, Fig. 3.73). Equal numbers of combs of simple and composite construction (three combs in each group) are known already from the early 11th century context, whereas in the mid 11th century layers only one single-sided composite comb stands out against the four simple ones. There is some evidence to suggest close

connections of the dwellers of property A with ecclesiastic circles of the town. 'Greek' connections, marked by an early 11th century find of a rim of a plate or a bowl belonging to an extremely rare type of Byzantine polychromic glazed pottery (Koval 2000, 132, Fig. 1:3), in this case are meaningful.

Of all other properties only properties Г and ИР have produced more simple combs than those of composite construction as early as in the mid 11th century, the earlier part of the century still being characterised by a predominance of combs of class 1. Like property A of the Nerevsky End, these two properties have produced the earliest evidence for settlement on the area and for the cultural and economic nexus embracing this settlement on the River Volkhov (along with Ryric Gorodishche), Staraja Ladoga, Gotland and Central Sweden, probably indicative of the initial presence of ethnic Scandinavians. It is hard to say how quick the process of assimilation progressed and how long various ethnic elements preserved their ethnic identity, but one should bear in mind that late 12th century single-sided combs indicating certain contacts with Scandinavia were uncovered precisely on properties Г and И (ИП). We can surmise that from the earliest times and during the First Period trade was the *raison d'être* of these migrants from Central Sweden or Gotland who settled down on the banks of the Volkhov. A hoard of dirhams (Gaidukov et al 2000) from the 10th century deposits, numerous finds of amphora sherds and walnut shells in the 11th and 12th century layers, as well as rare types of Byzantine bone buttons with inlaid orpiment pigment (Freestone and Middleton 2000, 12; Smirnova 2000, 116-123) indicate, probably, trade activities.

On the extremely wealthy property K, which was also one of the oldest dwelling areas of the town, cased single-sided composite combs remain more numerous than the simple combs up to the mid 11th century and only in the late 11th century the former cease to appear in the cultural deposits at all. It has been hypothesised (see section 3.5) that this property was no less than Prince Iaroslav's town residence and also that of a number of succeeding Princes. The presence of men-at-arms accompanying the Prince and settling on both this and the neighbouring properties E and ЮК, would, in this case, make perfect sense. Properties M and П reveal the same pattern of dominance of composite combs up until the late 11th century and the presence of only simple combs from then onwards.

To finish the description of the First Period, it should be mentioned that three walrus ivory combs found within this chronological stratum on the site derive from the early 12th century layers of properties K (B332), юK (B333) and ИП (B114).

During the Second Period (Table 42, Fig. 4.68) property A, which was famous in archaeological literature as a property of priests with a workshop of the icon painter Olesei Petrovich (Peter's son) Grechin (the Greek!) (Yanin 1992, 100-103), reveals a moderately high density of simple combs. Property K which, according to Yanin's theory, had a public rather than a private status and was a political centre of the Liudin End (if not the whole town) and the seat of a joint court of the Prince and *Posadnic* (Yanin 2001c; Yanin 2002a), demonstrates slightly lower than average numbers of comb finds per excavated unit. The same pattern can be observed on property Г. Property P, apparently having been separated from neighbouring property ИП in the west with its moderately dense distribution of simple combs, reveals the highest concentration of comb finds. It is difficult to say (due to the small area of the property excavated) whether the high index of concentration on property P values more than that of the property M (the second highest), which was excavated on a much larger scale. The assemblage of combs from property M demonstrates a remarkably high quota (7.1%) of bone combs (long-toothed specimen B130 (Fig. 4.65), as well as B206, B213, B216). These combs come from late 12th – early 13th century contexts, which do reveal the first tiny peaks in the use of this, for Novgorod, rare raw material (see above section 4.2.3, Table 32). The assemblage also contains one walrus ivory comb (B148), the other three Troitsky combs in this superb material deriving from properties K (B58 and B309) and Б (B27).

The Third Period, which is marked by a diminution in size of most properties, probably indicative of the growing population of Novgorod, also shows the highest densities of finds on properties P and M, property II revealing the third highest index of concentration of simple combs. Most properties located to the west of Proboinaia Street demonstrate fairly high concentrations of finds, the only walrus ivory comb coming from the mid 13th century deposits on property E (B92 (Fig.4.15)). All properties to the east of the street show either a low number of combs or none at all.

Only three combs are known from the deposits of the Fourth Period, including antler combs from properties Π (B170) and Γ (B251) and a flat rectangular comb in ivory (probably elephant) from property K (B481).

The Plotnitsky End

Since the Plotnitsky End came into being only ca 1168 as a political and administrative unit (under this year it was first mentioned in the chronicle), it is still debatable which End of the town the earliest deposits on the Fedorovsky site, dated from the 1070s, can be assigned to. The Fedorovsky site, excavated in the 1990s, has proved to be one of the most difficult sites for both field investigation and post-excavation analysis of artifactual, stratigraphical, structural and dendrochronological evidence, due to the later development of the area which significantly disturbed the sequence of medieval deposits (Dubrovin et al 2000).

Table 43 Chronological distribution of class 2a combs from the Fedorovsky site

Date	Number of combs	Period	Number of combs	Index of concentration	
				This site	Total
e.11th C.	0	First	36	1.4	1.8
m.11th C.	0				
l.11th C.	10				
e.12th C.	26				
m.12th C.	19	Second	52	2.1	2.2
l.12th C.	18				
e.13th C.	15				
Total dated	88	-	-	3.4	4.8
Undated combs	42 (32.3%)	-			
Total	130	-	-	5.1	5.6

As can be seen in Table 43, simple combs in skeletal materials are unknown from contexts younger than the early 13th century. It is also likely that some of the late 11th – early 13th century combs were extracted from the medieval deposits during later development on the spot, resulting in moderately low concentration of finds from this otherwise extremely rich site. Nearly a third of all combs derive from disturbed contexts and are, therefore, undated. In this case, the knowledge on the chronological trends, as revealed from the analysis of morphological trends of class 2a combs based on the dated specimens from this site and from other sites

in Novgorod, can give some indication of the dates of archaeologically undated objects.

The indices of concentration of simple combs calculated for the periods are slightly lower than average for the town, but reveal the same dynamics of chronological changes as elsewhere. One should bear in mind, that the Fedorovsky First Period covers only the latter half of this Period, fully present on both the Nerevsky and Troitsky sites. The index of concentration should, therefore, be lower. Table 44 demonstrates the spatial distribution of Fedorovsky combs within the first two Periods, with changes in the layout of properties within the site being shown in Figure 4.69.

Table 44 Chronological and spatial distribution of class 2a combs on the properties excavated within the Fedorovsky site

First Period				Second Period			
Context	No. of combs	Index of concentration*	Excavated area (sq.m)	Context	No. of combs	Index of concentration*	Excavated area (sq.m)
A	3	1.2	252	A	8	3.2	252
Б	6	1.5	392	Б	22	5.6	392
ВГД	7	0.9	746	ВГД	10	1.3	746
Е	10	2.6	390	Е	2	0.5	390
Ж	10	1.4	712	Ж	8	1.1	712
streets	0	0.0	42	streets	2	4.8	42
Total	36	1.4	2534	Total	52	2.1	2534

* Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

During the First Period, the highest concentration of simple combs has been revealed on property E, with a medium high density of finds on properties Б and Ж. Nearly all Fedorovsky properties at this stage produced some evidence for the 'Northern' and 'Western' connections, such as fragments of worked walrus ivory (properties ВГД and E) (Smirnova 1998) and a single-sided comb of unusual construction, the nearest parallels to which are known in Norway (A336 (Fig. 3.9)) from property Ж, a Scandinavian type of cross from property E and silver denarii from either property ВГД or E (disturbed layer of Fedorovsky trench V) (Dubrovin and Tarabardina 1993, 1998). Artifactual evidence from property Ж including a gold temple ring decorated with filigree and granulation, a birch bark

list of debtors and a wooden cylinder lock belonging to a tax collector, demonstrates the elite status of the property owner.

During the Second Period, property Ж retains its elite status revealed by finds of Byzantine objects including glass bracelets, numerous amphorae fragments and an ampulla (pilgrim's bottle); as well as other exquisite finds such as a lead plate with scratched Cyrillic alphabet; a lead seal of Prince Mstislav Yurievich (prince of Novgorod in 1155-1156), objects with a prince's emblem and a walrus ivory comb (B1017) (Dubrovin and Tarabardina 1998, 14). In general, however, the concentration of simple combs in skeletal materials on this property is low, the highest density of finds being revealed on properties A and Б. The latter reveals not only the highest concentration of simple combs among the properties excavated on the site, but also the highest ever concentration of walrus ivory combs (B1053-B1056 (all Fig. 4.62)). Another walrus ivory comb from the group of six stratified specimens (out of a total of nine walrus ivory combs from the site) derives from property A. The combination of walrus ivory waste elements with high numbers (per area unit) of finished combs in walrus ivory constitute a pointer towards a production area for these luxury goods somewhere within the excavated area or nearby.

The Slavensky End

The chronological distribution of class 2a combs from the Il'insky site (Table 45) strikes one immediately as being somewhat odd for a number of reasons. Firstly, unlike the three sites examined above, whose Second Period assemblages correspond to the highest peak of occurrence of simple combs in the late 12th century (Fig. 4.4), the Il'insky collection reveals the highest numbers of combs during the First Period. Since there is another peak in the chronological distribution of Novgorod combs in the early 12th century, the chronological patterning would not be puzzling, if the numbers of combs from the most prolific late 12th – early 13th century layers were to be high. However, pathetically few combs were uncovered in these particular layers.

A detailed examination of 89 dated specimens from the assemblage with regard to chronological changes in the occurrence of the main decorative patterns, as well as blank central zones, has revealed a certain discrepancy between the assemblage examined and the overall picture from the total assemblage. Table

46 compiling the Il'insky simple combs, is a combined version of Tables 27 and 29 presenting the overall assemblage of class 2a combs. The Il'insky assemblage persistently demonstrates peaks in occurrence of all patterns one or two steps earlier than evidenced according to the overall chronology. It is especially noticeable concerning L patterned combs, which account for only about a third of all decorated counterparts and a half of decorated specimens as early as in the late 11th century, whereas in the overall assemblage L patterned combs account for nearly half of the decorated combs and do not cease to dominate absolutely up until early-mid 12th century.

Table 45 Chronological distribution of class 2a combs from the Il'insky site (based on the existing chronology by Kolchin and Chernykh (1978))

Date	Number of combs	Period	Number of combs	Index of concentration	
				This site	Total
e.11th C.	0	First	64	4.5 (5.5)*	1.8
m.11th C.	14				
l.11th C.	18				
e.12th C.	32				
m.12th C.	11	Second	19	1.3 (1.6)*	2.2
l.12th C.	5				
e.13th C.	3				
m.13th C.	0	Third	5	0.3 (0.4)*	0.6
l.13th C.	1				
e.14th C.	2				
m.14th C.	2				
l.14th C.	0	Fourth	1	0.07	0.1
e.15th C.	1				
m.15th C.	0				
l.15th C.	0				
Total dated	89	-	-	6.2	4.8
Undated combs	2 (2.2%)	-	-	-	-
Total	91	-	-	6.4	5.6

* Figures in brackets show corrected indices of concentration using the reduced area of the site (1174 sq.m) on the levels of the 11th to 14th centuries. An index of concentration for the Fourth Period is calculated using the initial area of the site (1430 sq.m) (see below Fig. 4.70, Table 47). Indices equal or higher than those for the total sub-assemblage (rightmost column) are given in Bold.

This discrepancy could be accepted, were there to be any evidence for intensive comb manufacturing on the spot, dictating certain fashionable trends in the comb repertoire in the town. However, there are no concentrations of any 'bone'-working waste (see below section 4.5), nor do the combs themselves

reveal any signs of incompleteness or manufacturing faults. Bearing this in mind, one can suspect some discrepancies in the chronology of the site.

Table 46 The frequency of main patterns on decorated combs and chronological distribution of undecorated combs on the evidence of the Il'insky assemblage

Date	Decorated combs*								Date	Undecorated combs**
	All	L	L+	L.RDE	L.RDB	RDE	RDF	RDC		
m.11th C.	14	10 (71.4)	1 (7.2)	2 (14.2)	1 (7.2)	-	-	-	m.11th C.	-
l.11th C.	18	9 (50.0)	6 (33.2)	1 (5.6)	1 (5.6)	1 (5.6)	-	-	l.11th C.	-
e.12th C.	30	5 (16.8)	7 (23.3)	-	7 (23.3)	7 (23.3)	3 (10.0)	1 (3.3)	e.12th C.	2 (6.3)
m.12th C.	7	-	-	-	1 (14.3)	3 (42.9)	1 (14.3)	2 (28.5)	m.12th C.	4 (36.4)
l.12th C.	1	-	-	-	-	-	-	1 (100)	l.12th C.	4 (80)
e.13th C.	1	-	-	-	-	-	-	1 (100)	e.13th C.	2 (66)
m.13th C.	0	-	-	-	-	-	-	-	m.13th C.	-
l.13th C.	0	-	-	-	-	-	-	-	l.13th C.	1 (100)
e.14th C.	0	-	-	-	-	-	-	-	e.14th C.	2 (100)
m.14th C.	0	-	-	-	-	-	-	-	m.14th C.	2 (100)
l.14th C.	0	-	-	-	-	-	-	-	l.14th C.	-
e.15th C.	0	-	-	-	-	-	-	-	e.15th C.	1 (100)
Total	71 (100)	24 (33.8)	14 (19.7)	3 (4.2)	10 (14.1)	11 (15.5)	4 (5.6)	5 (7.1)	Total	18 (20.2)

* Percentages of patterned combs in the total of 71 decorated specimens (in brackets) are given in Bold when equal or higher than those for the whole sub-assemblage (bottom line).

** Percentages of undecorated combs in the total of 89 dated specimens (in brackets) are given in Bold when equal or higher than those for the whole sub-assemblage (bottom line).

Dendrochronological analysis of timber samples from the Il'insky site was carried out in the late 1960s – early 1970s by B.A.Kolchin and N.B.Chernykh (1978). Three characteristic moments stand out concerning Il'insky samples. Firstly, the assemblage reveals specific peculiarities of tree ring growth compared with the Nerevsky assemblage, which lead Kolchin to conclude the use of a different source of wood for the constructions (Kolchin and Chernykh 1978, 65, 78). Secondly, the preservation of wood was good or mediocre only in the group of samples from construction layers 6-13 (mid 12th – mid 14th century) (Kolchin and Chernykh 1978, 60). The earliest construction layers (18 and 17), for instance, were dated to the second half of the 11th century by only one (!) timber sample which gave 1058 as the date of tree fell (Kolchin and Chernykh

1978, 69, 79-83, Table 2). Thirdly, a reuse of old timber in new structures was confirmed to be highly characteristic for Il'insky structures (Kolchin and Chernykh 1978, 69). The above points would seem to undermine the chronology of some construction layers, the early ones in particular.

The Il'insky dendrochronological curve (amongst others) was later revised by A.F.Ur'eva and N.B.Chernykh (1995). The fact that no corrections to the existing Kolchin's chronology were made, is not significant, since the re-examined assemblage of Il'insky samples consisted of only 14 samples, which accounted for 1.7% of 839 dated samples from the site (Ur'eva and Chernykh 1995, 113).

The analysis of the Il'insky assemblage of simple combs has suggested that the chronology of the site needs to be corrected upwards (towards younger dates) by approximately 35-40 years. A conventional way of cross-checking chronologies and stratigraphies in Novgorod is through studying graphs of chronological distribution of mass categories of artifactual types such as glass bracelets and slate spindle-whorls, the former having a peak in the 1230s-1270s, the latter in the 1100s-1140s (Poluboiarinova 1963, 169-170, Kolchin 1982, 159). Il'insky graphs (Kolchin and Chernykh 1978, 114-115) demonstrate more flattened peaks with maximum finds of glass bracelets claimed to be occurring in the 1200s-1250s and the most numerous slate spindle whorls deriving from layers dated to 1080-1130s. This, therefore, constitutes no contradiction to the proposal of a chronological revision.

Table 47 compiles 88¹ simple combs from the Il'insky site quantified by property within the four Periods defined using the proposed revised chronology (+40years on top of the old dates). The earliest cultural layers on the site according to the proposed chronology were deposited in the 1090s. Indices of concentration have been calculated according to property areas within the arbitrary boundaries drawn for each Period (Fig. 4.70). New indices of concentration (or rather the dynamics of their changes) appear to be in accordance with those calculated for the overall assemblage (see above Table 38) and comparable with those for major sites (Tables 39, 41, 43).

¹ From a total of 89 dated combs specimen B1206 is excluded due to uncertain context.

Table 47 Spatial distribution of class 2a combs on the properties of the Slavensky End (Il'insky site) within the four Periods (based on the revised chronology)

First Period				Second Period				Third Period				Fourth Period			
Context	No. of combs	Index of concentration	Excavated area (sq.m)	Context	No. of combs	Index of concentration	Excavated area (sq.m)	Context	No. of combs	Index of concentration	Excavated area (sq.m)	Context	No. of combs	Index of concentration	Excavated area (sq.m)
A	10	3.6	278	A	11	4.0	278	A	2	0.7	278	A	2	0.2	858
<u>B</u>	<u>11</u>	<u>3.0</u>	<u>369</u>	<u>B</u>	<u>18</u>	<u>5.6</u>	<u>324</u>	<u>B</u>	<u>0</u>	<u>0.0</u>	<u>324</u>	<u>B</u>	<u>0</u>	<u>0.0</u>	<u>45</u>
B				B	0	0.0	45	B	0	0.0	45	B	0	0.0	45
Г	4	2.4	166	Г	2	1.2	166	Г	2	1.2	166	Г			
Д	2	4.4	45	Д	2	4.4	45	Д	0	0.0	45	Д	1	0.2	527
E	4	1.3	316	B	15	4.7	316	E	2	0.6	316	E			
Total	31	2.6	1174	Total	48	4.1	1174	Total	6	0.5	1174	Total	3	0.2	1430

* Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

During the First Period (late 11th –early 12th century), properties A and ББ reveal a medium high concentration of simple combs and it is hard to say (due to a very small area of the property occurring within the site) whether the much higher index shown on property Д values more than those of properties A and ББ (Fig. 4.70).

The Second Period is marked by moderately high densities of class 2a combs on a number of properties (Б, Д, E), with property A demonstrating concentrations just below the average. Only six combs derive from the layers assigned to the Third Period with the highest concentration on property Г and medium high concentrations on properties A and E.

The Fourth Period is marked by the appearance in the northern part of the site of a wealthy property encompassing properties A and Б. The lack of structures in the southern part of the site and a background of generally poor preservation of wood in the upper layers make it impossible to distinguish property boundaries (if any) on this area, referred to here as area ГДЕ. Both southern and northern areas reveal moderately high concentrations of late combs with flat elephant ivory combs deriving from both northern (B1200) and southern (B1221 (Fig. 4.22)) areas of the site.

4.5 Areas of Origin and Place of Manufacture

4.5.1 Use, Loss and Disposal

The first combs of simple construction in skeletal materials were lost in the town of Novgorod around the turn of the 11th century. That their owners had the misfortune to lose or misplace these novel objects can be assumed due to the fact that almost all early simple combs are complete objects with sound teeth. During the first few decades, simple combs account for a smaller portion in the comb repertoire in which single-sided composite combs reign.

It is highly remarkable that smallish simple combs appear almost simultaneously in a number of Northern European lands around the Baltic area. The tradition of double-sided combs of simple construction was unknown among the Germanic and Slavic peoples in the Baltic area, who for hundreds of years utilised single-sided combs of composite construction, believed to have been developed sometime towards the end of the Migration period among the North Germanic peoples. Up until the beginning of the 12th century (and in some areas around the Baltic Sea up until the mid 13th century) (see above chapter 3) these totally eclipsed all other classes of combs.

To comprehend the origin of the simple comb tradition and the reason for its almost synchronous appearance in Baltic lands one should cast a glance at the history of simple combs. It is characteristic that the first combs of simple construction from Dark Age and Romanesque contexts in Northern Europe are large, lavishly decorated objects often referred to as 'Liturgical Combs'. These demonstrate adherence to the Mediterranean tradition and are distinctively made of ivory or boxwood (MacGregor 1985, 78-81, Winter 1906). Double-sided one-piece combs of boxwood and ivory with squared or more rarely convex ends are believed to originate in Greco-Roman culture; elephant ivory or boxwood being the usual media, due to their great dimensions more appropriately lent themselves to single-piece combs (MacGregor 1985, 78-80; Dunlevy 1988, 349; Galloway 1990, 665-671). Lasco has argued for an East Mediterranean or Coptic origin for these combs (Lasco 1956, 336-355). Simple boxwood and ivory combs became especially common in the late Roman period, and the first finds of these in the West appear to have been introduced by the Romans. After the collapse of the

Roman Empire, the continuity of the tradition of making double-sided composite combs of boxwood and ivory well into Byzantine time can be traced only in the Mediterranean area (Davidson 1952, 179-180).

In areas of Northern Europe which were never involved in the orbit of Roman political or cultural influence, simple combs were a complete novelty. It is noteworthy that before the first simple combs in skeletal materials appeared in Novgorod, the town dwellers had been introduced to boxwood combs of simple construction which occur in the town cultural deposits as early as the late 10th century (see below chapter 5). Among the few simple combs found in Hedeby there is one in elephant ivory¹. These facts also throw some light on the problem of the origin of the earliest class 2a combs in the Baltic area.

It is hardly coincidental that in the latter 10th century a number of Northern European rulers proclaimed their conversion to Christianity. Mieszko of Poland is believed to have adopted Christianity in 969. Silver coins bearing a cross issued from the mid 970s by Harald Bluetooth, king of the Danes, were a proclamation of the king's baptism some time in the 960s. In 988 Vladimir, Prince of the Rus, was baptised in Cherson (Korsun, in Old Russia) and wed to Princess Anna of Byzantine, sister of Emperor Basil II. Whereas the Conversion of the rulers were events, the Christianisation of the lands around the Baltic was a long process spreading down from the top of the society, and for the first few decades even in the main centres of royal (princely) authority Christian observance must have been a thin social veneer (Franklin and Shepard 1996, 230). It was argued by H.Birnbaum (1978, 14-15) that in pre-Schismatic years (i.e. prior to 1054²) in the areas only newly converted to Christianity, the contrasts between Christianity and paganism counted for far more than differences in dogma and ritual embraced by members of the Roman and Byzantine Churches. At the same time a number of ecclesiastic institutions including the archdioceses of England and Hamburg-Bremen and the Byzantine Church of the Orthodox faith (and later young Russian Orthodox Church (under spiritual supervision from Constantinople)) competed with regard to their influence in Scandinavia. It is worth noting, in support of this point of view versus the general assumption of the total dominance of the western, Roman

¹ Unpublished material. I would like to thank Mrs I.Ulbricht (Schleswig-Holsteinisches Landesmuseum) for the opportunity to work with the Hedeby collection.

² By coincidence this is also the year of Prince Iaroslav's death.

variety of Christian Church in Scandinavia and the southern Baltic, that there is enough evidence for a strong Byzantinesque influence in the late 10th – mid 11th centuries. Silver coins minted by Harald Bluetooth (Harald Gormson) of the Danes bore a figure of Byzantine inspiration as well as a cross (Roesdahl 1991, 113, 162). A variety of objects of Russian(?)-Byzantine provenance has been uncovered recently from the earliest deposits of Sigtuna (Edberg 1996). Byzantine style frescos are known in the countryside of Gotland (Falck 1971, 85-93; Söderberg 1971, 67, 96).

Simple combs manufactured in raw materials conventional for Northern Europe (mainly antler and to a certain extent bone, as well as exquisite walrus ivory), but according to a Mediterranean (i.e. Christian) tradition, can be seen as an example of comb-makers' adaptation to a changing demand in a Christianising society. It is highly symbolic that one of the early 12th century simple combs from Novgorod bears a cross (B922 (Fig. 4.42)). The fact that double-sided one-piece combs occurred amongst the dress accessories in so-called churchyard graves in Gotland where Christians were buried (11th –12th centuries), and are unknown in the burials of the contemporary pagan cemeteries, is very meaningful (Tunmark-Nylén 1995, 162-163).

The 11th to early 12th century class 2a combs found from the sites around the Baltic and further east (Hedeby-Schleswig, Ribe, Lund, Wolin, Szczecin, Gotland, Staraja Ladoga, Novgorod and Kiev) reveal as much similarity in their morphological features as their counterparts in composite construction, and were probably manufactured by the same itinerant comb-makers who spread both types of products over vast stretches of the early medieval Northern European world. These new products appear to have been made for Christianising communities. Inevitably, due to the use of different raw materials, early Northern European simple combs were smaller than the Mediterranean prototypes, and some strong local traditions of comb-making were conventionally applied (method of cutting teeth, for example, as well as the optimal tooth density).

By the end of the 11th century, production reached its peak and some designs (e.g. L-patterned combs) became highly standardised. Compact L-patterned combs having slight differences in the gauge of coarse and fine teeth and modest decoration, were probably men's items (Tunmark-Nylén 1995, 163). Other

designs were less numerous, but are invariably present in every assemblage of combs from the sites around the Baltic.

The simple combs, which in the course of the 11th century were probably being brought to Novgorod from the Southern Baltic, gave an impetus to local production around the second quarter of the 12th century. The 12th century saw a thriving growth of comb-making in Novgorod which, unlike most of the Baltic centres was specialised almost exclusively on simple combs, since as was argued above (see section 3.5) single-sided combs were not manufactured in Novgorod, but brought into town as personal belongings of newcomers. The latter 12th and 13th century simple comb assemblages feature an absolute dominance of local designs, appearing to be indicative of the fact that the town comb-makers successfully met the demand of the growing population of Novgorod.

In the course of the 14th century, the consumption of simple combs in skeletal materials declines, and by the end of the century imported rectangular combs of slender cross-section made from elephant ivory became available, at least for the social and political elite of Novgorod society.

4.5.2 Production

Local production of class 2a combs should be evidenced, firstly by the presence of concentrations of manufacturing waste (in this case, antler and walrus ivory), as well as the occurrence of half-finished items and rejects in the deposits. The status and scale of the production can be assessed by the size of the waste concentrations and the duration of waste accumulating deposits. It is also useful to study the occurrence of noticeable 'faults' with regard to ornamentation and outline on a series of finished items from the same contexts.

Table 48 presents the occurrence of waste elements¹ in antler, ivory and bone in the collections of artifacts from Novgorod. Troitsky, Fedorovsky and Nerevsky sites have produced the highest numbers of waste elements and high concentrations of 'bone' manufacturing waste per unit of excavated area. It has been argued (see above section 4.4 in this chapter and section 3.4 in chapter 3)

that constantly lower than average concentrations of artifactual types in the Nerevsky site reflect the lower standards of recovery of finds in the 1950s-early 1960s. Noteworthy is also the fact that larger assemblages of simple combs in higher concentrations also come from these sites (Table 37).

Table 48 Waste elements in skeletal materials in the assemblages from Novgorod sites

Side	End	Site	Waste elements in skeletal materials				Site size (sq.m)	Index of concentration*
			Antler	Ivory	Bone	Total		
St. Sophia's	Nerevsky	Dmitrievsky	1	0	0	1	360	0.3
		Kozmodemyansky	6	0	0	6	140	4.3
		Liudogoshchensky	1	0	0	1	160	0.6
		Nerevsky	185	21**	204	410	8840	4.6
		Tikhvinsky	3	0	0	3	364	0.8
	Lud.	Troitsky	284	10**	113	407	6336	6.4
	Zag.	Mikhailo-Arkhangelsky	37	1	2	40	656	6.1
		Kremlin	0	0	0	0	100	0.0
Trade	Slavensky	Buyany	0	1	0	1	160	0.6
		Duboshin	7	0	4	11	160	6.9
		Gotsky	3	0	4	7	552	1.3
		Il'insky	7	0	9	16	1430	1.1
		Kirovsky	8	0	2	10	320	3.1
		Mikhailovsky	4	0	1	5	440	1.1
		Nutny	16	0	5		674	0.0
		Rogatitsky	0	0	0	0	140	0.0
		Torgovy	0	0	0	0	160	0.0
	Plot.	Fedorovsky	86	26	152	264	2534	10.4
	Total	648	59	496	1182	23,526	5.0	

* Indices are given in Bold when equal or higher than that for the whole town (bottom line)

** Two pieces of worked elephant ivory on each the Nerevsky and Troitsky sites. The rest is walrus ivory

The occurrence of high concentrations of both simple combs and waste elements can be seen on the Duboshin site, one of the small excavations in the Slavensky End. However, there are no specific comb-working debris and waste elements coming from later 13th-14th century deposits (Third Period) (Smirnova 2002), whereas almost all simple combs were uncovered from the 12th-early 13th century

¹ Waste elements do not include shavings, which should have been preserved in Novgorod soil, but due to the methods of excavation accepted in the Novgorod expedition, have been never identified and retained.

layers (Second Period). Two locations of antler-working activities have been traced in the late 12th – early 14th century deposits of the Mikhailo-Arkhangelsky site in the Zagorodsky End (Smirnova 2002) with no evidence for specialization in comb-making, the concentrations of simple combs per excavated unit being fairly low also (Table 37).

Comb blanks and half-finished simple combs are known from the deposits of the Nerevsky and Dmitrievsky sites in the Nerevsky End, Troitsky (Liudin End) and Il'insky (Slavensky End) sites. In the Il'insky site, a comb blank¹ comes from the late 14th century deposits (property AB) and there are only two bone waste elements from the same chronological horizon (Fourth Period), too little evidence to suggest sedentary comb-making activities. The same situation occurs in the Dmirtievsky site, where a single find of antler simple comb (B1335) was uncovered along with a single comb blank² (both Fig. 4.71:5) from the earliest deposits dated to the turn of the 14th century, which produced no other evidence for 'bone'-working or comb-making (Khoroshev 1982, 63).

A total of 127 simple combs (9.6% of the overall assemblage) reveal some 'faults' with regard to ornamentation and outline or some signs of incompleteness, the bulk of them (95.3%) deriving from the Nerevsky, Troitsky and Fedorovsky sites representing three different parts of the town.

The Nerevsky End (Nerevsky site)

It is extremely regrettable that all three comb blanks and unfinished comb B862 (Fig. 4.72) deriving from the site are unprovenanced and undated. One can surmise judging by the size, trapezoid form and concave sides of one of the blanks (Fig. 4.72:3), that the latter 12th-early 13th century is the most probable date for the object. As for the unfinished comb, its peculiar morphological features (including low depth) finding no parallels among the 11th-13th century specimens, suggest a late date for the object (14th-15th century).

A total of 29 (6.4% of the assemblage) specimens have some irregularities in the decoration or outline, which account for 4.4% (6 items) of the First Period combs, 7.7% (16 items) of the Second Period combs and 4.7% (2 items) of the Third

¹ Il-II-1962, -13-128-366 (spit-square-field No.)

² Dm-1976, -19-59-8 (spit-square-field No.)

Period combs¹. Dated waste elements in antler, ivory and bone from the Nerevsky site compiled in Tables 49a and 49b are quantified by contexts and Periods.

Table 49a Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Nerevsky site

Period	Context	Excavated area (sq.m)	Waste elements in skeletal materials							
			Antler		Ivory		Bone		Total	
			No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*
First	A	520	3	0.6	0	-	1	0.2	4	0.8
	Б	1200	2	0.2	0	-	0	-	2	0.2
	Г	550	1	0.2	0	-	1	0.2	2	0.4
	ВД	1850	10	0.5	0	-	0	-	10	0.5
	Е	1300	1	0.1	0	-	1	0.1	2	0.2
	И	1150	8	0.7	0	-	0	-	8	0.7
	К	550	1	0.2	0	-	0	-	1	0.2
	streets	1600	0	-	1	0.1	0	-	1	0.6
	Total	8720	26	0.3	1	0.01	3	0.03	30	0.3
Second	A	520	0	-	0	-	0	-	0	-
	Б	1330	14	1.1	1	0.1	0	-	15	1.1
	Г	550	0	-	0	-	0	-	0	-
	В	550	0	-	2	0.4	1	0.2	3	0.5
	Д	1300	20	1.5	12	0.9	3	0.2	35	2.7
	Е	1170	6	0.5	0	-	2	0.2	8	0.1
	И	1150	8	0.7	0	-	0	-	8	0.7
	К	550	3	0.5	0	-	1	0.2	4	0.7
	streets	1600	2	0.1	2	0.1	1	0.1	5	0.3
	Total	8720	53	0.6	17	0.2	8	0.1	78	0.9

* Indices equal or higher than those for the whole sub-assembly (bottom line for each Period) are given in Bold.

The First Period antler debris concentrations are small and are higher on properties A, ВД and И. Even if there was some antler working activity, it could neither have been intensive in the case of property A (one antler piece from each third of the 11th century) nor prolonged (most antler elements come from late 11th

¹ 5 specimens are undated.

century contexts on properties ВД and И (see also Table 15). There is no evidence for specifically comb-making activities at all, let alone the manufacturing of class 2a combs, which in the case of properties ВД and И are only just slightly more numerous than class 1 specimens (Fig. 3.73).

The Second Period is marked by the highest concentration of 'bone-working' activity on property Д, with the highest concentration of antler and walrus ivory waste elements. Walrus ivory waste elements are extremely rare in Novgorod soil and are known as single examples in the assemblages from the Mikhailo-Arkhangelsky and Buyany sites, as a handful of items from the Troitsky site and as more numerous finds from the Nerevsky and Fedorovsky sites, where they form chronological and spatial concentrations. On the Nerevsky site the vast majority of walrus ivory worked pieces derive from the Second Period deposits on property Д, and a few were found on neighbouring property В and the adjacent stretches of Velikaia Street (Fig. 4.73).

We recollect (see above section 4.4) that the highest number of walrus ivory combs in the Nerevsky assemblage have also been uncovered from property Д. It was also demonstrated elsewhere (Smirnova 2001, 14, Tab. 3a) that, in general, this property reveals the highest concentration of objects in walrus ivory in the 12th century deposits, most of which are combs and knife handles. This combination of highest concentrations of both objects and manufacturing waste in this exotic material constitutes a reliable pointer towards manufacturing activities utilising antler and walrus ivory. There is no direct evidence for simple comb making on properties В and И which also have relatively high concentrations of antler waste.

It can be simply coincidental that the highest concentration of 'bone'-working waste from Third Period deposits occurs on property И, which also reveals the highest concentration of class 2a combs (Table 4.24, 4.33b). However, the fact that both combs (B587 and B873) with irregularities in decoration or outline derive from this property gives some additional support to the suggestion of comb-making activities on the spot. Medium high concentrations of both simple combs and waste elements have been also revealed on the related (see above section 3.4) properties Д, Е and К.

Table 49b Spatial distribution of waste elements in skeletal materials from the deposits of the Third and Fourth Periods on the properties of the Nerevsky site

Period	Context	Excavated area (sq.m)	Waste elements in skeletal materials							
			Antler		Ivory		Bone		Total	
			No. of fragments	Index of concentration	No. of fragments	Index of concentration	No. of fragments	Index of concentration	No. of fragments	Index of concentration
Third	A	520	1	0.2	0	-	0	-	1	0.2
	Б	1330	4	0.3	0	-	3	0.2	7	0.5
	Г	550	2	0.4	0	-	1	0.2	3	0.5
	В	550	2	0.4	0	-	1	0.2	3	0.5
	Д	1300	4	0.3	0	-	5	0.4	9	0.7
	Е	720	3	0.4	0	-	5	0.7	8	1.1
	Е1	450	0	-	0	-	1	0.2	1	0.2
	И	1150	9	0.8	0	-	5	0.4	14	1.2
	К	550	3	0.5	0	-	2	0.4	5	0.9
	streets	1600	1	0.1	0	-	1	0.1	2	0.1
Total	8720	29	0.3	0	-	24	0.3	53	0.6	

Fourth	A	520	5	1.0	0	-	6	1.2	11	2.1
	Б	1330	7	0.5	0	-	11	0.8	18	1.4
	Г	550	3	0.5	0	-	27	4.9	30	5.5
	ВД	1850	34	1.8	2**	0.1	65	3.5	101	5.5
	Е	980	3	0.3	0	-	1	0.1	4	0.4
	Е1	190	0	-	0	-	1	0.5	1	0.5
	И	1150	1	0.1	0	-	11	1.0	12	1.0
	К	550	0	-	0	-	2	0.4	2	0.4
	streets	1600	6	0.4	0	-	17	1.1	23	1.4
	Total	8720	59	0.7	2	0.02	141	1.6	202	2.3

* Indices equal or higher than those for the whole sub-assembly (bottom line for each Period) are given in Bold.

** 2 pieces of worked elephant ivory

During the Fourth Period, two centres of 'bone'-working activities are located in the northern part of property ДВ and on property Г, both of which relied predominantly on skeletal bone and only partially on antler. Numerous half-finished knife handles uncovered from both localities, as well as high concentrations of knife blades suggest knife-making activities, but there is no evidence for comb-making.

The Liudin End (Troitsky site)

The Troitsky site has produced probably the most substantial evidence for comb-making activities in terms of the presence of comb blanks, unfinished simple combs, concentrations of manufacturing waste and 'faulty' combs. The group of specimens with irregularities in outline or decoration and signs of incompleteness encompasses 83 combs (16.5%), which account for 13.6% of the First Period objects (22 items), 18.7% of the Second Period objects (41 items) and 20.2% of the Third Period objects (17 items)¹. Two unfinished combs with uncut teeth on one side deriving from properties Γ (B113 (Fig. 4.33), First Period) and И (B145 (Fig. 4.35), Third Period), a total of three comb blanks including two antler ones from properties М (Fig. 4.71:1, Second Period) and А (Fig. 4.71:3, Third Period) and a fragment of a walrus ivory comb blank from property Б (Fig. 4.71:2, Third Period) constitute the most convincing evidence for comb-making on the spot.

Tables 50a and 50b present dated waste elements in antler, ivory and bone from the Troitsky site quantified by contexts and Periods. The numbers of waste elements uncovered from the First Period deposits of Troitsky properties are notoriously small. One can suggest some sort of 'bone'-working activities on a number of properties, but only property Γ reveals direct evidence of comb manufacturing on the spot (unfinished comb B113). An indirect proof may be seen in the highest concentration of 'faulty' combs (36.4% of all deriving from contemporary layers) (e.g. B155 (Fig. 4.31)). However, this activity could have been only episodic, probably in the form of a flying visit (stay) of a comb-maker some time in the latter 11th century. It can be only speculatively suggested that the higher number of 'faulty' combs from properties ИР and И (30.8% and 18.7% respectively) and a few walrus ivory worked pieces (from properties Γ and И) and walrus ivory combs (properties ИР, К and ЮК) were the fruits of this visit. If this is right, it is worth mentioning a peculiar combination of local, 'northern' and 'western' waste elements including elk antler pieces, worked pieces of reindeer and red deer antler and walrus ivory (see also, section 3.5).

¹ Three combs are unstratified.

Table 50a Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Troitsky site

Period	Context	Excavated area (sq.m)	Waste elements in skeletal materials							
			Antler		Ivory		Bone		Total	
			No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*
First	A	920	3	0.3	0	-	3	0.3	6	0.7
	Б	450	2	0.4	0	-	0	-	2	0.4
	B	70	1	1.4	0	-	0	-	1	1.4
	Г	950	5	0.5	2	0.2	3	0.3	10	1.1
	E	460	4	0.9	0	-	0	-	4	0.9
	K	950	5	0.5	2**	0.2	3	0.3	10	1.1
	юK	150	2	1.3	0	-	0	-	2	1.3
	M	720	7	1.0	0	-	1	0.1	8	1.1
	Р	330	5	1.5	0	-	4	1.2	9	2.7
	И	590	6	1.0	2	0.3	2	0.3	10	1.7
	other prop.	0	0	-	0	-	0	-	0	-
	streets	750	0	-	0	-	0	-	0	-
	Total	6340	40	0.6	6	0.1	16	0.3	62	1.0
Second	A	800	44	5.5	0	-	4	0.5	48	6.0
	Б	570	26	4.6	0	-	1	0.2	27	4.7
	B	70	1	1.4	0	-	1	1.4	2	2.9
	Г	840	3	0.4	1	0.1	22	2.6	26	3.1
	E	460	0	0.0	0	-	0	-	0	-
	K	950	0	0.0	0	-	1	0.1	1	0.1
	юK	150	0	0.0	0	-	0	-	0	-
	M	600	3	0.5	1	0.2	4	0.7	8	1.3
	И	230	0	0.0	0	-	0	-	0	-
	ПИ	630	9	1.4	0	-	5	0.8	14	2.2
	O	210	0	-	0	-	0	-	0	-
	Р	80	0	-	0	-	0	-	0	-
	other prop.	0	0	-	0	-	0	-	0	-
	streets	750	9	1.2	0	-	3	0.4	12	1.6
Total	6340	95	1.5	2	0.03	41	0.6	138	2.2	

* Indices equal or higher than those for the whole sub-assembly (bottom line for each Period) are given in Bold.

** Pieces of worked elephant ivory

Table 50b Spatial distribution of waste elements in skeletal materials from the deposits of the Third and Fourth Periods on the properties of the Troitsky site

Period	Context	Excavated area (sq.m)	Waste elements in skeletal materials							
			Antler		Ivory		Bone		Total	
			No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*
Third	A	300	9	3.0	0	0.0	1	0.3	10	3.3
	A1	350	39	11.1	0	0.0	9	2.6	48	13.7
	Б	350	4	1.1	1	0.3	1	0.3	6	1.7
	B	70	3	4.3	0	0.0	0	0.0	3	4.3
	Г	720	7	1.0	1	0.1	4	0.6	12	1.7
	E	440	6	1.4	0	0.0	2	0.5	8	1.8
	Ж	170	0	0.0	0	0.0	0	0.0	0	0.0
	K	800	7	0.9	1	0.1	4	0.5	12	1.5
	юK	150	0	0.0	0	0.0	2	1.3	2	1.3
	M	500	3	0.6	0	0.0	0	0.0	3	0.6
	H	330	0	0.0	0	0.0	0	0.0	0	0.0
	И	220	4	1.8	0	0.0	2	0.9	6	2.7
	П	410	4	1.0	0	0.0	3	0.7	7	1.7
	O	210	2	1.0	0	0.0	1	0.5	3	1.4
	P	80	0	0.0	0	0.0	0	0.0	0	0.0
other prop.	490	22	4.5	0	0.0	6	1.2	28	5.7	
streets	750	2	0.3	0	0.0	2	0.3	4	0.5	
Total	6340	112	1.8	2	0.05	37	0.6	151	2.4	
Fourth	A	300	1	0.3	0	0.0	0	0.0	1	0.3
	A1	350	0	0.0	0	0.0	0	0.0	0	0.0
	Б	350	0	0.0	0	0.0	0	0.0	0	0.0
	B	70	0	0.0	0	0.0	0	0.0	0	0.0
	Г	720	0	0.0	0	0.0	1	0.1	1	0.1
	E	440	0	0.0	0	0.0	0	0.0	0	0.0
	Ж	170	0	0.0	0	0.0	0	0.0	0	0.0
	K	800	4	0.5	0	0.0	1	0.1	5	0.6
	юK	150	0	0.0	0	0.0	1	0.7	1	0.7
	M	500	0	0.0	0	0.0	1	0.2	1	0.2
	H	330	0	0.0	0	0.0	0	0.0	0	0.0
	И	250	0	0.0	0	0.0	1	0.4	1	0.4
	П	380	0	0.0	0	0.0	0	0.0	0	0.0
	O	210	0	0.0	0	0.0	0	0.0	0	0.0
	P	80	0	0.0	0	0.0	0	0.0	0	0.0
other prop.	490	0	0.0	0	0.0	1	0.2	1	0.2	
streets	750	0	0.0	0	0.0	1	0.1	1	0.1	
Total	6340	5	0.1	0	0.0	7	0.1	12	0.2	

* Indices equal or higher than those for the whole sub-assemblage (bottom line for each Period) are given in Bold.

During the Second Period, intensive antler-working is proven to have taken place in the late 12th-early 13th centuries on properties A and B located to the east of Proboinaia streets (Smirnova 1997). As far as property A is concerned it is possible, judging from the high percentage of 'faulty' combs (7 out of 29, 24.1%), that simple combs were manufactured, although there is no direct evidence. Two other properties with higher than average (18.7%) numbers of 'faulty' combs are properties M and Γ (19.6% and 20% respectively). The only antler comb blank from Second Period contexts comes from the mid 12th century layer on property M (Fig. 4.71:1)¹.

Three comb blanks and an unfinished comb deriving from the Third Period layers, as well as the highest ever number of 'faulty combs' (20.2%) appear to confirm comb-making in this part of the town. Two antler comb blanks were uncovered on properties A (Fig. 4.71:3)² and A1 (Fig. 4.71:4)³, both of which reveal higher concentrations of antler waste (antler and bone, in the case of property A1) (Table 50b). Antler comb B145 (Fig. 4.35) derives from property H with moderately high concentration of waste. The only walrus ivory comb blank in fragmented form was uncovered on property B, which at this chronological stage demonstrates fairly low concentrations of 'bone'-working waste.

The Fourth Period deposits on the Troitsky site reveal no evidence for comb-making and very little evidence for any other kind of 'bone'-working activities in the areas of the Liudin End excavated within the site.

Plotnitsky End (Fedorovsky site)

The Fedorovsky site, located in the part of the town from the late 12th century onwards known as the Plotnitsky End of Novgorod, has produced substantial evidence for an industry based on skeletal bone as early (for Novgorod) as the 13th century, and especially later in the 15th-16th centuries, as revealed by archaeological and written sources (Smirnova 1998). There is also somewhat patchy evidence (due to the later disturbances in the sequence of earlier deposits) for 'bone'-working activities utilising antler and walrus ivory during the late 11th and 12th centuries.

¹ Tr-IX-1992, 9-944-9 (spit-square-field No.)

² Tr-VI-1981, 7-476-8 (spit-square-field No.)

³ Tr-I-1973, 9-11-37 (spit-square-field No.)

Table 51 Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Fedorovsky site

Period	Context	Excavated area (sq.m)	Waste elements in skeletal materials							
			Antler		Ivory		Bone		Total	
			No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*	No. of fragments	Index of concentration*
First	A	252	0	0.0	0	0.0	0	0.0	0	0.0
	Б	392	2	0.5	0	0.0	2	0.5	4	1.0
	ВГД	746	9	1.2	7	0.9	4	0.5	20	2.7
	Е	390	6	1.5	1	0.3	5	1.3	12	3.1
	Ж	712	5	0.7	0	0.0	0	0.0	5	0.7
	streets	42	0	0.0	0	0.0	0	0.0	0	0.0
	Total	2534	22	0.9	8	0.3	11	0.4	41	1.6
Second	A	252	3	1.2	0	0.0	1	0.4	4	1.6
	Б	392	0	0.0	0	0.0	0	0.0	0	0.0
	ВГД	746	22	2.9	5	0.7	10	1.3	37	5.0
	Е	390	2	0.5	2	0.5	2	0.5	6	1.5
	Ж	712	1	0.1	0	0.0	8	1.1	9	1.3
	streets	42	0	0.0	0	0.0	1	2.4	1	2.4
	Total	2534	28	1.1	7	0.3	22	0.9	57	2.2

* Indices equal or higher than those for the whole sub-assembly (bottom line for each Period) are given in Bold.

A total of 26 fragments of worked walrus ivory (Fig. 4.74) collected from the site form the largest assemblage of waste elements among the assemblages from various sites in Novgorod and, probably, in the whole of Northern Europe. Only 15 fragments, however, derive from undisturbed contexts on the First and Second Period properties E and ВГД, these also having preserved higher numbers of waste elements in antler and bone.

No comb blanks or unambiguously unfinished combs have been found on the Fedorovsky site, and 11 combs featuring irregularities in decoration and outline form 8.5% of the whole assemblage, only three specimens of which derive from undisturbed contexts. However, the combination of the highest concentrations of walrus ivory debris and combs in walrus ivory in Novgorod seems to be substantial evidence for ivory comb-making in this part of the town.

Whereas comb-making was definitely an activity of professional craftsmen of either itinerant or sedentary status, comb repair most likely did not require the involvement of a professional. Two ways of dealing with damaged combs have been observed in the Novgorod assemblage. Firstly, the life span of a comb with broken teeth on one side could be prolonged by converting a double-sided one-piece specimen into a single-sided, damaged teeth being filed off and the back being reshaped. This method of repair can be seen on a number of combs from the earliest and latest deposits (e.g. B69, B359, B1042 (all Fig. 4.1), B789, B861, B865 (all Fig. 4.2)).

Another problem which may have occurred with regard to a simple comb in antler or ivory is rooted in the microstructure of these raw materials. A breakage of a seemingly sound comb into two pieces along the grain of fibrous tissues must have been highly frustrating. This is what appears to have happened to specimens B51/79, B298 and B971 (all Fig. 4.75). The two latter undecorated specimens deriving from Third Period deposits on the Troitsky (property K) and Kirovsky (property A) sites were halves of combs revealing signs of repair: a pair of holes was drilled through the central zone close to the broken edge of both halves to receive a retaining shackle or a thong which would have been passed through holes, so keeping them firmly together. We can only speculate whether the repaired combs lasted for long, but an elephant ivory flat rectangular comb repaired by means of three iron shackles was uncovered intact in Amsterdam from a deposit dated to 1350-1450 (Sarfati 1990, 111).

Although the symptoms evidenced on the late 12th century comb B51/79 were probably the same as on its repaired counterparts B298 and B971, it was discarded rather than repaired, the two parts having been separated by a distance of 22m within property A. The two halves were uncovered from different trenches of the Troitsky site in 1977 and 1982 and it was not before 2000 when they were identified as belonging to the same object 'electronically' during the analysis of simple comb forms and sizes. When fished out from different collections in the Novgorod Museum, the two fragments formed a perfect fit with amazing contrast in colour due to the differences in burial conditions.

4.5.3 Distribution

A review of the character of the immediate physical and structural environment within which the combs were presumably used and lost can demonstrate whether they lay close to their original deposition point (both spatially and chronologically) or, alternatively, were removed from the initial burial situations and redeposited within somewhat misleading associations.

There are, however, certain limitations inherent to the characterisation of find contexts relating to and obviously arising from the methods of urban excavations in Novgorod. Nevertheless, the vast majority of combs appear to derive directly from the localities within the contexts where one can expect them to have been used. Up to 97.8% of simple combs derive from properties, with only 2.2% of objects having been uncovered from street contexts. Moreover, the bulk of finds from properties (89%) come from within and immediately outside dwelling structures and thus can be reasonably regarded as *in situ*.

It has been mentioned above, that most combs in the assemblage (up to 80%) are in a sound, usable state, which implies that they met the fate of loss or misplacement. Therefore, unlike other artefacts (pottery, for instance) these should not be classified as deliberately discarded rubbish items, which could have gone through a long process leading to their ultimate deposition, but can be assumed to derive from the contexts of primary deposition.

The patterns of spatial distribution of simple combs on the excavated properties of Novgorod and their implications vary at different chronological stages. At the earliest stage (the First Period) and during the first few decades of the 11th century in particular, the sparse distribution of new comb types reflects to a certain extent the limited strength of Christian observance. Early Novgorod may be seen as a case-study of the degree to which religious identity plays a role in dictating consumer choice in multicultural and multireligious early urban communities.

By the end of the 11th century simple combs became common items to such an extent that they ceased to be symbols of religious (Christian) identity. New local designs can be seen as symbols of national (Old Russian) identity and social status (expensive walrus ivory items). The patterns of distribution of class 2a

combs during the 12th-early 14th centuries (Second and Third Periods) reflect now mainly the density of population and the intensity of life on the properties, including in some cases comb-making activities on the property or in the nearest proximity (see above, section 4.4 and 'Production' in this section).

The final stage, coinciding with the final decades of the town's glory and independence adds very little information on the matters of comb distribution due to the limited evidence from usually less well preserved uppermost waterlogged deposits of Novgorod.

Chapter 5

WOODEN SIMPLE COMBS

5.1 Introduction

Simple combs made of wood (class 2b) from the cultural deposits of Medieval Novgorod form a substantial group, which is by far the largest collection of these finds from a single archaeological site.

Combs, as well as other categories of items of everyday use in wood, were first studied by B.A.Kolchin. His pioneering research on Novgorod archaeological wood published in 1968 included a brief survey of 299 wooden combs and fragments from the Nerevsky site excavated in the 1950s – early 1960s (Kolchin 1968, 83-84, 176).¹ Kolchin classified the combs into 3 main groups according to the shape of the ends. Group 1 is the most numerous and encompasses combs with straight ends found in the deposits of the 10th-early 12th and 13th-mid 15th centuries. Combs with concave ends, which amounted for 26% of the assemblage, were classified as Group 2 and dated to the 13th-15th centuries. The quota of the combs with convex ends (Group 3) was no more than 4% and the occurrence of these in the cultural deposits is limited to the second half of the 13th century. A selection of 85 combs has been identified to species by Prof. V.E. Vikhrov, who revealed that 97% of them were made of boxwood. Boxwood does not grow naturally in Northern Europe and thus was subjected to long distance trading. Under the assumption that the combs were produced in Novgorod, B.A.Kolchin postulated that the wood, rather than finished items in boxwood, was imported. He did not support his theory with evidence and claimed that boxwood could only have come from the woody northern slopes of the Talysh hills and from the Caucasian coastline area of the Black Sea along the Volga trade route. The striking lack of wooden combs in the construction layers 19-17 dated to the 1130s-1170s (Kolchin 1968, 84, Fig. 73, 93, diagram 19) was explained by the fact that the Volga trade route was disrupted by the nomadic tribe of Polovtsy.

¹ This research in English translation was introduced to the Western archaeological audience in 1989 (Kolchin 1989)

This very disruption in the supply of boxwood resulted in Kolchin's theory in the rise of utilisation of bone materials by the Novgorod comb-makers.

A decade later, E.A.Rybina addressed herself to the assemblages of imports among the artefacts from excavations in the town (Rybina 1978). She divided the imported objects into two groups: imports from the west and imports from the south or southeast. The latter encompasses fragments of amphorae, walnuts, glass articles, amber, spindle-whorls made of pink slate and boxwood, which were brought into town via Kiev from Byzantium, the Crimea, Volynia along the Dnieper trade route or from the Caucasus, Central Asia and oriental countries along the Volga trade route. In her close examination of the earliest southern imports (pre-Mongol period of Russian history 10th-early 13th centuries), Rybina finds a strong similarity in the patterns of chronological distribution of the imported articles such as pink slate spindle-whorls from the Ovruch area, amphorae, walnuts and Byzantine glass wares. Their numbers gradually increase in the course of the late 10th –11th centuries, reach their peaks in the mid 11th century and decline from the late 11th –early 12th centuries. Rybina sees in these chronological patterns the clear reflection of political confrontation in the late 11th century between the *boyars* of Novgorod and the Prince of Kiev, resulting in the trading blockade imposed on Novgorod by Kiev and inevitable decline of the Dnieper trade route (Rybina 1978, 19-52). Although the curve of chronological distribution of early wooden combs is strikingly similar, it was thought that the import of the raw material was influenced by different circumstances in the lower Volga region. That it was raw material, namely boxwood, (not finished items), which was imported, that the source of wood was in the Transcaucasian area and that the wood was traded along the Volga route, was axiomatic. The chronological distribution of 312 wooden combs found in Novgorod by that time (basically the same Nerevsky assemblage with the addition of some material, whose provenance was not specified) had been analysed and compared with that of combs in bone materials. No stylistic analysis of the wooden combs themselves, no comparisons between early and late products was undertaken and it remained unclear whether the 'bone' combs included both composite and one-piece combs or only simple ones.

It is regrettable to say that up to now a comprehensive study of boxwood combs from Novgorod has not been undertaken. Over 300 wooden combs have been uncovered during the excavations of the 1970s –1990s and, together with the finds of the 1950s-1960s, they form an impressive collection of 640 combs and their fragments, 181 being intact or with only minor damage to reveal original forms.

5.2 Chronological and spatial distribution

Recent finds form a substantial basis for the analysis of class 2b combs and the revision of the old collections. Due to the fact that wooden combs from early excavations have attracted much attention from previous researchers, it was decided to concentrate on practically unknown finds from post-Nerevsky excavations. This research is based on the analysis of 325 wooden combs from the collections of the Novgorod State Museum¹, 127 specimens being complete or with minor damage. Table 52 quantifies the assemblage of wooden combs from Novgorod by the excavation site.

Let us examine once again in detail the pattern of chronological distribution of boxwood combs in the cultural deposits of the town as presented in Figure 5.1, designed on the basis of 287 well-stratified finds from post-Nerevsky excavations. A total of 21 dated combs from the Il'insky site has been excluded from the chronological analysis due to the ambiguity of the existing chronology of the site (see above section 4.4). It is worth noting, however, that there are no wooden combs in the Il'insky assemblage deriving from the deposits older than the 13th century, which can be seen as indirect proof in favour of the suggested revision of the Il'insky chronology (+30 to 40 years).

One can see two peaks of the occurrence of class 2b combs in the mid-late 11th and late 13th -mid 14th centuries. With a comforting sense of security the whole assemblage can be divided into two groups of 10th-12th century combs (referred to from now on as early combs) and 13th-15th century combs (referred to as late combs). The discrepancy in numbers between combs of the 'early' and 'late' groups is quite

¹ Materials from the collections of the Museum of the Departments of Archaeology and Ethnology (Moscow State University) as well as the State Historical Museum have not been analysed.

explicit. Early combs (68 specimens) take only 23.6% of the assemblage of dated combs, their quota in the Troitsky assemblage being higher (56 out of 201 dated specimens, 27.9%) and, due to a similar sequence of waterlogged deposits, more comparable with the Nerevsky's quota (73 combs out of 209 dated specimens, 34.9% (Kolchin 1968, 84). In fact, there is only a handful of twelve early combs among dated specimens from the Nutny (C30 (Fig. 5.4), C279, C280 (Fig.5.2), C281 and C289 (Fig. 5.2)), Fedorovsky (C315-C318, C321), Duboshin (C291 (Fig. 5.2)) and Kirovsky (C254) sites¹, none of which derive from contexts older than mid 11th century. It is obvious, therefore, that the Nerevsky and Liudin Ends of Novgorod reveal the highest concentration of early wooden combs.

In the course of the 12th century one can see a steady decline in the numbers of class 2b combs. It is indeed true that very few combs are known from the 12th century layers in Novgorod, but still a total of 34 specimens have been uncovered from this chronological stratum, including 13 finds from the Nerevsky site.

It is worth comparing the chronological distributions of simple combs in skeletal materials and wood and, as far as the early period is concerned, the chronological distribution of single-sided composite combs (class 1) and spatial distribution of the earliest specimens in all three groups. The diagrams in Figure 5.3 demonstrate the three chronological curves on the evidence of the assemblage of finds collected on the Troitsky site (trenches I-XII, excavated in 1973-2000). Simple combs in wood appear earlier and, up until the early 11th century, outnumber their counterparts in skeletal materials (antler).

With the exception of comb C43 (Fig. 5.5) from an uncertain context, 17 earliest combs (10th-early 11th century) have been uncovered on seven properties of the Troitsky site: property A (C1, C2, C5 (Fig. 5.5), C15, C16 (Fig.5.5) and C19), property B (C14), property Г (C32, C74 (Fig. 5.2), property E (C46, C47 and C308 (Fig. 5.4), and C85 (Fig. 5.4)), property И (C75 (Fig. 5.4)) presenting the oldest stratigraphically wooden comb from the site, property K (C314) and property M

¹ In the assemblage of 12 class 2b combs from the Mikhailovsky site (Slavensky End) with earliest deposits dated to the late 10th century, only one comb derives from the layers older than the 13th century (mid 11th century). Thankyou to P.G.Gaidukov and N.N.Faradzheva for the search in archive materials.

(C166 (Fig. 5.5) and C325 (Fig. 5.4)). The highest concentration of earliest wooden combs (both in terms of numbers and density per excavated unit) has been revealed on property A. It is worth recollecting that this is the property with the lowest concentration of single-sided composite combs, the highest concentration of the earliest simple combs in antler and significant artifactual evidence for Byzantine ecclesiastic connections (see above, sections 3.4 and section 4.4).

Table 52 The occurrence of wooden simple combs on Novgorod sites

Side	End	Site	Number of class 2b combs	Site size (sq.m)	Index of concentration*		
					Sites	Ends	Sides
St. Sophia's	Nerevsky	Dmitrievsky	0	360	-	3.1	3.0
		Kozmodemyansky	0	140	-		
		Liudogoshchensky	0	160	-		
		Nerevsky	299	8840	3.4		
		Tikhvinsky	1	364	0.3		
	Liud.	Troitsky	206	6336	3.3	3.3	
	Zag.	Mikhailo-Arkhangelsky	0	656	-	-	
	Kremlin		0	100	-	-	
Trade	Slavensky	Buyany	1	160	0.6	3.1	2.0
		Duboshin	1	160	0.6		
		Gotsky	1	552	0.2		
		Il'insky	23	1430	1.6		
		Kirovsky	49	320	15.3		
		Mikhailovsky	12	440	2.7		
		Nutny	25	674	3.7		
		Rogatitsky	4	140	2.9		
		Torgovy	8	160	5.0		
	Plot.	Fedorovsky	10	2534	0.4	0.4	
<i>Casual finds</i>		0	-	-	-	-	
Total		640	23,526	2.7	2.7	2.7	

* Indices equal or higher than those for the total sub-assembly (bottom line) are given in Bold.

From about the mid 11th century combs of class 2a began to dominate among the combs of simple construction and, as these constantly increase in numbers towards reaching their first peak of occurrence in the early 12th century, class 2b combs reveal a tendency to decrease during the late 11th century and constantly diminish in numbers thereafter up until the turn of the 13th century.

Table 53 The occurrence of late wooden simple combs on Novgorod sites

Side	End	Site	Number of class 2b combs	Site size (sq.m)	Index of concentration*		
					Sites	Ends	Sides
St. Sophia's	Nerevsky	Dmitrievsky	0	360	0.0	1.4	1.7
		Kozmodemyansky	0	140	0.0		
		Liudogoshchensky	0	160	0.0		
		Nerevsky	136	8840	1.5		
		Tikhvinsky	1	364	0.3		
	Liud.	Troitsky	145	6336	2.3	2.3	
	Zag.	Mikhailo-Arkhangelsky	0	656	0.0	-	
	Kremlin		0	0	-	-	
Trade	Slavensky	Buyany	1	160	0.6	2.9	1.8
		Duboshin	0	160	0.0		
		Gotsky	1	552	-		
		Il'insky	23	1430	1.6		
		Kirovsky	48	320	15.0		
		Mikhailovsky	11	440	2.5		
		Nutny	22	674	3.3		
		Rogatitsky	2	140	1.4		
		Torgovy	8	160	5.0		
	Plot.	Fedorovsky	0	2534	0.0	0.0	
Total		398	23,526	1.7	1.7	1.7	

* Indices equal or higher than those for the total sub-assembly (bottom line) are given in Bold.

A new rise in the occurrence of wooden combs began in the early 13th century and in the course of this century increasing numbers of objects were utilised in the town. This second peak of the use of wooden combs in Novgorod occurs on the background of a steady decline in the use (production) of simple combs in skeletal materials in the town. Unlike the situation of the early period, when class 2a combs formed only a small group in the repertoire of utilised combs and, apart from the 10th-early 11th century, were outnumbered by their simple counterparts in skeletal materials, from the late 13th century onwards class 2b combs became not only more numerous than class 2a combs, but also a predominant group in the comb repertoire (Fig. 7.2 and 7.3) As can be seen in Table 53 compiling finds from the 13th-15th century layers, a higher density of class 2b combs has been revealed in the sites located within the Slavensky End, whose quarters were clustered around the town market.

Especially interesting is an enormous concentration of late wooden combs from the Kirovsky site (excavated in 1972-1974). A total of 48 combs and comb fragments derive from the 13th – early 15th century deposits at the Kirovsky site. This is a remarkable number of finds from a small trench of 320 sq.m – 12% of all finds from the deposits of this period in the town. Nearly all finds were collected from property A (northern part of the excavated area) (Fig. 5.6). In the late 13th-14th centuries the property is believed to have been owned by a Novgorodian who, although not belonging to the boyar clans, most certainly was one the richest and most influential people in the town (*zhityi liudi*, independent citizens of Novgorod, or *poshlye kuptsy*, duty paying merchants). The excavations revealed a manufacturing complex: a production of turned wooden tableware as well as items in bone materials, jewelry and textiles took place in the mid 13th- mid 14th centuries. On the other hand, there was abundant artifactual and written evidence (birch-bark documents) for close links between the owner and the world of overseas trading. The property was located in close proximity to the market place and the German Court and it has been argued that, due to the lack of space within the German and Gotlandic Quarters, Hanseatic merchants would have lodged in the nearest properties of the Slavensky End (Rybina 1978, 118-121; Kolchin and Rybina 1982, 178-239).

5.3 Survey of Morphological Traits

The survey of specific morphological traits distinguishing simple combs in wood is designed in a similar fashion in order to make easier the comparison between these and simple combs in skeletal materials.

5.3.1. Comb Outline and Integral Parts

Due to the simple construction of both class 2a and class 2b combs the integral parts of these combs are similar. The existing classification of wooden simple combs (Kolchin 1968) uses the comb outline as a main criterion for distinguishing comb types. It is worthwhile, therefore, to start with the survey of comb outline based on the analysis of the sub-assemblage of 127 complete or almost complete specimens from the collection of recent finds.

5.3.1a Outline

Front view

Unlike combs of class 2a featuring both rectangular and trapezoid forms of various proportions, simple combs in wood are limited almost exclusively to rectangular forms of comb blanks¹. This undoubtedly reflects the specific nature of wood (mainly boxwood), whereby cylindrical trunks suggest the rectangular form of comb blanks. The *dss* (the degree of side slope) of combs in this sub-assembly is very high and varies from 0.82 to 1, with only two combs (late specimen C241 and early comb C321) featuring $dss < 0.85$, thus (see section 4.2.1a) qualifying for trapezoid form with steep sides.

A certain criterion has been introduced whilst analysing class 2a combs for distinguishing comb proportion (*hwr*, height to width ratio), which in this assemblage varies from 0.62 to 1.64. Combs elongated in the horizontal plane ($hwr < 0.90$) form the minority (8 specimens, 6.3%), with square ($0.90 \leq hwr < 1.10$) and vertically elongated ($hwr \geq 1.10$) forms being most numerous (59 and 60 specimens respectively, 46.5% and 47.2%).

A scatter chart in Fig. 5.7 combines all individual variations of comb forms (as revealed by *dss* and *hwr*) with the background, demonstrating outlines of generalised forms. A total of 114 complete objects come from certain chronological contexts including 35 10th – 12th century combs and 79 13th – 15th century specimens. It is quite perceptible that early combs, on the one hand, are more diverse in terms of proportions, featuring some rare horizontally elongated forms (e.g. C30 (Fig. 5.4), C279 and C281) and, on the other hand, they reveal more emphasis on vertically elongated forms which account for 65.7% of complete dated specimens (e.g. C74 (Fig.5.2), C83 (Fig. 5.5), C85 (Fig.5.4), C280 (Fig. 5.2) and C308 (Fig. 5.4)). Late combs reveal more uniformity with regard to proportions and are predominantly clustered around square forms, which take 55.7% of complete late specimens (e.g.

¹ Combs themselves can obtain a more specific shape when concave, convex or ornate sides are formed.

C65 (Fig. 5.20), C55, C164 and C181 (all Fig. 5.24), C90 (Fig. 5.13) and C136 (Fig. 5.13), C139 (Fig. 5.18), C183 (Fig. 5.12), C292 (Fig. 5.10) and C293 (Fig. 5.16)).

A total of 276 combs reveal the shape of comb sides. Combs with other than straight or concave sides form a minority of 3.2%, being either ornate (C41 (Fig. 5.16) and C261 (Fig. 5.15)) or convex (C113, C116, C130 (Fig. 5.16), C156, C172 (Fig. 5.14), C259 and C295 (Fig. 5.12)). The former come from the deposits dated to the first half of the 13th century, the latter derive from late 13th-14th century contexts. The European counterparts with convex ends also come mainly from the deposits of the 13th -14th century, only two specimens deriving from the latter 12th century (Egan and Pritchard 1991, 370-374, Fig. 248-9; Hurley and Scully 1997, 555, 584-585, Fig. 16:11, 25). Ornate-sided combs are known from 14th century deposits in London (Egan and Pritchard 1991, 372-374, Fig. 249).

Table 54 The occurrence of class 2b combs with straight and concave sides in dated contexts

Date	Straight sides		Concave sides		Total
	Number of combs	% of all contemporary combs	Number of combs	% of all contemporary combs	
m.10th C.	1	100.0	0	0.0	1
l.10th C.	4	100.0	0	0.0	4
e.11th C.	10	100.0	0	0.0	10
m.11th C.	14	100.0	0	0.0	14
l.11th C.	8	80.0	2	20.0	10
e.12th C.	7	100.0	0	0.0	7
m.12th C.	7	100.0	0	0.0	7
l.12th C.	1	100.0	0	0.0	1
e.13th C.	8	88.9	1	11.1	9
m.13th C.	9	60.0	6	40.0	15
l.13th C.	23	52.3	21	47.7	44
e.14th C.	24	52.2	22	47.8	46
m.14th C.	21	45.7	25	54.3	46
l.14th C.	8	57.1	6	42.9	14
e.15th C.	3	50.0	3	50.0	6
m.15th C.	2	100.0	0	0.0	2
Total	150	63.6	86	36.4	236

Straight-sided combs are most numerous (168 specimens, 60.9%) and combs with concave sides form the second largest group of 99 specimens (35.9%). For the

purpose of assessing the chronological changes in percentages of combs with straight and concave sides a selection of 236 dated specimens with the two most common shape of sides has been compiled in Table 54. Almost all early wooden combs in Novgorod have straight sides, with only two late 11th century specimens (C37 and C291 (Fig. 5.2)) featuring concave sides. Whereas straight-sided combs are predominant among the oldest of late combs, the quota of concave-sided objects increases noticeably already in the mid 13th century, and during the late 13th-early 15th century almost equal numbers of combs have been encountered. Both mid 15th century combs have straight sides.

A few remarks concerning concave-sided combs can be made. Unlike 13th century simple counterparts in skeletal materials, which usually feature the emphasised curve in the upper part of the comb height, all wooden specimens have evenly curved sides with an emphasis at half of the comb height (e.g. C57 (Fig. 5.22), C24 (Fig. 5.28), C120 (Fig. 5.16), C125 (Fig. 5.18) and C260 (Fig. 5.15).

Cross-section

Only 20 specimens in the assemblage of wooden combs survived in such small fragments as not to allow registering the form of cross-section. The remaining 305 objects unambiguously reveal the form of cross-section, which in most cases is lentoid. A tiny group of four combs (14th century specimens C141, C255 and C256 and undated object C286) feature a somewhat rhomboid cross-section.

The cross-section of wooden combs is on average thicker than that of combs in skeletal materials. Comb depth varies from 5mm to 20mm, with an average depth of 9.8mm¹. Comb relative depth revealed by the index of relative depth² (*ird*, see above section 4.2.1a), is also higher in wooden combs, *ird* varying from 0.05 to 0.19 and an average index of relative depth being 0.12³. The frequency of class 2b combs with various indices of relative depth is shown in Figure 5.8. Combs with a thick cross-section (*idr* \geq 0.15) account for 14.6% (20 objects in the sub-assemblage of 137

¹ Calculated for 158 specimens with measurable depth.

² The index is a ratio of comb depth either to comb height (for vertically elongated objects with *hwr* \geq 1), or to average width (for combs elongated in horizontal plane with *hwr* < 1).

³ Calculated for 137 specimens with required measurements for calculating indices of relative depth.

combs with calculated *ird*). As can be seen from the data compiled in Table 55 (132 dated specimens), the periods of the most diverse relative depth of wooden combs coincide with the chronological peaks of occurrence of class 2a combs in Novgorod, namely mid-late 11th century and 14th century.

Table 55 Chronological changes in average depth and relative depth of wooden combs

Date	Number of combs	Average depth	Range of average depth
l.10th C.	4	0.09	0.07-0.10
e.11th C.	7	0.09	0.05-0.13
m.11th C.	12	0.13	0.07-0.19
l.11th C.	6	0.13	0.07-0.18
e.12th C.	7	0.14	0.10-0.17
m.12th C.	4	0.12	0.11-0.13
l.12th C.	1	0.11	0.11-0.11
e.13th C.	2	0.10	0.08-0.13
m.13th C.	8	0.12	0.10-0.15
l.13th C.	19	0.13	0.10-0.19
e.14th C.	14	0.11	0.06-0.18
m.14th C.	30	0.11	0.06-0.18
l.14th C.	12	0.11	0.06-0.15
e.15th C.	4	0.11	0.08-0.13
m.15th C.	2	0.08	0.06-0.10
Total	132	0.11	0.05-0.19

As combs in different skeletal materials have been proven to have slight differences in relative depth (see above chapter 4, section 4.2.1a), reflecting probably different mechanical properties of antler, ivory and bone, it is possible that different species of wood can determine somewhat differing optimal relative depths of combs (see further discussion below in section 5.2.3).

Size

Simple combs in wood have been encountered in larger sizes than their counterparts in skeletal materials, which is demonstrative of the different nature of wood providing a larger amount of solid tissue. Wooden comb sizes were obviously limited by the dimensions of the available raw material, the width of a comb being determined by the width of a wooden block determined in its turn by the diameter of

the trunk. The height of wooden combs varies from 51mm to 120mm and the width from 40mm to 113mm. Comb size ranges from 4025 to 9951 sq.mm, with an average size being around 6400 sq.mm. Figure 5.9 demonstrates that over 60% of combs range from 5000 to 7000 sq.mm in size, small-sized combs ($S < 5000$ sq.mm) accounting for about 12% of 127 objects in the assemblage of complete wooden combs from recent excavations and large-sized combs ($S \geq 7000$ sq.mm) taking about 25%. Table 56 compiling the data on 114 dated specimens from the sub-assemblage of complete combs, demonstrates that comb size diversity is higher in the group of early combs at the expense of a higher quota of small-sized combs (e.g. C280 (Fig.5.2) and large-sized specimens (e.g. C289 (Fig.5.2) and 308 (Fig. 5.4)).

Table 56 Class 2b combs. Sizes of dated intact specimens

Comb group	No. of combs	Average size	Small-sized combs		Medium-sized combs		Large-sized combs	
			No. of combs	% of a total combs	No. of combs	% of a total combs	No. of combs	% of a total combs
Early combs	35	6394	6	17.1	19	54.3	10	28.6
Late combs	79	6406	7	8.9	52	65.8	20	25.3
All combs	114	6402	13	11.4	71	62.3	30	26.3

5.3.1b Teeth

Most class 2b combs have two rows of teeth, with the usual marked division between fine teeth on one side and more widely spaced coarse teeth on the other.

As a basic rule, teeth in each row are cut in a similar manner as in the case of simple combs in skeletal materials, with a saw held at an angle to each face, first from one face and then from the other, resulting in a characteristically triangular cross-sectional tooth base. Straight cut teeth, however, are featured on some late combs (e.g. C102 (Fig.5.13), C283 (Fig. 5.18) and C293 (Fig. 5.16)).

The teeth are cut, tapered and rounded individually and teeth on only 7.4% of combs (24 specimens) show incontestable signs of having been cut to a height marked by guidelines, gently scratched more often on both faces and for both sets of teeth (e.g.

C30 (Fig. 5.4), C50 (Fig. 5.13), C76 and C77 (both Fig. 5.26), C266 (Fig. 5.10), C280 (Fig. 5.2)). Sometimes a guideline is incised along the centre of the central zone (C93 and C102 (both Fig. 5.13) and, quite exceptionally, just for coarse (C89 (Fig. 5.13)) or fine (C212 (Fig. 5.13)) teeth.

The paucity of objects with visible guidelines amongst the combs featuring, as usual, perfectly executed cutting of teeth to a desired height, however, rather highlights the probability that the guidelines would be disguised in one way or another. Some of the early combs, for instance, demonstrate a highly characteristic fashion of the treatment of teeth. The space between teeth at the very base is accurately slightly chipped out in a manner, which leaves a set of u-shaped or v-shaped indents. This seems to be a common ploy intended to conceal guidelines for cutting teeth. Quite often, similar incisions are cut alternately to the first row at the base of every tooth, producing a meander pattern (e.g. C44 and C83 (both Fig. 5.5), C 289 (Fig. 5.2)). The closest parallels to this fashion are found on lavishly decorated so called liturgical ivory combs from the Byzantine period at Corinth, dated to the 10th-early 11th centuries (Davidson 1952, Plate 80, 1301-1302). There is only one antler comb in the Novgorod collection (B47 (Fig. 4.38)) which features a similar fashion of treating the teeth and the immediate areas of the central zone. It derives from the context dated to the turn of the 12th century within property A (Troitsky site), which in many ways reveals Byzantine and ecclesiastical connections. It is worth noting that comb B47 features a marked difference in the density of coarse and fine teeth which, as was shown above (chapter 4, section 4.2.1b), was very unusual for class 2a combs of that time.

Most of the linear decorations along the margins of the central zone on late combs appear to have been applied by deepening and doubling the guidelines, the tooth cuts frequently overlapping them (e.g. C95, C142, C144 and C160 (all Fig. 5.21), C106, C132, C147 (all Fig. 5.23) and C292 (Fig. 5.10)). In general, such a decorative exploitation of guidelines appears to have been a new trend in the approach to decoration in the later period, quite opposite to conventional ploys to conceal guidelines in the early period.

There is another fashion concerning teeth, featured on some of the earliest wooden combs from Novgorod, which displays a marked similarity with the Byzantine counterparts. The depth to which fine teeth are cut diminishes towards the centre, giving the central 'solid' zone an arched outline. The solid zone is delimited with single or double incised lines, which in this case could well have been guidelines for cutting teeth (C85 and C325 (both Fig. 5.4)). A very similar comb made of elephant ivory was found with the remains of St Cuthbert at Durham (late 7th century) (MacGregor 1985, 79, Fig.45).

Three mid-late 13th century combs (C26, C260 (both Fig. 5.15) and C120 (Fig. 5.16)) feature an impressively skillful way of cutting teeth to the height, which was gradually diminishing and increasing again, producing an intricate outline of a blank central zone.

It has been demonstrated on the basis of the assemblage of class 2a combs (section 4.2.1b) that the degree of division in density between coarse and fine teeth (*tdr*) is a feature which is (in combination of other traits) diagnostic for certain cultural traditions and chronological trends. Let us have a close look at this feature in class 2b combs.

A total of 238 wooden combs have survived in a state suitable for precise measurement of the teeth density. The density of coarse teeth varies from 2 to 6 teeth per 10mm, with fine teeth varying in density from 6 to 11 teeth per 10mm. The degree of division in density between coarse and fine teeth is expressed as a coarse to fine teeth density ratio (*tdr*), and varies from 0.22 to 0.75 (the lower the *tdr*, the more marked the division between coarse and fine teeth). The average *tdr* is 0.40, which is lower than the average *tdr* for class 2a combs (*tdr*=0.54), implying that tooth density division is more pronounced on wooden combs (see section 4.2.1b, Table 23). A total of 219 combs from the group with measurable densities of both rows of teeth deriving from dated contexts are quantified in Table 57.

As can be clearly seen, a marked division between coarse and fine teeth ($tdr \leq 0.50$) can be called a characteristic feature of wooden combs, revealing a striking affinity with the Southern, Byzantine tradition of comb-making. Only a handful of five

combs feature a less pronounced difference in gauge of coarse and fine teeth. Two of these (C18 and C84 (Fig. 5.26)) derive from mid 11th century contexts within properties B and Γ on the Troitsky site. An early 13th century comb C70 (Fig. 5.27) is a rare example of an unfinished comb, an extremely clumsy attempt to make a wooden comb, which obviously went wrong. Finally, two combs (C265 and C283 (both Fig. 5.18)) come from 15th century layers. The difference between early and late combs with less marked difference in tooth density is that the former feature two rows of fairly coarse teeth, whereas the latter have two rows of fairly fine teeth, a feature also registered on some 15th century elephant ivory combs.

Table 57 Class 2b combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth

Date	Number of combs	Average coarse teeth density (per 10mm)	Average fine teeth density (per 10mm)	Average coarse/fine teeth density (per 10mm) ratio <i>tdr</i> *
m.10th C.	1	3.0	10.0	0.30 (0.30)
l.10th C.	3	3.0	9.7	0.31 (0.30-0.33)
e.11th C.	8	3.3	8.6	0.38 (0.30-0.50)
m.11th C.	13	3.5	7.9	0.44 (0.29-0.67)
l.11th C.	7	3.7	8.6	0.44 (0.27-0.50)
e.12th C.	6	2.8	8.5	0.33 (0.25-0.44)
m.12th C.	7	2.6	8.1	0.32 (0.22-0.44)
l.12th C.	2	3.0	7.5	0.39 (0.29-0.50)
e.13th C.	11	3.5	9.3	0.39 (0.25-0.56)
m.13th C.	17	3.4	8.5	0.41 (0.27-0.50)
l.13th C.	42	3.7	8.8	0.43 (0.29-0.50)
e.14th C.	38	3.6	8.7	0.42 (0.25-0.50)
m.14th C.	41	3.4	9.0	0.38 (0.27-0.50)
l.14th C.	16	3.2	8.8	0.37 (0.30-0.50)
e.15th C.	5	4.0	9.0	0.44 (0.33-0.60)
m.15th C.	2	5.5	9.5	0.58 (0.33-0.80)
Total	219	3.5	8.7	0.40 (0.22-0.80)

* A range of *tdr* within each chronological group is given in brackets.

5.3.1c Central zone

The relative height (relating to comb height: $rh = H_{cz}/H$) of the central zone has been proven to be a distinctive chronological indicator with regard to simple combs

in skeletal materials (see above chapter 4, section 4.2.1c). It is worth comparing this variable with regards to simple combs in wood.

Table 58 Simple combs in wood. Chronological changes in the relative height of the central zone

Date	Number of combs	Average relative height ($\sim rh$)
m.10th C.	1	0.19
l.10th C.	4	0.31
e.11th C.	9	0.31
m.11th C.	15	0.32
l.11th C.	9	0.29
e.12th C.	9	0.24
m.12th C.	7	0.22
l.12th C.	1	0.12
e.13th C.	11	0.23
m.13th C.	18	0.25
l.13th C.	44	0.22
e.14th C.	49	0.23
m.14th C.	49	0.21
l.14th C.	14	0.24
e.15th C.	5	0.26
m.15th C.	2	0.26
Total	247	0.24

A total of 278 combs from the class 2b comb assemblage have both measurements (H and Hcz) to allow the calculation of rh . The rh ranges less significantly than in the case of class 2a combs, varying from 0.11 to 0.50. Figure 5.11, which demonstrates the frequency of combs featuring various rh , reveals a few peaks, the highest two peaks being around 0.20 (proportional module 1:5, $rh = 0.19-0.22$) and 0.25 (module 1:4, $rh = 0.24-0.26$). Other peaks occur strikingly around the same points as have been revealed for class 2a combs, coinciding with certain proportional modules. One can see peaks aligned with modules 1:6 ($rh = 0.14-0.18$), 2:7 ($rh = 0.27-0.29$), 1:3 (0.30-0.34), 2:5 ($rh = 0.35-0.41$), a few small peaks being assigned to module 1:2 ($rh > 0.41$). A total of 247 dated combs are quantified by date in Table 58, which also shows the average rh for combs in each chronological slot.

When comparing the data in Tables 24 and 58, presenting respectively simple combs in skeletal materials and wood, one can see that wooden combs have on average

higher central zones which, as far as early combs are concerned, are consistently higher than in the case of their contemporary counterparts in skeletal materials. Late wooden combs, on the contrary, feature central zones which are consistently less high than those of class 2a combs.

Table 59 Simple combs in wood. The chronological distribution of combs featuring central zones assigned to various proportional modules*

Module Date	1:6	1:5	1:4	2:7	1:3	2:5	1:2	Total (100%)
m.10th C.	-	1 (100.0)	-	-	-	-	-	1
l.10th C.	-	-	-	-	3 (75.0)	1 (25.0)	-	4
e.11th C.	2 (22.2)	1 (11.1)	2 (22.2)	-	-	1 (11.1)	3 (33.3)	9
m.11th C.	-	1 (6.7)	3 (20.0)	1 (6.7)	3 (20.0)	6 (40.0)	1 (6.7)	15
l.11th C.	-	1 (11.1)	1 (11.1)	4 (44.4)	2 (22.2)	1 (11.1)	-	9
e.12th C.	2 (22.2)	3 (33.3)	1 (11.1)	1 (11.1)	1 (11.1)	1 (11.1)	-	9
m.12th C.	3 (42.9)	2 (28.6)	-	-	1 (14.3)	1 (14.3)	-	7
l.12th C.	1 (100.0)	-	-	-	-	-	-	1
e.13th C.	3 (27.3)	2 (18.2)	4 (36.4)	1 (9.1)	1 (9.1)	-	-	11
m.13th C.	3 (16.7)	4 (22.2)	4 (22.2)	1 (5.6)	5 (27.8)	1 (5.6)	-	18
l.13th C.	10 (22.7)	19 (43.2)	8 (18.2)	3 (6.8)	4 (9.1)	-	-	44
e.14th C.	8 (16.3)	16 (32.7)	10 (20.4)	9 (18.4)	5 (10.2)	1 (2.0)	-	49
m.14th C.	16 (32.7)	20 (40.8)	6 (12.2)	5 (10.2)	2 (4.1)	-	-	49
l.14th C.	2 (14.3)	4 (28.6)	3 (21.4)	5 (35.7)	-	-	-	14
e.15th C.	-	4 (80.0)	-	-	-	-	1 (20.0)	5
m.15th C.	1 (50.0)	-	-	-	1 (50.0)	-	-	2
Total	51 (20.6)	78 (31.6)	42 (17.0)	31 (12.6)	27 (10.9)	13 (5.3)	5 (2.0)	247

* Percentages given in brackets are in bold print when being equal to or more than the average (bottom line).

5.3.2. Decoration

Decorative enhancement of simple combs in wood is even more emphasised on the central zone than in the case of class 2a combs, with decoration on the side ends of the faces and side edges occurring extremely rarely. Of 325 class 2b combs from recent excavations, 223 objects have decorated central zones, including five specimens (early comb C321 and late combs C65 (Fig. 5.20), C170, C183 and C295 (all Fig. 5.12) which feature a rather careless scratched secondary decoration. Twelve objects are either too fragmented or too poorly preserved to judge whether they were decorated or not. A total of 90 combs (28.8% of 313 combs with unambiguous blank or ornamented central zones) have undecorated central zones. These form a proportionally larger group compared with their class 2a counterparts.

Table 60 compiling class 2b dated combs, is a combined version of Tables 27 and 29 presenting the assemblage of class 2a combs. Combs with blank central zones are not uncommon amongst both early and late wooden combs, whereas those in the assemblage of skeletal materials form only a small fraction up until early 13th century (see above Table 27). Undecorated wooden combs of the early wave most often (in terms of both numbers and the percentage of contemporary combs) occur in the mid 11th century, i.e. during the first peak time (e.g. C78, C84 and C167 (all Fig. 5.26)). It is worth noting that late combs with blank central zones are both most numerous and provide larger proportions in the late 13th –14th century sample, in other words around the second peak period. Comparing the two sub-assemblages of both 2a and 2b classes of simple combs deriving from the deposits younger than mid 13th century, one can see that the quota of combs with blank central zones is consistently higher amongst specimens in skeletal materials. Common types of late combs with blank central zones are depicted in Figure 5.14.

Some late combs look very ornamental even when devoid of any decoration in the conventional manner. Decorative impression is created either by ornate outline of the central zones, delimited by the base line of teeth deliberately cut at gradually changing heights (e.g. C26 and C260 (both Fig. 5.15), C120 (Fig. 5.16)), or by ornate sides (e.g. C41 (Fig. 5.16) and C261 (Fig. 5.15)).

Another difference between class 2a and 2b combs, both in organic materials, is that the former quite often combine blank central zones with side edge decoration, which is especially common in the 13th century. Side edge decoration is very rare on wooden combs (discussed below in this section) and only one wooden comb from the latter 12th century context (C300 (Fig. 5.4)) features ornamentation of multiple oblique lines on the side edges and a blank central zone.

Table 60 The frequency of the main patterns on decorated combs and chronological distribution of undecorated combs on the evidence of the assemblage of class 2b combs.

Date	Decorated combs*				Undecorated combs**	Total of dated combs
	All	L	RD(L.RD)	Others		
m.10th C.	0	-	-	-	1 (100.0)	1
l.10th C.	5	4 (80.0)	-	1 (20.0)	-	7
e.11th C.	8	8 (100.0)	-	-	2 (20.0)	10
m.11th C.	8	6 (75.0)	2 (25.0)	-	6 (40.0)	15
l.11th C.	8	8 (100.0)	-	-	3 (21.4)	14
e.12th C.	7	6 (85.7)	-	1•(14.3)	4 (36.4)	11
m.12th C.	2	2 (100.0)	-	-	5 (71.4)	7
l.12th C.	2	2 (100.0)	-	-	1 (33.3)	3
e.13th C.	6	6 (100.0)	-	-	5 (41.7)	12
m.13th C.	16	9 (56.2)	5 (31.3)	2• (12.5)	4 (20.0)	20
l.13th C.	31	14 (45.2)	12 (38.7)	5••(16.1)	20 (37.0)	54
e.14th C.	40	23 (57.5)	16 (40.0)	1 (2.5)	16 (28.6)	56
m.14th C.	41	29 (70.7)	11 (26.8)	1•(2.5)	9 (17.6)	51
l.14th C.	17	14 (82.4)	3 (17.6)	-	1 (5.6)	18
e.15th C.	6	4 (66.6)	-	2 (33.3)	-	6
m.15th C.	1	-	-	1 (100.0)	1 (50.0)	2
Total	198	135 (68.2)	49 (24.7)	14(7.1)	78 (27.2)	287 ¹

* Figures in brackets show the percentage of patterned combs in the total of 198 decorated specimens and appear in Bold when equal or higher than those for the whole sub-assemblage (bottom line).

** Figures in brackets show the percentage of undecorated combs in the total of 287 dated specimens and appear in Bold when equal or higher than those for the whole sub-assemblage (bottom line).

• A single comb with secondary decoration

As far as decorated wooden combs are concerned, it should be noted, that on the one hand, the range of decorative motifs is far less wide than on those in skeletal materials, with the dominance of L-patterns and ring-and-dot decorations. On the

¹ In a total of 287 dated specimens 11 fragmented or poorly preserved combs can not be allocated to either decorated or undecorated combs.

other hand, that there are some ornamental elements and decorative techniques, which were rarely or never exploited on class 2a combs. Let us start with these first.

Table 60 demonstrates that decorations other than linear or ring-and-dot ones account for only about 7% of decorated combs from dated contexts.

Only two early combs feature rare types of ornamentation, one of which is a secondary decoration of marginal lines flanking a meandering line in the centre scratched in a rather careless manner (C321). The other example (C74 (Fig. 5.2)) deriving from the late 10th century context is decorated with carved in relief triple lines crossed repeatedly to form multiple lozenge patterns incorporated within marginal lines marking boundaries of the solid zone on all four sides. Patterns within marginal frames are very characteristic for Byzantine traditions of comb-making (Davidson 1952, Plate 80, 1299, 1301-1303).

In the group of late wooden combs rare types of ornamentation (apart from the secondary ones) occur either amongst the mid 13th-early 14th century specimens (Fig. 5.17) (carved decorations) or amongst the 15th century combs (Fig. 5.18) (painted decorations). Rare carved decorations are normally based on patterns incorporating also most popular linear (C104 (Fig. 5.17)) or linear and ring-and-dot motifs (C86, C125 (both Fig. 5.17), and C257 (Fig. 5.22)). 14th century specimens C86 and C257 both with an unfortunate break through the middle feature a zoomorphic figure carved in bas-relief in the central medallion, which is most likely a depiction of a lion featured also on an early 14th century Nerevsky comb with almost identical decoration (Kolchin 1971, 16-17, Fig. 3:1).

Decorative motifs carved in relief were almost never exploited on simple combs in skeletal materials. Wood, even hardwood species such as boxwood, as a much softer material than ivory, bone and antler, provided better opportunities for carving, which, due to a deeper intrusion of knives and chisels into the solid material looks very impressive. This can be seen on combs featuring chevron and IVBM patterns (C274 and Ner-2¹), depicted in Figure 5.25. Decorative elements carved in relief

¹ Ner-XXIX-1960 14-1980-1 (spit-square-field No.), late 13th century

against tooled background, smooth or punched are often encountered on boxwood combs made in European workshops in the 13th-15th centuries.

In the Novgorod collection, especially interesting is comb C259 (Fig. 5.15) which bears a relief-carved figure consisting of a number of short lines intersecting one another at right angles. The figure resembles geometrical symbols of ownership, which were used by merchants from the countries of the Hanseatic League for marking their merchandise (Homeyer 1970). In Novgorod, similar symbols are known on discoid bases of coopered vessels from the 14th-15th century deposits (Kolchin 1968, 30-31, Fig. 22) and on wooden plates, coopered and turned vessels from the Gotsky site within Gotlanders' quarter on the Trade side of the town (Rybina 1978b, 215-217, Fig. 14-15). Owners' marks are extremely rare on wooden combs. There is only one comb bearing a carved inscription in Cyrillic 'ЗАВИЖ ГРЕБЕНЬ' ('comb belonging to Zavid') in two strips of blank areas in the central zone outlined by linear saw-cut incisions (Fig. 5.19). On the other face, however these strips are filled with meandering line carved in relief. If the interpretation of the symbol on comb C259 as an owner's mark is correct, then the owner was most likely a trader from Western Europe. The find was uncovered in the Torgovy site located in the nearest vicinity of the Novgorod market and may well have been lost by its owner, perhaps a frequent visitor to the market.

Openwork decorations are also unknown on simple combs in skeletal materials, but a few specimens in wood feature this decorative technique. On late 13th century comb C125 (Fig. 5.17) marginal linear decoration is combined with a single ring-and-dot element incorporating circular openings. Openwork decorations are very rare on the combs from the Novgorod collection. Only two more examples are known from the Nerevsky assemblage: an early 14th century comb combining two rhomboid openings with ring-and-dot decoration (Kolchin 1971, 16-17, Fig. 3:9; Rosenfeld and Rybina 1997, Table 12, 5) and a mid 14th century specimen featuring linear marginal decoration with multiple rhomboid openings (Fig. 5.17: Ner-1)¹.

Boxwood combs decorated with engraved linear or ring-and-dot patterns alternating with openwork and specimens with openwork only are known amongst the finds

¹ Ner-XXIX-59 10-1968-8 (spit-square-field No.)

from late 13th – 15th century contexts in London (Egan and Pritchard 1991, Fig. 249, 1730, 1737, 1743). At the same time openwork decorations are very common on the 12th-14th century double-sided composite combs from the sites all around the Baltic, such as Schleswig (Ulbricht 1984, Taf. 31:4, 76:4), Århus (Andersen and Madsen 1985, 70, Fig. 40:ZM), Ribe (Andersen 1968, 36 Fig. 19, 39), Tommarp (Thun 1967, 84 Fig. 28g), Lund (Persson 1976, 330 Fig. 295:54E), Oslo (Molaug 1975, 238 Fig. 17:3; Wiberg 1987, 418 Fig. 4:e), Polish Opole-Ostrówek and Kraków (Chimelowska 1971, 74 Ryc. 23), Riga (Caune 1983, 116 Att. 39:16) and a number of Estonian towns including Tartu, Tallin, Rakvere and Ostepää (Luik 1998, 97-99 Fig. 81-83, 115-116, Fig. 101-102).

All three painted combs come from 15th century deposits (Fig. 5.18). On comb C139 the paint is poorly preserved as a faint, hardly visible geometrical pattern with no hint with regard to the original colour. Painting in reddish-brown hues is preserved better on the specimen C283, but the pattern is difficult to make out. A superb flowery pattern painted within the central belt outlined by multiple fine marginal lines, which are also painted, has preserved extremely well on the early 15th century comb C265. Although no special identification of the pigment has been undertaken, a sparkling golden hue suggests that it may have been orpiment (arsenic sulphide), a pigment imported to Europe mainly from Asia Minor. This pigment has been identified on a bone button from the 11th century context in Novgorod (Freestone and Middleton 2000, 12; Smirnova 2000, 116-123). The arsenic content of orpiment could have been harmful for the hair and even fatal. In 1324 Parisian comb-makers utilising boxwood were not allowed to paint and gild their products due to possible side effects of toxic colours (De Lespinasse 1892, 672). However, a French made boxwood comb uncovered from a 15th century deposit in London features painting with a mixture of yellow ochre and orpiment (Egan and Pritchard 1991, 374-376, Fig. 250).

Over 90% of decorated wooden combs feature marginal linear or ring-and-dot decorations.

Combs with linear decoration (mainly L1, less often L2 patterns) invariably form the largest group among decorated specimens from all periods. However, their quota is

constantly much higher in the early combs and only youngest combs in the late specimens (late 14th – early 15th century) reveal as high a percentage of L-patterned combs as the early ones (Table 60). There is, however, a distinctive character of early linear decorations: linear incisions underlining the teeth rows are cut at a certain indent from the tooth base (e.g. C280 and C291 (both Fig. 5.2), C308 (Fig. 5.4), C5, C16, C44, C83 and C166 (all Fig. 5.6)). Only very few of the oldest L-patterned combs of the second wave (early-mid 13th century) feature the same character of linear ornamentation (e.g. C6 (Fig. 5.20)). As a rule, linear incisions on the late combs are narrow saw-cuts right along the tooth base line which appear to be just deepened guidelines for cutting teeth (Fig. 5.21).

Ring-and-dot elements are extremely rare on early wooden combs and in the collection of recent finds have been encountered twice amongst the mid 11th century combs (C289 (Fig. 5.2) and C307) featuring classical L.RDE patterns incorporating small ring-and-dot motifs, which are common on early class 2a combs (see above chapter 4, section 4.2.2).

Ring-and dot decoration is unknown on wooden combs from the deposits of the late 11th –early 13th century, precisely the time when the use of ring-and-dot elements in various patterns on the combs in skeletal material was especially common (section 4.2.2, Table 29). From the mid 13th century and during the 14th century, however, ring-and-dot decoration became very common on wooden combs. There are a few aspects concerning this type of ornamentation, which separate simple combs in wood from their counterparts in skeletal materials featuring ring-and-dot decorations.

The first, a chronological aspect has been mentioned already. Wooden combs featuring patterns similar to most common on class 2a RDE (and the like) patterns incorporating a few larger motifs (most frequent three, RDE3 patterns) with or without small groups of smaller motifs (see Fig. 4.53), are at least a hundred years younger (e.g. C106 and C132 (both Fig. 5.23), C54, C55, C96 and C164 (all Fig. 5.24)). More often wooden combs feature RDE patterns based on one (e.g. C28 (Fig. 5.28), C61, C150, C290 (Fig. 5.10)), two (e.g. C28 (Fig. 5.28) and C181 (Fig. 5.24)) or five and more biggish motifs (e.g. C297 (Fig. 5.22), C147 (Fig. 5.23) and C176 (Fig. 5.24)). There are also RDE patterns, which are featured only on wooden simple

combs (e.g. 161, C 177 and C297 (all Fig. 5.22)). A highly distinguishing feature of the late 13th –14th wooden combs with ring-and-dot decorations is that these are most often combined with single or double marginal linear incisions of the ‘deepened guideline’ type. Ring-and-dot ornamentation without marginal lines are encountered very rarely (e.g. C177 (Fig. 5.22), C96 and C176 (both Fig. 5.24)).

The next aspect separating combs in wood from their RDE-patterned counterparts is technological. Firstly, the ring-and-dot motifs are bigger, large elements being 12-16mm in diameter and small elements being 5-7mm in diameter. Secondly, large elements feature as a rule three and sometimes four rings, whereas those on class 2a combs have two concentric rings. Fairly often wooden combs feature either ring-and-dot elements carved in relief (e.g. C57 and C297 (both Fig. 5.22), C28 (Fig. 5.28)), in combination with other elements carved in relief (e.g. C86 (Fig. 5.18) and C257 (Fig. 5.22)) or in combination with openwork elements (C125 (Fig. 5.17)).

Decoration of the ends of comb faces occurs on wooden combs extremely rarely and has been encountered on three combs including a specimen from the Nerevsky excavation (Fig. 5.25: Ner-2) and two combs from recent excavations (C56 and C274 (Fig. 5.25)), all deriving from 13th century layers.

Also rare are combs with side edge decoration: four combs in the collection from recent excavations feature this type of additional ornamental enhancement, which in the case of the late 14th century specimen C96 (Fig. 5.24) appears to be secondary. Flowery ring-and-dot compositions within a ring occur on another two 14th century combs (C86 (Fig. 5.17) and C257 (Fig. 5.22)). These have never been encountered on class 2a combs, which most often feature side edge decoration in the mid 12th – 13th centuries (section 4.2.2, Table 27). Only mid-late 12th century comb C300 (Fig. 5.4) has side edges decorated with oblique line in a manner similar to the conventional side edge decorations on simple combs in skeletal materials.

5.3.3 Raw Material

Only a selection of wooden combs has been identified to species. The Nerevsky assemblage of 909 wooden objects identified by Vikhrov included 85 simple combs

selected at random from a total of 299 class 2b combs from the site (28.4%). A total of 82 combs were identified as boxwood, the remaining three being pine (*Pinus sylvestris*), birch (*Betula* sp.) and willow (*Salix* sp.) (Kolchin 1968, 12-13, Table 1). Some combs from post-Nerevsky excavations of the 1960-s to mid-1970s have been identified by O.N.Chistiakova, who revealed that the vast majority were made of boxwood, 'other southern species' including iron tree being present (Rybina 1978, 45). The exact numbers of finds identified by Chistiakova as well as the size of the total assemblage and its provenance, however, are unknown. Finally, a random selection of six combs from the Nerevsky¹ Il'insky (C290), Nutny (C266, C289 (Fig. 5.2)) and Troitsky (C28) excavation sites has been identified by J.Hather (Institute of Archaeology, UCL), all being boxwood.

It can be assumed, therefore, that most wooden combs from Novgorod deposits are made of boxwood, an immensely dense and hardwood with ultra fine and uniform texture and a straight grain. Fresh boxwood has an even straw yellow colour and even archaeological boxwood is sandy-greyish and noticeably lighter than wooden fragments of other species. The main advantages of boxwood are that it does not warp once it has been seasoned and it holds a clean sharp edge and finishes to a perfectly polished surface. The wood has excellent machining properties and is extremely difficult for working with hand tools. The shrub (*Buxus sempervirens* L.) grows naturally in the mixed deciduous woodlands of the Mediterranean zone, Transcaucasian region and Caucasian coastline area of the Black Sea; it is accepted as being native even in the south of England, southern Germany and Northern France. The shrub could grow up to over 2m high, the diameter of the lower parts of trunk being up to 150-180mm.

One of the most important questions to answer is where the boxwood brought to Novgorod came from, and whether it was raw material or finished items, which were imported.

¹ Mid 14th century comb Ner-XXIX-1959, 10-1968-8 (spit-square-field No.) and mid 13th century comb Ner-XXIX-1960, 14-1980-1(spit-square-field No.).

Observations on the grain flow on combs and average dimensions of the combs ($\sim h^1=83\text{mm}$ (range 51-120mm); $\sim w^2=78\text{mm}$ (range 40-113mm); $\sim d^3=10\text{mm}$ (range 5-16mm)) reveal the fact that they were made out of blocks of wood approximately 10mm thick, 80-90mm high and 70-80mm wide cut tangentially with the grain. It is not difficult to see that with the average width of combs equal to 78mm raw material of about 9-11mm in diameter was used for comb-making and simple calculations give us a shockingly small figure of 6.5m total length of wood of this diameter utilised for production of all combs from Novgorod recorded up to now. Even if we assumed that about 20% of raw material were discarded as waste, the figure would rise only up to 8m and early combs would take a length of no more than 2m of the valuable wood.

The amount of raw material does not allow serious discussion of the existence of well-organised long-distance trade of raw material. Unfortunately, woodworking waste (which might throw some light on the problem) has never been retrieved or even looked for systematically. Inevitably, with so little raw material involved, even if boxwood waste had been preserved in the soil it would have been overlooked. The unique fragment of a wooden plate with half-cut row of fine teeth from the Kirovsky site in the Slavensky End of the town (discussed below) is the only direct evidence for the local comb-making utilising wood, which probably took place in Novgorod, to some extent at least. The piece, however, was not retained and it remains unknown whether it was boxwood or not. For the moment it may simply be said that the lack of direct evidence makes us pay special attention to stylistic analysis of the products themselves and comparative study of the materials from other contemporary sites in Europe.

5.4 Review of the Main Stylistic Groups of Class 2b Combs

Wooden simple combs in Novgorod collection represent two periods of occurrence: the early period (10th-12th centuries) and the late period (13th-15th centuries). Early combs from Novgorod (Fig. 5.2, 5.4 and 5.5) reveal a striking uniformity on the one

¹ calculated on the basis of 279 specimens

² calculated on the basis of 127 specimens

³ calculated on the basis of 158 specimens

hand, and conformity with the East Mediterranean tradition on the other. They are lentoid in cross-section and square in outline, more often slightly elongated in the vertical plane. Almost all of them have straight ends and pronounced difference in gauge between coarse and fine teeth.

35% of early boxwood combs from Novgorod are without any decoration, but slender proportion and very professional craftsmanship revealed, for example, in special methods of cutting and shaping teeth, make for their exquisite character. As a basic rule, the central solid zone is characteristically wide, taking on most combs about a third or more of their height, although a few combs are known with rather narrow central zones. A vast majority of decorated combs carry single (rarely double) linear incisions underlining the teeth rows at a pronounced indent.

The observation of stylistic peculiarities of early boxwood combs reveals rather ancient manufacturing traditions which are alien to Northern Russian, or indeed Northern European custom, but are perfectly in accordance with East Mediterranean tradition most explicitly manifested by contemporary boxwood and ivory combs from Byzantine collections.

Generally speaking, in comparison with early specimens, wooden combs of the later period exhibit a far wider range of forms and the use of a variety of new decorative motifs and techniques. They feature straight, concave, convex and ornate ends, carved linear, ring-and-dot and other motifs, as well as open work and painted decoration. However, different sub-periods can be revealed, throwing some light on the problem of the provenance of boxwood combs.

As mentioned above, a square outline is the most characteristic feature of boxwood combs, however, combs of the early group and early combs of the late group are more often slightly elongated in the vertical plane. Combs from the deposits dated to the first half of the 13th century demonstrate other features characteristic for the East Mediterranean tradition such as straight ends (up to 70% of the assemblage), wide central reserve of about a quarter of a comb height (85% of combs) and the lack of decoration (Fig. 5.20). Combs devoid of any decoration make up about 30% of 13th

century combs, linear incised decoration accounting for 75% of the remaining combs.

The whole concept behind reintroduced boxwood comb-making is totally contrasting to fashionable local products of antler combs with their extravagantly concave ends and lavish ring-and-dot ornaments, which dominated on the consumer's market in the period. A very small portion of combs of the first half of the 13th century exhibits features which are beyond both Novgorod and East Mediterranean tradition. Thus, ornate ends (Fig. 9; 10, 2) on composite and one-piece combs are more common in Western European and Baltic traditions of comb-making (Egan & Pritchard 1991, 370-376; Ulbricht 1984). Although antler combs with concave ends were very popular in the Novgorod comb-making repertoire, the turning point was normally located in the upper half of the height (a feature being a result of adapting the morphological forms of elk antler to a specific form of combs). A pronounced concave line of the sides with the turning point at the middle of the height is a rather unusual form for Novgorod tradition, more common in the west (Fig. 5.15).

Although the quota of the combs devoid of decoration remained more or less the same as in the early period (about a third) during the first decades of the 13th century, decorative effects were gained more by means such as a curve of the sides or an intricate outline of the central zone as a result of skillful way of cutting teeth to the height, which was gradually diminishing and increasing again (Fig. 5.15, 5.16).

On the other hand, some alterations in the old decorative schemes can be seen on some of the oldest wooden combs of the second wave: incised lines seem to be no more than guidelines deepened into grooves. Generally speaking, such a decorative exploitation of guidelines appears to have been a new trend in the approach to decoration in the later period, quite opposite to conventional ploys to conceal guidelines in the early period. By the end of the first half of the 13th century ring-and-dot decorations appeared on boxwood combs, featuring much bigger circles than on the antler counterparts (Fig. 5.22).

From around the mid 13th century a noticeable shift in the style of boxwood combs can be traced. Fewer combs might be allied to Mediterranean tradition and

throughout the late 13th-14th centuries new designs became predominant on the Novgorod market with L patterns of the 'deepened guideline' style and RDE patterns (most often also incorporating linear incisions along the tooth base line) accounting for over 80% of decorative patterns. Specimens featuring ornamental elements carved in relief and openwork decorations find parallels in the assemblages of 13th-15th century simple and composite combs in Western Europe. Undecorated combs with narrow central zones take about a quarter of late 13th –14th century specimens.

The main shift in wooden comb designs around the second peak time for boxwood combs in Novgorod (late 13th-14th centuries) was away from the straight sides and towards the concave sides. Convex-sided become especially fashionable for a limited period in the early 14th century. The only morphological trait, namely the pronounced difference in tooth density on coarse and fine teeth rows, remained stable throughout.

The youngest combs in the Novgorod collection (15th century) exhibit new decorative techniques (painted combs) and an occasional occurrence of specimens with two rows of fairly fine teeth, which has been also encountered amongst the latest ivory combs in the assemblage of class 2a combs.

5.5 Areas of Origin and Place of Manufacture

Single combs of boxwood and ivory with squared or more rarely convex ends are believed to originate in Greco-Roman culture, elephant ivory or boxwood being the usual media, since their great dimensions more appropriately lent themselves to single-piece combs (MacGregor 1985, 78-80; Dunlevy 1988, 349; Galloway 1990, 665-671). Lasko has argued for an East Mediterranean or Coptic origin for these combs (Lasko 1956, 336-355). They become especially common in the late Roman period and the first finds in the West appear to have come via the Roman World. Very few Dark Age and Romanesque combs (in ivory) are distinguished by their adherence to Mediterranean tradition and are thought to be associated with the dignitaries of the Church of Rome, most likely having been of liturgical use (MacGregor 1985, 78; Hughes 1925). Boxwood combs are unknown in early medieval urban contexts in Western Europe, which highlights the significance of the

Novgorod assemblage of 65 combs from the late 10th – mid 12th century layers. In Russian lands only Kiev (Karger 1958, Plate XCIII) and Pskov (I.K.Labutina, personal communication) can boast a few early medieval boxwood combs in archaeological collections.

Observation of the stylistic peculiarities of early boxwood combs reveals ancient manufacturing traditions which are alien to Northern Russian, or rather Northern European custom, but are perfectly in accordance with East Mediterranean tradition. Highly developed skills implicit in most of the early comb designs suggest that they were manufactured outside Novgorod and imported as finished items. The most plausible provenance of the oldest simple combs in wood is the Byzantine Empire, which had both a continuity of simple comb making from the late Roman times well into the 11th century, as well as rich sources of boxwood (especially in Asia Minor). The appearance of the first boxwood combs coincides with the intensive contacts of the Russian princes with Constantinople, which reached a peak around and after the time of the adoption of Christianity in Russian lands (ca 988). Boxwood simple combs appear to represent, therefore, the Christian tradition of comb-making versus the ‘pagan’ practice of manufacturing single-sided composite combs. They were, so to say, symbols of the new faith, items of the new ‘cultural vocabulary’, as it was expressed by Franklin and Shepard (1996, 209-210):

The cultural vocabulary of the new faith –whether in buildings or in worship or in painting or in writing – was that of eastern Christianity, and thus was derived directly or indirectly from Byzantium. Byzantium was the source, the measure, the prototype of Christian civilization; a Byzantine provenance was a guarantee of authenticity and authority.

It remains unclear, however, whether they were produced in the Byzantine Empire homeland or in the Byzantine outposts in the Crimea. It is worth noting again that the earliest simple combs in skeletal materials are a few decades younger than their wooden counterparts, but they seem to have followed the same fashion as boxwood combs in having, as a basic rule, straight sides, mainly linear incised decoration and a square or steep-sided trapezoid outline (see section 4.3). By the mid 11th century, when one can see the first peak of the occurrence of boxwood combs in the deposits of Novgorod, class 2a combs already outnumbered those of class 2b and, together,

single combs became more common than single-sided composite combs, which up to that time remained predominant (Fig. 5.3).

Whereas most early wooden combs appear to have been brought into the town as finished items, mid-late 11th century specimens (most numerous amongst the combs of the first wave) feature a certain diversity of morphological features, such as tooth density ratio, relative depth, as well as high percentages of undecorated combs (see sections 5.3.1ab, 5.3.2). Most of these somewhat odd combs come from property Γ of the Lyudin End (Troitsky site) (with a few deriving from neighbouring properties M and IP) (Fig. 5.26). Property Γ has produced some direct and indirect evidence for episodic manufacturing of class 2a combs in the later 11th century (see section 4.5) and one can see stylistic similarity between class 2 combs in antler (B112 (Fig. 4.39), B113 (Fig.4.33)) and wood (C76, C77 and C84 (all Fig. 5.26)) deriving from the same chronological stratum on property Γ . It can be speculatively suggested that a maker of simple combs, who stayed for some time on the property, utilised both kinds of organic materials. It is highly regrettable that the wooden combs have not been identified and it remains unclear whether the comb-maker had some boxwood material or prefabricated boxwood combs (comb-blanks) in stock which can be indicative of southern connections or experimented in different species of wood.

Similar mechanical properties of wood and skeletal materials cause similar common types of breakage of combs and, therefore, similar methods of repair. In cases when teeth on one side were broken, whereas teeth on the other side remained sound, a double-sided one-piece specimen could have been converted into a single-sided one, damaged teeth being filed off and the back being reshaped. This method of repair can be seen on the three early combs (C44, C166 (both Fig. 5.5) and C325 (Fig. 5.4)). In cases of breakage of a seemingly sound comb into two pieces along the grain of fibrous tissues, one or two holes were drilled through the central zone close to the broken edge of both halves to receive retaining shackles, or a thong which would have been passed through the holes, thus keeping them firmly together (C43 (Fig. 5.5) and C291 (Fig. 5.2)).

By the late 11th century class 2b combs appear to have been superseded by class 2a combs and during the 12th century they constantly decreased in numbers. It is

obvious, therefore, that early boxwood combs belong to the same group of imported items such as amphorae fragments, walnuts, glassware, which together with some coins and lead seals indicate political, cultural and trade contacts with the Byzantine Empire in the 10th –11th centuries. These contacts were especially brisk during the time of the most successful of the Byzantine emperors, Basil II (985-1025). Under Basil II the Empire doubled in size and, up to the mid 11th century, the Byzantines took control over all Mediterranean trade and dominated in trade with Rus'. Exports (both directly from and through Constantinople and from Byzantine cities on the Black Sea) of amphorae (with oil and wine), coins, walnuts, boxwood, silver and gold flowed to Russian lands via Kiev along the river Dnieper (*The Oxford Dictionary of Byzantium* 1991).

After the emperor Basil II died in 1025, the Byzantine Empire lacked the infrastructure and resources to maintain the boundaries. Subsequent emperors became embroiled in the ecclesiastical politics that provoked the 'Great Schism' of 1054. The Schism invited hostility from the West, which coincides with the renewed Muslim offensive by Seljuk Turks, culminating in the Battle of Manzikert (1071). As a result, the political situation in the Mediterranean by the end of the 11th century had changed dramatically: the Seljuk Turks established themselves in Anatolia (Muslim state of Iconium) while the Normans took over Byzantine territory in southern Italy.

The decline of the Byzantine Empire in the late 11th century seems to be the most crucial factor determining the patterns of chronological distribution of southern imports in the earliest deposits of Novgorod. The political confrontation between the *boyars* of Novgorod and the Prince of Kiev, which occurred around the same time, was the additional factor contributing to the decrease of the southern trade and the decline of the Dnieper trading routes (Rybina 1978, 19-52).

Boxwood combs reappear in Western Europe in the late 12th century and become more common in the late 14th centuries (Egan and Pritchard 1991, 374), which coincides with the second period of occurrence of boxwood combs in Novgorod. Some medieval boxwood combs found in urban contexts show amazing similarity to their counterparts of the Roman period.

Wooden simple combs reappear in Novgorod at the turn of the 13th century in numbers comparable with those at the very peak of their occurrence in the early period but, even in the mid 13th century, they formed only the smallest group in the range of combs available in the town. However, boxwood combs quickly appear to supersede the previously most popular classes of simple combs in skeletal materials (Fig. 5.3) as well as, as will be shown below (see chapter 6), double-sided composite combs in antler and bone. By the turn of the 14th century they gained a predominant position in the comb repertoire of Novgorod, the middle to late 14th century having been the period of real bloom.

The 12th century, characterised by low numbers of boxwood combs associated with East Mediterranean tradition, coincides with the period of crusades. During that time, a number of important changes took place in the East Mediterranean. Byzantine lands were divided up: following the sack of Constantinople by the Fourth Crusade in 1204, the territory in Europe in the form of a series of Latin states came under the control of the Frankish emperor. Greek rule survived in Western Anatolia, based at Nicaea, and also in Epirus and in Trebizond on the Black Sea. These areas are the most probable provenance of the earliest boxwood combs of the later period. The decline in their occurrence by the mid 13th century can be explained by the invasion of Tartar-Mongols. After the city of Kiev was razed to the ground, the trade along the Dnieper came virtually to a standstill. Around the same time one can see a noticeable deceleration in the increase of the presence of boxwood combs, characteristic in general for the 13th century. Similar chronological trends in the dynamics of the southern trade have been demonstrated by I. Volkov in his detailed study of the occurrence of Byzantine amphorae in Novgorod (Volkov 1996, 90-101). The author identified two main groups among the amphorae fragments: Triglia and Trebizond groups, called after the two pottery production centres on the south coast of the Sea of Marmara and on the south-east coast of the Black Sea. The former group shows similar patterns in their chronological distribution in Novgorod deposits to those of combs allied to Mediterranean tradition.

It is possible that some combs may have come into town from the south via Kiev. In 1247, that is to say after Kiev had been captured by Mongols, John of Pian de Carpine saw merchants who came from Constantinople through the lands under

Tatar-Mongols. Their names were Michael and Bartholomew of Genoa, Manuil of Venice, Jacob Ravelius of Acra and Nicolay of Pisa (Friar John of Pian de Carpine 1957, 82). As a result of the increasing weakness of the Byzantine empire from the late 12th century, its economy became dominated by Venetian merchants in Constantinople and, by the mid 13th century, Venetian and Genoese trading houses completely took over control of Byzantine and Mediterranean international commerce. On the evidence of stylistic changes, it seems more likely, however, that the flow of boxwood was re-routed as it became more available from the west. An increasing flow of boxwood from the west, brought into Novgorod by Gotlandic and German merchants, may have helped to soften a little the loss of southern trade. Quite similar patterns has been recently traced by V.Koval in the red wine trade on the evidence of Byzantine amphora fragments found in Russian towns, Novgorod providing the bulk of the material. After the Byzantine reign was restored in Constantinople in 1261, Genoese trading houses were granted the sole right of trade in the Black Sea region. The Italians used barrels instead of amphorae, as did the Germans, who immediately filled the gap in the wine supply to Russia caused by the Tatar-Mongols' intrusion into the lands to the north of the Black Sea (Koval 1999, 254).

The late 13th century appears to be a rather crucial period in terms of the range of most popular combs. It demonstrates a marked drop in the use of double-sided composite combs (Fig. 6.1, 7.2 and 7.3), which, for a while in the middle of the century, dominated over single-sided combs of skeletal materials and boxwood, and nearly equal usage of simple combs of both media. Meantime, antler combs became plain and, apparently, went through a period of decline, whilst boxwood combs showed a wide variety of designs.

Marginal linear decoration of the 'deepened guideline' type is very common on late 13th-14th century combs, with over 65% of late wooden combs exhibiting this feature. Up to 83% of RDE-patterned wooden combs combine this decoration with incised marginal lines along the tooth base. It seems very likely that ring-and-dot patterns (most of which are similar to decorative patterns on the later 12th-early 13th century class 2a combs, manufactured locally) would have been applied in Novgorod on either blank combs or combs with simple linear decoration manufactured

elsewhere. A few examples have been encountered which can be called experimental with a marked asymmetry of ornamentation (e.g. C63 (Fig. 5.27) and C132).

The most expressive find with, presumably, a secondary carved decoration is Zavid's comb (C60 (Fig. 5.19)), deriving from the late 13th century context on property Ж of the Troitsky site. Both faces were originally decorated with incised linear decoration, whilst later, one face obtained an additional decoration of a double meander line carved in relief, and the other received the owner's mark in Russian reading 'comb belonging to Zavid'. In contrast to a few finds featuring rather botched attempts at additional decoration, which were probably scratched by the owners, Zavid's comb appears to be one of 'special order' combs (Hilczerowna 1961, 96) or, rather, 'true special-order' combs. The latter term was introduced by Galloway and Newcomer (1981, 87) for combs which were especially elaborate in conception and execution and which feature 'special departures from the norm'.

It seems reasonable to state that the vast majority of late wooden combs were brought into the town of Novgorod as finished items or as prefabricated products. Novgorod, situated on the ecotone between the Northern Boreal woodland and the Central European Temperate woodland, enjoyed abundant resources of wood of softwood species (pine, spruce and birch) as well as hardwood species such as oak, elm, lime and maple (Hather 1999, 46). There must have been attempts to utilise local hardwood species for comb-making, if only to prove that these were still too soft as a material for combs. One of these attempts can be seen on comb C70¹ (Fig. 5.27) from an early 13th century context. The teeth were cut without following a certain idea for their depth and the piece must have been abandoned before completion.

The unique find is a wooden blank (unidentified) of a simple comb from property A in the Slavensky End (Kirovsky site) which has been mentioned already (Fig. 5.27). It is of a rather unusual rectangular form elongated in the vertical plane, with a few fine teeth cut. For some reason, the piece was rejected before completion. There might have been other finds associated with production waste, but the recovery policy practiced in the 1970s would have precluded the retention of woodworking

¹ The material has not been identified.

waste. The complex on the Kirovsky site reveals the fact that in the first half of the 14th century, some sort of comb-making activity took place on the town property of the Slavensky End. We do not have enough evidence to argue for a complete comb-making process, starting with raw wood and finishing with ready to use combs. Nevertheless, there may have been some sort of secondary production, altering the decoration of combs prefabricated elsewhere.

A few examples of special care for damaged combs have been encountered among the late wooden combs. Specimens C21 and C28¹ (both Fig. 5.28) were reused as one-piece single-sided combs after the broken teeth (fine teeth in both cases) had been cut off and filed down flush with the back. Specimen C24 (Fig. 5.28) from later 14th century context features a rather unusual form of repair. A deep cut along the centre of the solid zone of the broken halves appears to have been wedged with a strip of wood retained with shackles.

A marked decrease in the flow of boxwood from about the mid 14th century may have been a result of the economic crisis in Europe after the 'black death' epidemics of the 1340s-1350s.

The poor survival of wooden objects in the medieval cultural deposits in Europe makes wooden combs much rarer finds than in Novgorod. Although the assemblage of boxwood combs from the 13th-15th century deposits in Novgorod demonstrates some differences in decoration, in general it shows a large measure of identity in morphological and decorative features with the materials from other European towns. In other words, Novgorod material confirms that the dearth of artefacts in wood on most European sites was more apparent than real and for this reason it can be used in the case of Novgorod as an index of trade and cultural exchange with mercantile communities across the Baltic Sea and beyond.

¹ Comb C28 is unstratified, however, stylistically it belongs to the group of late wooden combs.

Chapter 6

DOUBLE-SIDED COMPOSITE COMBS

6.1 Introduction, Chronology.

Double-sided combs of composite construction (class 3) are believed to originate around the 3rd century AD in provincial Roman contexts (Dunlevy 1988, 355; Galloway 1990, 669; Biddle 1990, 683). Whether these combs were a Roman invention (Roes 1963, 13) or a 'barbarian interpretation' of true Roman simple combs (MacGregor 1985, 92), remains debatable.

During the Dark ages and early Viking period, double-sided composite combs became common among Celtic and Germanic tribes both on the Continent and in the British Isles. Anglo-Saxon combs are considered as being a result of the 'second importation' of class 3 combs from Saxony and Frisia (Galloway 1990, 669). Dozens of Irish examples come from the 3rd to 9th century contexts (Dunlevey 1988, 353-356, 358-362) and double-sided composite combs are numerous around the Atlantic coast of Scotland (MacGregor 1985,94; Weber 1993, 165-170). On the Continent, class 3 combs are known from Merovingian (Schmidt 1961, 144; MacGregor 1985, 94) and Carolingian (Roes 1963, 13-17) contexts. A few examples, deriving from 5th-9th century contexts in Poland (Chmielowska 1971, 72, Ryc.28) and Moravia (Hrubý 1957, 214-215, Fig. 9, 11, 23), seem to have appeared through the connections with Frankish kingdoms.

In the lands around the Baltic associated with the Viking world, however, double-sided composite combs in antler and bone did not become common until the 12th – early 13th centuries (Arbman 1939, 30; Blomqvist 1943, 154; Broberg and Hasselmo 1981, 121; Chmielowska 1971, 98, Ryc.28; Flodin 1989, 119-125, Fig. 44; Kolchin 1982, 164-166, Fig. 5); Lampe 1981, 193; Persson 1976, 331), the earliest examples coming from 11th century contexts in Schleswig (Ulbricht 1984, 52-54).

The assemblage of class 3 combs from Novgorod encompasses 551 specimens in various states of fragmentation¹ made of antler, bone and mixed skeletal materials (antler-bone, antler-ivory and bone-ivory). Only one composite case for a double-sided composite comb in the assemblage (D381 (Fig. 6.17)) demonstrates the paucity of cased class 3 examples. This is treated as a part of a cased comb according to the concept outlined above (section 3.1). Figure 6.1 demonstrates the chronological distribution of 421 combs and comb fragments, which come from contexts with reliable dates². One can see that the first double-sided combs of composite construction became buried in the soil of Novgorod around the turn of the 12th century. At that time, their single-sided counterparts all but disappeared from the comb repertoire, where combs of simple construction (in skeletal materials and wood) were predominant. In the course of the 12th – early 13th century, class 3 combs increase in numbers reaching the peak of their occurrence in the mid 13th century. The next few decades in the late 13th – early 14th centuries saw a noticeable drop in numbers of utilised combs. Only very few double-sided composite combs are dated to the mid –late 14th century, and they almost disappear by the beginning of the 15th century. The distribution is clearly unimodal.

Figure 6.2, created on the evidence from the Troitsky site, clearly shows that class 3 combs dominated over combs of simple construction only for a few decades in the mid 13th century. Class 2a combs formed the most numerous groups in the 12th – early 13th centuries and class 2b combs outnumbered all other comb forms in the late 13th – 14th centuries.

The Novgorod assemblage appears to be in accordance with assemblages from other North European continental sites around the Baltic where class 3 combs stand in relationship to single-sided composite combs (class 1) and, to a certain extent, simple combs in skeletal materials (class 2a), which are class 3 combs antecedents. Double-sided composite combs from the Late Roman and Dark Age periods,

¹ Database D also includes three class 3 combs from Rytic Gorodishche.

² An actual number of dated combs is 453, however, but for reasons discussed below (see section 4.4), 32 dated specimens from the Il'insky site have been excluded from the sub-assemblage of dated examples.

therefore, are omitted in comparison analysis and in references to North European parallels concerning morphological traits of class 3 combs from Novgorod.

There are typologies of double-sided composite combs in almost every country around the Baltic and, often, even for major sites. These typologies correspond little to each other, which makes it difficult to undertake a thorough comparative analysis. The oldest typology is by Blomqvist (1943, 154, Fig. 52-75), who divided an assemblage of nearly 90 combs from Lund into different type groups on the basis of the morphological characteristics of the side-plates (shape, cross-section, decoration and the arrangement of rivets). Consequently, specimens with different shapes of the end-plates were often assigned to the same type group. The same typology was applied to the Lund assemblages from later excavations (Persson 1976).

A different approach was offered by Kolchin (1958), who distinguished five types of class 3 combs from Novgorod on the basis of the shape of comb sides (end-plates). The same criterion distinguishing types was used for Hilczérowna's (1961) typology of combs from Gdansk, and for Chmielowska's (1971) classification of combs found all over Poland. Both researchers distinguished seven basic type groups. Similar typologies of three type groups based on the shape of comb sides have been worked out for the assemblages from Ribe (Andersen 1968) and the Mecklenburg coastal area (Lampe 1981). The same approach, exploiting the shape of end-plates, was shown in the typology of specimens from Swedish medieval towns (Broberg and Hasselmo 1981; Carlsson 1991).

The typology of Norwegian class 3 combs was outlined by Wiberg on the evidence from Oslo (1977, 1987) and was developed further by Flodin (1989) on the evidence from Trondheim. Although most type groups are distinguished using 'end-plate shape' criterion (groups D1-D4, D6), others are differentiated by the elongated proportions (D5 (Wiberg 1987, 418-419)) or asymmetric outline and offset rows of teeth (D7 (Flodin 1989, 30-33)).

Mixed criteria were used by Ulbricht, who classified class 3 combs from Schleswig into six variants. Whereas variants 1, 3, 5 and 6 were distinguished by the form of

the end-plates, combs of variants 2 and 5 were set apart by their sizes and proportions (Ulbricht 1984, 52-54).

The most elaborate and, at the same time inconsistent, typology of class 3 combs from Estonia has been created recently by Luik (1998). Most type groups were conventionally differentiated by the shape of the end-plates (types 1, 2, 4-6), but these were divided into sub-groups using criteria which vary even within one type group. For example, type 1 is represented by five variants distinguished by form and decoration of side-plates (variants 1a and 1b), form and decorative style of side-plates as well as arrangements of rivets (variants 1c and 1d), and number of side-plates (variant 1e).

This typology is a perfect example of classification for the sake of classification, practically useless and greatly misleading. However, none of the others are applicable to the Novgorod assemblage in its present state.

Kolchin's typology is widely used by Russian archaeologists, who always refer to class 3 combs amongst the collections from other Russian medieval towns in terms of his five groups, differentiated in the early 1950s. The typology was originally based on the assemblage of 97 combs from the Nerevsky site the trenches excavated in the early-mid 1950s (Kolchin 1958, 101). Later on, although the Novgorod assemblage of class 3 combs tripled (305 specimens) and featured examples which did not fit into the type groups, no amendments were made (Kolchin 1982, 166). Besides, some of Kolchin's type groups encompass stylistically so obviously different specimens, that the whole classification needs to be revised.

6.2 Survey of Morphological Traits

Composite combs feature such a complex of morphological traits determining comb styles, that it seems almost impossible to comprehend the chronological sequence of stylistic trends without a thorough analysis of all individual characteristics. Morphological traits of class 3 combs with regard to construction, outline of the

comb as a whole and of its units, decoration and utilised raw material are analysed as follows.

6.2.1 Construction

Double-sided composite combs exhibit the same standard method of construction as featured on single-sided composite combs, the only difference being that the side-plates are positioned at the middle of billets' height and teeth are cut on both sides of protruding billets. A comb is assembled from certain prefabricated units, which are:

- a number of **billets** – thin, rectangular plaques of even depth of skeletal material with the 'grain' running with the vertical axis (depending on the position of a billet in the assembly **end-plates** and **tooth-plates** are distinguished)
- a symmetrical pair (pairs) of **side-plates**
- a number of **rivets** fastening the whole assembly when driven into pierced holes in side-plates and billets alike

Attributes of various subdivisions of double-sided composite combs are discussed as follows.

Billets

The average depth of billets is 3-4mm, but can be up to 7mm. When viewed in vertical cross-section, a billet has sides which are parallel for most of its height and curve inwards to a point only at the tip of the tooth. The other fashion is found much less often: billets are parallel-sided only within the middle area of their height where they are covered by the side-plates, tapering thereafter in a long slope towards the tips.

A total of 321 combs have evidence for the original number of billets (Table 61), which varies from one to nine. Those most frequently encountered are combs assembled with two to four billets; sets of five and six billets are found fairly often, but assemblies of more billets are very rare. Four 13th century combs (D80, D284, D312 and D435 (all three Fig. 6.3)) feature only one elk antler billet. Side-plates

riveted to single billets of these combs are mechanically useless and the only possible reason for their presence was to resemble in construction the most fashionable combs of that time.

Table 61 Class 3 combs quantified by number of billets

Number of billets	Number of combs	%
1	4	1.2
2	108	33.6
3	78	24.3
4	57	17.8
5	34	10.6
6	33	10.3
7	6	1.9
8	0	0.0
9	1	0.3
Total	321	100.0

The number of billets in the assembly varies differently in the sub-groups of antler-, bone- and ivory-billeted combs (see also section 6.2.4). Only two combs amongst 321 specimens with complete sets of billets (D5 (Fig. 6.15) and D222 (Fig. 6.8)) feature mixed antler and bone billets. The remaining 319 are quantified in Table 62 by skeletal material and number of billets. Antler-billeted class 3 combs reveal an average of only 2.5 billets per assembly, with the percentages of 1-3 billeted combs being higher than those for bone and ivory. Assemblies of more than five billets are unknown amongst antler-billeted combs. Amongst the bone-billeted combs, which averaged 4.9 billets per assembly, sets of 4-6 billets are most numerous. Although higher numbers of billets are fairly uncommon amongst the bone-billeted combs, it is worth noting that assemblies of six and over billets are unknown in other types of skeletal materials. Seven specimens with billets in walrus ivory average 3.9 billets with 4-5 billets being most frequently encountered.

Very few specimens demonstrate a pronounced discrepancy between the width of billets in the assembly. Thus three-billeted combs D487 and D543 have a very narrow central billet, with end billets being about 35 mm wide. Most combs, however, reveal a fairly even width of billets in the assembly, but the average billet width varies in combs of different materials (Table 62, bottom line). The sub-

assemblage of antler-billeted combs features the most diverse range of 'average billet width per comb' variable and the highest average billet width of 39 mm compared to that for bone and ivory sub-assemblages.

Table 62 The occurrence of various sets of billets amongst antler-, bone- and ivory-billeted class 3 combs

Number of billets	Antler		Bone		Walrus ivory		All combs	
	No. of combs	As a % of 193 antler-billeted combs*	No. of combs	As a % of 119 bone-billeted combs*	No. of combs	As a % of 7 ivory-billeted combs*	No. of combs	As a % of all 319 combs
1	4	2.1	0	-	0	-	4	1.3
2	107	55.4	0	-	1	14.3	108	33.9
3	65	33.7	11	9.2	1	14.3	77	24.1
4	15	7.8	39	32.8	3	42.9	57	17.9
5	2	1.0	29	24.4	2	28.6	33	10.3
6	0	-	33	27.7	0	-	33	10.3
7	0	-	6	5.0	0	-	6	1.9
8	0	-	0	-	0	-	0	0.0
9	0	-	1	0.8	0	-	1	0.3
Total	193	100.0	119	100.0	7	100.0	319	100.0
Average No. of billets	2.5		4.9		3.9		3.4	
Billet width	min 19.5mm max 107.0mm average 39.0mm		min 12.6mm max 29.7mm average 19.6mm		min 17.0mm max 27.3mm average 21.9mm		min 12.6mm max 107.0mm average 31.2mm	

* Percentages higher than those in the rightmost column (overall assemblage) are given in Bold

Rivets

The riveting system in double-sided composite combs is less than for single-sided composite combs. Rivets are copper-alloy and, as a basic rule, at least one rivet is pierced through a billet with end billets often receiving additional rivets. There is, however, a wide variety in the arrangements of rivets.

A total of 494 specimens provide evidence as to the arrangements of rivets. The most common riveting system (337 examples, 68.2%) is a single row of a few rivets (set at low frequency)¹ (e.g. D30, D31, D391 and D406 (all Fig. 6.4)). Two rows of low frequented rivets, offset to produce a meandering line² (Fig. 6.5), have been encountered on 86 combs (17.4%) (e.g. D50, D285, D385 and D390 (all Fig. 6.5)). Sets of vertical pairs of rivets³ (often with a single rivet at either end of the side-plate) are quite common (45 combs, 9.1%) (e.g. D323 and D382 (both Fig. 6.6)), but sets of obliquely arranged pairs of rivets⁴ have been encountered on only ten combs (2.0%) (e.g. D383 (Fig. 6.6)).

A few combs feature quite an extravagant use of numerous rivets arranged in one row (five specimens, 1.0%) (e.g. D192, D526 and D529 (all Fig. 6.7)), or in two rows (10 combs, 2.0%) (e.g. D112, D222, D425 and D544 (all Fig. 6.8)). Numerous parallels to this usage of rivets derive from 12th-13th century contexts in west Scandinavia and the Southern Baltic, where this practice of riveting is also known on contemporary single-sided combs. Specimens featuring multiple rivets set at high frequency, can be seen in the assemblages from Schleswig (Ulbricht 1984, Taf. 31:5, 32:5, 75:7, 76:4, 77:4, 6, 7); Århus (Andersen and Madsen 1985, 70, Fig. 40:ZM), Ribe (Andersen 1968, 39, Fig. 26-27) in Jutland, Lund (Mårtensson and Wahlöö 1970, 61; Persson 1976, 330, Fig. 295: 65D), Tommarp (Thun 1967, 84f, i), Lödöse (Broberg and Hasselmo 1981, 84-85, Fig. 64:8-10) in Scania; Oslo (Wiberg 1987, 418, Fig. 4a, b) and Trondheim (Flodin 1989, Fig. 28, 29, 32, 35) as well as amongst the late Norse combs from Sanday in Orkney⁵. Occasional finds are known in Gdansk (Hilczerówna 1961, 72, Ryc. 28:b, d) and Tallinn (Luik 1998, 109, Fig. 96).

One comb (D214 (Fig. 6.24)) from an early 13th century deposit features unusual riveting through the middle of each side of the side-plate close to the edge.

Table 63 demonstrates the occurrence of various riveting systems based on the evidence of 369 dated specimens. It seems to show in samples from the mid 12th

¹ Abbreviated as R1(lf) in the coding system of Database D.

² Abbreviated as R2(lf-offset) in the coding system of Database D.

³ Abbreviated as Pv in the coding system of Database D.

⁴ Abbreviated as Po in the coding system of Database D.

⁵ Unpublished material. I thank Anne Brundle, the curator of the Museum in Kirkwall for the opportunity to examine combs from Pictish and Norse contexts.

century that there was a gradual decline in the dominance of R1(lf) riveting system from the mid 12th century to the early 14th century, as other forms of riveting were introduced. Late samples are too small to be analysed. A meandering pattern of rivets (R2(lf-offset)) is most common amongst the mid 13th - 14th century specimens. Of the rarer systems, Pv specimens were many at 13th century date, although they just appeared in the mid 12th century; the eight Po specimens are restricted to contexts dating between the early 13th century and early 14th century; R1(hf) and R2(hf) systems occur only in late 12th to mid 13th deposits.

Table 63 The occurrence main riveting systems on the dated class 3 combs*

Date	R1(lf)		R2 (lf-offset)		Pv		Po		R1(hf)		R2(hf)		Total
	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	
e.12th C.	3	75.0	1	25.0	0	-	0	-	0	-	0	-	4
m.12th C.	11	91.7	0	-	1	8.3	0	-	0	-	0	-	12
l.12th C.	40	85.1	2	4.3	3	6.4	0	-	1	2.1	1	2.1	47
e.13th C.	70	71.4	11	11.2	10	10.2	2	2.0	2	2.0	3	3.1	98
m.13th C.	78	68.4	24	21.1	7	6.1	3	2.6	1	0.9	1	0.9	114
l.13th C.	35	55.6	17	27.0	10	15.9	1	1.6	0	-	0	-	63
e.14th C.	9	37.5	10	41.7	3	12.5	2	8.3	0	-	0	-	24
m.14th C.	1	33.3	2	66.7	0	-	0	-	0	-	0	-	3
l.14th C.	2	66.7	1	33.3	0	-	0	-	0	-	0	-	3
e.15th C.	0	-	0	-	1	100.0	0	-	0	-	0	-	1
Total	249	67.5	67	18.2	36	9.8	8	2.2	4	1.1	5	1.4	369

* Percentages equal or higher than the average figures for the whole sub-assembly (bottom line) are given in bold. Tables are formatted in the same manner unless stated otherwise.

Side-plates

The vast majority of class 3 combs in the Novgorod assemblage have one pair of side-plates positioned at the middle of comb height. Two pairs of side-plates were originally present on the unique comb case uncovered from an early 13th century context with one pair of side-plates missing (D381 (Fig. 6.17)). Only two combs D361 and D420 (both Fig. 6.9) and one end-plate with ornate end side (D380) feature two pairs of side-plates (missing in the case of D380), positioned in order to reveal the central zone of billets enhanced with circular openings. The large comb

D361 comes from a mid 12th century context on the Nerevsky site (property E), and the nearest parallel to this is known in Schelswig (Ulbricht 1984, Taf. 31:4). Also from the Nerevsky site is the end-plate D380 from much smaller comb. Comb D420, smaller-sized as well, derives from the early 14th century deposits on the Duboshin site on the Trade side of the town. Nearest parallels have been encountered in the Swedish towns of Nycöping, Uppsala and Örebro (Broberg and Hasselmo 1981, 75-83, Fig. 49:9, 58:1,2, 63:8; Carlsson 1991, 117, Fig. 40:190), Lund in Skåne (Blomqvist 1943, 159, Bild 74; Persson 1976, 330, Fig.295:55E); Oslo (Molaug 1975, 238, Abb. 17:3; Wiberg 1987, 418, Fig. 4:e) and Trondheim (Flodin 1989, Ill. 34) in Norway, as well as in the East Baltic towns of Riga (Caune 1983, 116, att. 39:16), Tallinn, Ostepää, Tartu, and Rakvere (Luik 1998, 97-100, 116, Fig. 81-83, 102; Luik 2001, 322-323, Fig. 10-17).

Side-plates of double-sided composite combs are in the form of a pair of bars in antler or bone, with a depth of 2-4mm. Their width in most cases is equal to the width of the comb (at the middle of comb height), or just slightly less (side-plates ends being just 2mm short of the line of the comb ends). Only eight combs feature shallow side-plates with rectangular, plano-convex, B-shaped or sinuous cross-sections, whose ends are set approximately 5mm from the comb sides, either reaching the line of the end teeth (D69 (Fig. 6.24)), or extending beyond this line half way to the comb side (D79, D96, D180 (Fig. 6.11), D382, D383 (both Fig. 6.6), D387 (Fig. 6.17)). The side-plates are usually 10mm to 16mm high, examples of lower (D420 (Fig. 6.9), 7-8mm) or greater heights of 18-20mm (D385 (Fig. 6.5) and D406 (Fig. 6.4)) being extremely rare.

In a total of 507 specimens with complete or fragmented side-plates, 314 (61.9%) are made of antler, 190 (37.5%) of bone, and three (0.6%) have side-plates in antler and bone, otherwise being identical. Combs D97 and D449 are both bone-billeted combs, whereas specimen D5 (Fig. 6.15) features an assembly of one bone and two antler billets. All these examples are probably indicative of repair or re-assembly of combs with damaged elements. Another 15 specimens, featuring a combination of bone and antler¹ (e.g. D192 (Fig. 6.7) and D222 (Fig. 6.8)), all have bone billets and antler

¹ D7, D21, D24, D41, D53, D64, D83, D192, D222, D410, D411, D455, D483 and D511.

side-plates. This would have advantages, since antler is a mechanically superior material for side-plates, which provide the structural strength for the whole assembly and are, therefore, subject to substantial stress.

Other examples of usage of mixed skeletal materials in one comb are combinations of walrus ivory (billets) and antler (side-plates) (10 combs¹ (e.g. D28, D38, D201, D217 and D374 (all Fig. 6.22)) and walrus ivory (billets) and bone (side-plates) (D537 and D554 (Fig. 6.22)). The use of bone for side-plates in walrus ivory-billeted combs seems to be a reasonable idea of utilisation of a cheaper material for the elements most susceptible to breakage. The occurrence of antler and bone raw materials in side-plates of various cross-sections is shown in Table 64.

Table 64 The utilisation of antler and bone for side-plates

Cross-section	antler		bone		antler and bone		Total
	No. of combs	%	No. of combs	%	No. of combs	%	
trapezoid	289	64.9	154	34.6	2	0.4	445
plano-convex	19	73.1	7	26.9	0	-	26
rectangular	2	13.3	12	80.0	1	6.7	15
sinuous	3	21.4	11	78.6	0	-	14
B-shaped	1	14.3	6	85.7	0	-	7
Total	314	61.9	190	37.5	3	0.6	507

Cross-section

In the assemblage of 507 specimens with surviving side-plates, there are only two combs with bone side-plates of different cross-section. Mid 13th century comb D316² has a sinuous-cross-sectional side-plate (Blomquist's variant A (Fig. 6.10)) on one face and a flat rectangular-cross-sectional side-plate with a longitudinal groove along the middle on the other face. Specimen D441³ features on one face the only example of a triangular cross-sectional side-plate in the Novgorod assemblage, the other side-plate being plano-convex-cross-sectional. It is probable that both combs were repaired in the past.

¹ D28, D38, D170, D201, D217, D259, D261, D277, D374 and D409.

² Listed among sinuous-cross-sectional specimens.

³ Listed among plano-convex-cross-sectional specimens.

Trapezoid

The vast majority of the 507 specimens with surviving side-plates feature trapezoid cross-sectional side-plates (445 specimens, 87.8%) (e.g. D31, D406 (both Fig. 6.4), D50, D385 and D390 (all Fig. 6.5), and D323 (Fig. 6.6)). These occasionally obtain a slightly more elaborate profile, with staged sides resulting from linear incisions cut on the sloping sides (D43, D104 (Fig. 6.24), D285 (Fig. 6.5), D391 (Fig. 6.4) and D553)). Antler was mainly used for trapezoid-cross-sectional side-plates, although bone is not uncommon either (Table 6.4).

Plano-convex

A total of 26 specimens¹ (5.1%) have plano-convex-cross-sectional side-plates (e.g. D69 (Fig. 6.24)), again being made more often in antler than in bone (Table 6.4). Most side-plates of this shape exhibit deep teeth cuts on both upper and lower edges (e.g. D67 (Fig. 6.14), D192 and D526 (both Fig. 6.7)), a feature seen very rarely on trapezoid-cross-sectional side-plates. It is possible that some side-plates originally with a plano-convex cross-section, were reshaped into a trapezoid profile to remove grooves left after cutting teeth. Specimen D30 (Fig. 6.4) has one side-plate of trapezoid cross-section, the other having a plano-convex cross-section in the middle and a trapezoid-cross-section towards the ends.

Sinuuous

Fourteen combs² (2.8%) feature side-plates with sinuous profiles, the side-plates being more often in bone than in antler (Table 6.4). Blomqvist (1943, 155, Bild 56) distinguishes five variants of sinuous cross-section on the evidence from Lund (Fig. 6.10). Specimens from Novgorod most often have side-plates of Blomqvist's variant A (six combs, e.g. D529 (Fig. 6.7)) and variant C (four combs, e.g. D112 (Fig. 6.8)), one example representing variant B (D544 (Fig. 6.8)). However, two more variants

¹ D58, D61, D67, D69, D90, D91, D95, D115, D123, D167, D191, D192, D215, D219, D369, D404, D414, D420, D426, D427, D430, D441, D448, D495, D526 and D528.

² D112, D244, D298, D316, D356, D361, D382, D387, D395, D418, D429, D478, D529 and D544.

can be added to Blomqvist's list (Fig. 6.10), variant F (three combs, e.g. D382 (Fig. 6.6)) and G (D387 (Fig. 6.17)).

Specimen D418 (Fig. 6.8) has circular openings in the side-plates, which appear to have been highlighted by bronze sheets underlying the side-plates. The preservation of the sheets is poor, the metal having been rendered to a green powder. Apart from Lund, class 3 combs with sinuously profiled side-plates (often having openings of circular or cruciate shapes) are known in assemblages from other sites in Scandinavia and the Southern Baltic. They are encountered in assemblages from Tommarp (Thun 1967, 84 Fig. 28:h-k) and Lödöse (Broberg and Hasselmo 1981, 85, Fig. 64:10) in Skåne, Uppsala, Nyköping and Söderköping in Central Sweden (Broberg and Hasselmo 1981, 75, Fig. 49:6, 77, Fig. 53:7; Carlsson 1991, 116-117, Fig. 39:194, 40:983), Oslo (Wiberg 1987, 418, Fig. 4: a, b, d) and Trondheim (Flodin 1989, Ill 28-30, 32, 35) in Norway as well as from Sanday in Orkney¹; Schleswig (Ulbricht 1984, Taf. 31:5; 32:5, 77: 4, 6, 7) and Ribe (Andersen 1968, 36, Fig. 19-20, 38, Fig. 25, 28; Ambrosiani 1981, 129, Fig. 80:1) in Jutland. A few examples have been encountered in assemblages from Gdansk (HilczeroŃna 1961, 121, Ryc. 56, 59:a, b, 129, Ryc. 60:c), Isle of Usedom off the Mecklenburg coast (Lampe 1981, 175, Abb. 5:j) and in the Estonian towns of Tallinn and Ostepää in the Eastern Baltic (Luik, 1998, 109-110, 121, Fig. 95-98, 111-112).

*Rectangular*²

Fifteen class 3 combs³ (3.0%) feature rectangular-cross-sectional side-plates (e.g. D160, D180 and D428 (all Fig. 6.11)), which were most often made in bone (Table 64). Parallels to these combs are found in most contemporary sites in the Baltic area.

¹ Unpublished material: PL 4480 (Museum in Kirkwall)

² Comb D316 exhibiting a flat rectangular-cross-sectional side-plate on one of the faces is listed among sinuous-cross-sectional combs.

³ D46, D81, D99, D114, D160, D164, D180, D187, D200, D283, D428, D449, D458, D516 and D537.

B-shaped

Seven examples¹ (1.4%) of combs featuring bone or (less often) antler (Table 64) side-plates with B-shaped cross-sections have been encountered in the assemblage (e.g. D383 (Fig. 6.6)).

Parallels to these are concentrated in the eastern part of Scandinavia (Uppsala Söderköping in Central Sweden (Broberg and Hasselmo 1981, 77, Fig. 53:11, 78, Fig. 55:2; Carlsson 1991, 116, Fig. 39: 1872, 234, 1160)) and the Baltic from the Mecklenburg coastal area (Lampe 1981, 175, Abb. 5:h, k) to the Estonian towns of Tallin, Tartu, Ostepää and Lihula in the Eastern Baltic (Luik, 1998, 79-83, Fig. 61-64). Similar finds in the western Baltic and Scandinavia are rare (e.g. Ribe (Andersen 1968, 37, Fig. 24)).

Table 65 The occurrence of side-plates with different cross-sections in dated contexts

Date	trapezoid		plano-convex		sinuous		rectangular		B-shaped		Total
	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	
e.12th C.	2	66.7	1	33.3	0	-	0	-	0	-	3
m.12th C.	10	83.3	0	-	2	16.7	0	-	0	-	12
l.12th C.	45	88.2	4	7.8	1	2.0	1	2.0	0	-	51
e.13th C.	88	87.1	4	4.0	5	5.0	3	3.0	1	1.0	101
m.13th C.	108	90.0	4	3.3	2	1.7	4	3.3	2	1.7	120
l.13th C.	61	89.7	3	4.4	1	1.5	2	2.9	1	1.5	68
e.14th C.	20	80.0	3	12.0	0	-	0	-	2	8.0	25
m.14th C.	4	100.0	0	-	0	-	0	-	0	-	4
l.14th C.	2	66.7	0	-	0	-	1	33.3	0	-	3
e.15th C.	1	100.0	0	-	0	-	0	-	0	-	1
Total	341	87.9	19	4.9	11	2.8	11	2.8	6	1.5	388

The chronological distribution of dated combs with varying cross-sections of the side-plates is shown in Table 65. Combs with trapezoid-cross-sectional side-plates

¹ D15, D79, D96, D158, D383, D413, and D477.

formed the largest groups at all times, but were most numerous and proportionally most noticeable in the period from the late 12th to the early 13th century. Plano-convex-cross-sectional side-plates are more common on the 12th century combs, as well as on the early 14th century specimens. Sinuous-cross-sectional side-plates are most common on combs from the 12th – early 13th century contexts, whereas flat rectangular side-plates become more noticeable on the 13th century specimens. B-shaped-cross-sectional combs deriving from 13th-early 14th century layers formed proportionally the largest group in the early 14th century.

Table 66 presents the correlation between the cross-sectional type of the side-plate and the arrangement of rivets, as revealed on the evidence of 476 specimens.

Table 66 The occurrence of different riveting systems on combs with the main five cross-sectional types of the side-plates

Cross-section	R1(lf)		R2 (lf-offset)		Pv		Po		R1(hf)		R2(hf)		Total
	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	
trapezoid	303	72.7	77	18.5	30	7.2	0	-	1	0.2	6	1.4	417
plano-convex	15	62.5	8	33.3	1	4.2	0	-	0	-	0	-	24
sinuous	4	28.6	0	-	3	21.4	0	-	3	21.4	4	28.6	14
rectangular	5	35.7	0	-	4	28.6	5	35.7	0	-	0	-	14
B-shaped	0	-	1	14.3	2	28.6	4	57.1	0	-	0	-	7
Total	327	68.7	86	18.1	40	8.4	9	1.9	4	0.8	10	2.1	476

The vast majority of combs with trapezoid- and plano-convex-cross-sectional side-plates have a single row of rivets set at low frequency. The latter group also reveals the highest numbers of combs riveted with two offset rows of pegs, this same system of riveting occurring also on specimens with B-shaped cross-sectional side-plates. B-shaped- and rectangular-cross-sectional side-plates are commonly riveted with pairs of pegs set vertically or (more often) obliquely. Numerous rivets arranged in one or two rows are usually encountered only on combs with sinuous-cross-sectional side-plates, which also reveal the most diverse range of riveting systems.

6.2.2 Outline

Unlike simple combs in skeletal materials, dimensions and forms of double-sided composite combs were less limited by the amount of available compact tissue in the raw material.

6.2.2a Front view

Class 3 combs fall into two basic outlines, either a rectangle or a trapezium of various proportions. Rectangular forms are distinguished from trapezoid forms by featuring almost equal widths of top and bottom edges, resulting in the degree of side slope close to 1 ($dss \geq 0.86$) (see sections 4.2.1a and 5.3.1a). A sub-assembly of 259 complete (or almost complete) combs reveals dss varying from 0.52 to 1, with slightly higher numbers of rectangular (139 combs, 53.7%) forms than trapezoid forms (120, 46.3%). The latter most often feature steeply sloping sides (dss 0.66-0.85) (104 specimens, 86.7%), only 16 combs having medium sloping sides ($dss < 0.66$).

Both rectangular and trapezoid forms are encountered in numerous proportional variations of 'square' or elongated. The criterion for distinguishing comb proportion is the comb height to average width ($\sum(Wt, Wb)$) ratio (hwr), varying from 0.31 to 1.36. Unlike assemblages of simple combs of both class 2a and 2b, where combs elongated in the horizontal plane form the minority (9.1% and 6.3% respectively) (see sections 4.2.1a and 5.3.1a), these account for the majority of class 3 combs. Table 67 demonstrates the combinations of main proportional groups of rectangular and trapezoid forms as revealed in the sub-assembly of complete combs. Merely a handful of rectangular forms are known only in the square proportional variant, all the rest being horizontally elongated. Trapezoid combs of square proportions are encountered more often, with only three specimens featuring vertically elongated proportions (D171 (Fig. 6.15), D201 (Fig. 6.22) and D214 (Fig. 6.24)).

Figure 6.12, showing the occurrence of class 3 combs with various hwr , clearly demonstrates that horizontally elongated combs, most common in all forms, fall into two sub-groups of long ($hwr \leq 0.65$) and somewhat squat ($0.65 < hwr \leq 0.90$)

specimens, with rectangular examples being predominantly long and trapezoid examples being predominantly squat¹.

Table 67 Main proportional groups of class 3 combs

Forms	horizontally elongated ($hwr < 0.90$)		square ($0.90 \leq hwr < 1.10$)		vertically elongated ($hwr \geq 1.10$)		Total
	No. of combs	%	No. of combs	%	No. of combs	%	
rectangular	135	97.1	4	2.9	0	-	139
trapezoid	100	83.3	17	14.2	3	2.5	120
Total	235	90.7	21	8.1	3	1.2	259

A scatter chart in Fig. 6.13 combines all individual variations of comb forms (as revealed by *dss* and *hwr*) with the background, demonstrating outlines of generalised forms.

A total of 207 complete objects come from contexts dated to the 12th – mid 14th century, including 113 rectangular combs and 94 trapezoid combs. Table 68 demonstrates the occurrence of main proportional groups of combs with rectangular outline, expressed also as percentages.

The earliest rectangular complete combs in the Novgorod assemblage are of both long (D4) and squat (D215) proportions. Generally speaking the quota of squat combs is fairly low (10.7%) and these tended to be found more often in deposits of the 12th – mid 13th centuries (e.g. D67 and D166 (both Fig. 6.14)). Squared rectangular combs are known only from mid-late 12th century layers (e.g. D41 (Fig. 6.14)). In the mid 13th century, which was the peak period of occurrence of class 3 combs in the comb repertoire in Novgorod, rectangular outlined combs began dominating over their trapezoid counterparts and, from the late 13th century onwards, they accounted for over three quarters of all contemporary complete specimens (e.g. D50, D385, D390 (all Fig. 6.5) and D406 (Fig. 6.4)).

¹ Combs of squared and vertically elongated proportions forming a very small minority of class 3 combs (Table 67) are referred to as 'other' in Tables 68-71.

Table 68 Chronological distribution of main proportional groups of rectangular double-sided composite combs

Date	Proportional groups						All rectangular	% of all complete	All complete
	long		squat		other				
	No. of combs	% of all rectangular	No. of combs	% of all rectangular	No. of combs	% of all rectangular			
e.12 th C.	1	50.0	1	50.0	0	-	2	100.0	2
m.12 th C.	2	66.7	0	-	1	33.3	3	42.9	7
l.12 th C.	6	60.0	2	20.0	2	20.0	10	31.3	32
e.13 th C.	25	89.3	3	10.7	0	-	28	45.2	62
m.13 th C.	29	90.6	3	9.4	0	-	32	55.2	58
l.13 th C.	22	95.7	1	4.3	0	-	23	76.7	30
e.14 th C.	12	92.3	1	7.7	0	-	13	92.9	14
m.14 th C.	1	50.0	1	50.0	0	-	2	100.0	2
Total	98	87.5	12	10.7	3	2.7	113	54.6	207

Table 69, presenting data from 94 complete trapezoid combs from dated contexts, demonstrates that this form dominates over rectangular form during the mid 12th – early 13th century, the highest percentage being in the late 12th century. It is exactly the period when the numbers of square and vertically elongated combs ('other', Table 6.7) are highest (e.g. D5, D9 and D171 (all Fig. 6.15)). It is worth recollecting here that class 2a combs, most of which were proven to be manufactured in the town, also became commonly of trapezoid outline around the same time (Fig. 4.10 and 4.11).

Squat proportions account for nearly three quarters of all trapezoid specimens, the highest quota being in the late 12th – mid 13th centuries (e.g. D28 (Fig. 6.22), D42 and D522 (both Fig. 5.15), D284 and D312 (both Fig. 6.3)). Long combs of trapezoid outline form only 10.6% of this group and are unknown before the late 12th century (D31 (Fig.6.4)), but are found in small numbers thereafter until the early 14th century (e.g. D83, D130, D360, D370 and D400).

Further variations of forms could be distinguished by specifying whether the sides are straight, convex, concave, ornate etc., in other words by analysing the edge line

of end-plates, something which attracted the most attention of comb experts in the past (see above section 6.1).

Table 69 Chronological distribution of main proportional groups of trapezoid double-sided composite combs

Date	Proportional groups						All trapezoid	% of all complete	All complete
	long		squat		other				
	No. of combs	% of all trapezoid	No. of combs	% of all trapezoid	No. of combs	% of all trapezoid			
e.12th C.	0	-	0	-	0	-	0	-	2
m.12th C.	0	-	2	50.0	2	50.0	4	57.1	7
l.12th C.	1	4.5	17	77.3	4	18.2	22	68.8	32
e.13th C.	3	8.8	25	73.5	6	17.6	34	54.8	62
m.13th C.	3	11.5	21	80.8	2	7.7	26	44.8	58
l.13th C.	2	28.6	4	57.1	1	14.3	7	23.3	30
e.14th C.	1	100.0	0	-	0	-	1	7.1	14
m.14th C.	0	-	0	-	0	-	0	-	2
Total	10	10.6	69	73.4	15	16.0	94	45.4	207

Although a total of 489 specimens in the assemblage provide the evidence for the side edge lines of end-plates, the analysis of this feature is based on the sub-assemblage of 259 complete combs.

Trapezoid combs have either straight or concave sides, the overwhelming majority featuring concave sides of a specific kind (Table 70). This is a curve emphasised in the upper part of the comb height. Twelfth century specimens generally exhibit a fairly smooth curve, whereas 13th century specimens frequently have a more pronounced concave line leaving a bulbous upper end and a bottom end to stick out (e.g. D5, D9 and B522 (all Fig. 6.15), D38, D201 and D554 (all Fig. 6.22), D104 and D214 (both Fig. 6.24), D284 and D312 (both Fig. 6.3)). A similar style of shaping comb sides can be seen on contemporary class 2a combs from Novgorod (section 4.2.1a, Fig. 4.19). Like their class 2a counterparts, concave-sided trapezoid class 3 combs occasionally feature somewhat lavish curves sweeping inwardly at the upper

part of the comb height and outwardly at the lower part (e.g. D389 (Fig. 6.16)), or even more elaborate curves (e.g. D172 and D422 (both Fig. 6.16)). Characteristically, like their class 2a counterparts, class 3 combs of similar style occasionally also exhibit a convex line of the bottom edge (e.g. D9 and D522 (both Fig. 6.15), D284 and 312 (both Fig. 6.3)).

To distinguish this specific ‘Novgorod style’ concave line from an even curve with the turning point at the middle of the comb height, the former is referred to as concave 1 and the latter as concave 2 in the tables and in Database D. Straight sided trapezoid combs are encountered very rarely (D34, D43, D83 and D391 (Fig. 6.4)).

Table 70 Types of side line of complete trapezoid class 3 combs

Sides	Proportional groups						Total	%
	long		squat		other			
	No. of combs	%	No. of combs	%	No. of combs	%		
concave 1	13	11.2	83	71.6	20	17.2	116	96.7
straight	1	25.0	3	75.0	0	-	4	3.3
Total	14	11.7	86	61.9	20	14.4	120	100.0

The sub-assembly of complete rectangular class 3 combs reveals a much wider range of side line types (Table 71). ‘Novgorod style’ concave sides with a turning point at the upper half of the comb height have been encountered on less than one tenth of rectangular combs, these being almost always of squat or square proportions (e.g. D41 and D166 (both Fig. 6.14)). All other types of side edge line are found more often on rectangular combs belonging to the long proportional group.

Straight-sided rectangular combs are the most common (e.g. D30 (Fig. 6.4), D67 and D92 (both Fig. 6.14), D180 (Fig. 6.11), D217 and D374 (both Fig. 6.22), D435 (Fig. 6.3)). Mid 13th century specimen D283, listed in the table under straight-sided combs, has one side straight and the other convex. Examples combining straight and convex sides are known in Schleswig (Ulbricht 1984, Taf. 31:3), Lund (Blomqvist 1943, 157, Bild 59; Persson 1976, 329, Fig. 294:68D) and Trondheim (Flodin 1989, III. 33).

Second most numerous are combs with angular sides, known only in the long proportional variants (e.g. D390 (Fig. 6.5) and D406 (Fig. 6.4)). Convex-sided class 3 combs account for approximately 9% of complete specimens of rectangular outline (e.g. D50 (Fig. 6.5), D222 (Fig. 6.8), D323 and D383 (both Fig. 6.6)).

Table 71 Types of side line of complete rectangular class 3 combs

Sides	Proportional groups						Total	%
	long		squat		other			
	No. of combs	%	No. of combs	%	No. of combs	%		
straight	55	90.2	6	9.8	0	-	61	43.9
angular	39	100.0	0	-	0	-	39	28.1
concave 1	1	7.7	9	69.2	3	23.1	13	9.4
convex	12	100.0	0	-	0	-	12	8.6
concave 2	7	100.0	0	-	0	-	7	5.0
ornate	4	80.0	0	-	1	20.0	4	2.9
B-shaped	2	100.0	0	-	0	-	3	2.2
Total	120	86.3	15	10.8	4	2.9	139	100.0

Seven combs with sides evenly curved inwards (concave 2) form a fairly small portion of rectangular outlined complete combs (e.g. D112 (Fig. 6.8), D192 and D529 (both Fig. 6.7), D385 (Fig. 6.5) and D420 (Fig. 6.9)). B-shaped (e.g. D544 (Fig. 6.8)) and ornate-sided combs (e.g. D382 (Fig. 6.6)) account for 2-3% of complete combs in this group. Both are most common in long proportional variants, although the latter are also known in squared proportion (D361 (Fig. 6.9)).

With the knowledge as to which main forms correlate with specific side line shapes, it is now also worth considering 230 incomplete specimens with surviving end-plates and having a close look at the chronological patterning. Table 72 demonstrates the percentages of combs with various lines of their sides in the whole assemblage of 489 examples with surviving end-plates and in the sub-assemblage of 375 dated specimens, as well as the percentages of the seven groups amongst the contemporary combs.

Table 72 Chronological distribution of class 3 combs with surviving end-plates

Date	concave 1		straight		angular		convex		concave 2		ornate		B-shaped		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
e.12th C.	1	25.0	2	50.0	1	25.0	0		0		0		0		4
m.12th C.	7	58.3	3	25.0	0	-	0	-	1	8.3	1	8.3	0	-	12
l.12th C.	34	68.0	9	18.0	2	4.0	3	6.0	2	4.0	0	-	0	-	50
e.13th C.	50	50.0	24	24.0	10	10.0	6	6.0	3	3.0	4	4.0	3	3.0	100
m.13th C.	49	45.0	28	25.7	22	20.2	5	4.6	4	3.7	1	0.9	0	-	109
l.13th C.	20	31.7	12	19.0	18	28.6	8	12.7	2	3.2	2	3.2	1	1.6	63
e.14th C.	3	10.0	10	33.3	11	36.7	5	16.7	1	3.3	0	-	0	-	30
m.14th C.	1	25.0	1	25.0	1	25.0	1	25.0	0	-	0	-	0	-	4
l.14th C.	1	50.0	1	50.0	0	-	0	-	0	-	0	-	0	-	2
e.15th C.	0	-	1	100.0	0	-	0	-	0	-	0	-	0	-	1
Total dated	166	44.3	91	24.3	65	17.3	28	7.5	13	3.5	8	2.1	4	1.1	375
All	223	45.6	122	24.9	83	17.0	32	6.5	15	3.1	9	1.8	5	1.0	489

Concave 1

Combs featuring concave sides with the turning point in the upper half of the comb height form the most numerous group of objects, their predominance being especially noticeable in the mid 12th – mid 13th century. Table 73, demonstrating the correlation between the types of cross-section of the side-plates and the shape of comb sides, as revealed on the evidence of 469 combs, clearly shows a homogenous character of this group of objects. Almost all concave-sided (Novgorod style) combs feature trapezoid cross-sectional side-plates.

Similar combs are known in the Princely residence in Rytic Gorodishche (Verkhorubova and Shorin 1985, 55, Fig. 2: 5, specimens D549 and D551 in database D), Pskov (Kharlashov 1994, 58:3), Beloozero (Golubeva 1973, 172), Smolensk (Astashova 1993, 72), Riazan (Darkevich and Borisevoch 1995, 258-265, Tables 30: 15, 32: 5, 37: 8) and Suzdal (Sedova 1997, Fig.41:5). These combs

belong to rare finds in the burial grounds in the lands eastwards of Lake Onega (Makarov 1990, 56, Table XXVII: 16). One comb is also known in the burial mounds in the Kostroma Volga region, which are believed to have been left by the colonists from the Novgorod lands (Ryabinin 1986, 85). In the assemblage from Lõhavere (central Estonia) a single comb of this type is considered as a rare find (Luik 1998, 103-104, Fig. 89).

Table 73 Correlation between the types of cross-section of the side-plates and the shape of class 3 comb sides

Sides	Cross-section of side-plates										Total
	trapezoid		plano-convex		sinuous		rectangular		B-shaped		
	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	
concave 1	214	98.2	3	1.4	0	-	0	-	1	0.5	218
straight	96	83.5	5	4.3	2	1.7	8	7.0	4	3.5	115
angular	75	93.8	5	6.3	0	-	0	-	0	-	80
convex	27	93.1	0	-	0	-	1	3.4	1	3.4	29
concave 2	4	26.7	4	26.7	5	33.3	2	13.3	0	-	15
ornate	0	-	0	-	5	71.4	1	14.3	1	14.3	7
B-shaped	1	20.0	1	20.0	2	40.0	1	20.0	0	-	5
Total	417	88.9	18	3.8	14	3.0	13	2.8	7	1.5	469

Straight

Specimens with straight sides form the second largest and most heterogeneous group of combs in the Novgorod assemblage. They are fairly common throughout (Table 72) and feature the most diverse range of types of side-plates (Table 73). Trapezoid cross-sectional side-plates on straight sided combs are most common and are encountered at all times (e.g. D30 and D391 (both Fig. 6.4)) and D92 (Fig. 6.14)). They are also known in Staraja Ladoga (Davidan 1962, 102-103, Fig. 4: 4, 5) and as a rare type in Ostepää in south-eastern Estonia (Luik 1998, 103, Fig. 88).

Plano-convex cross-sectional plates are rare and known only on two 12th century specimens (early 12th century D215 (Kolchin 1958, 100, Fig. 5:7(left)) and late 12th

century D67 (Fig. 6.14)) and on two early 14th century combs (D91 and D95). These are common in assemblages from Lund (Blomqvist 1943, 157, Bild 58, 62; Persson 1976, 329, Fig. 294:69D), Schleswig (Ulbricht 1984, Taf. 75:1, 3, 6, 8) and Ribe (Andersen 1968, 33-34, Fig. 15, 17a-b) in Jutland, Trondheim (Flodin 1989, Ill. 31, 33) and amongst medieval Norse combs from the Orkneys¹. As single finds they are also known in Smolensk (Astashova 1993, 72) and Beloozero (Golubeva 1973, 171-173, Fig. 62: 2).

Sinuuous cross-sectional side-plates occur twice on straight-sided combs, with only one (D316) deriving from a dated context (mid 13th century). These are most likely to be imported items. The same combination of features can be seen on combs from Uppsala and Söderköping in Central Sweden (Broberg and Hasselmo 1981, 75, Fig. 49:6, 77, Fig. 53:7; Carlsson 1991, 116-117, Fig. 39:194), Oslo (Wiberg 1987, 418, Fig. 4: a, b, d) and from Trondheim (Flodin 1989, Ill 28 29-30, 32, 35).

Straight-sided combs with rectangular or B-shaped cross-sectional side-plates also appear to be imported. The former derive mainly from the 13th century contexts (D46, D81, D180 (Fig. 6.11), D200, D283), with only one specimen from a late 14th century layer (D99). The latter come from mid-late 13th – early 14th century contexts (D15, D79, D96 and D158). Specimens featuring rectangular cross-sectional side-plates on straight-sided combs are known in the assemblages from Örebro, Uppsala and Söderköping in Central Sweden (Broberg and Hasselmo 1981, 75-83, Fig. 51:1, 53:11, 55:2, 56:2, 59:6, 61: 1-4, 63: 5-6), Lund (Mårtensson and Wahlöö 1970, 61; Ribe (Ambrosiani 1981, 129, Fig. 80:4); Persson 1976, 329, Fig. 294: 58D), from the Eastern Baltic towns of Tallinn, Tartu, Haapsalu (Luik 1998, 73-79, Fig. 55-58) and Riga (Caune 1983, 102, Att. 18: 11, 116, Att. 39:12). Combinations of B-shaped cross-sectional side-plates and straight end-plates are known on combs deriving from the Eastern parts of the Baltic-Scandinavian world, such as Uppsala and Söderköping in Central Sweden (Broberg and Hasselmo 1981, 77, Fig. 53:11, 78, Fig. 55:2; Carlsson 1991, 116, Fig. 39: 1872, 234, 1160)) and the Estonian towns of Tallin, Tartu, Ostepää and Lihula (Luik, 1998, 79-83, Fig. 61-64).

¹ Unpublished material: PL 4480 (Museum in Kirkwall)

Angular

Angular sided combs are most numerous and proportionally significant in the mid 13th to mid 14th centuries. Specimen D4, dated to the early 12th century, most likely derives from a disturbed context. It is at odds at this time and, judging by the combination of all morphological features (riveting system, form, proportion), belongs to a much later period.

Over 90% of combs with end-plates of angular shape have trapezoid-cross-sectional plates (e.g. D390 (Fig. 6.5) and D406 (Fig. 6.4)), which appear to be a feature of locally made products (Table 73). Five angular-sided combs featuring plano-convex cross-sectional side-plates (the only other type of side-plates known on these combs) appear to be totally pertaining to the style presented by the majority (e.g. D203 and D204 (both Fig. 6.27)).

Similar combs have been uncovered from Rytic Gorodishche (Verkhorubova and Shorin 1985, 54-55, Fig. 2: 4) and from Russian towns of Smolensk (Astashova 1993, 72-73) and Vshchizh¹. One find is known in Tallinn (Luik 1998, 106, Fig. 92).

Convex

Specimens with convex sides most commonly feature trapezoid cross-sectional plates (Table 73). These have characteristically a very pronounced, almost semi-circular line of the end-plates, curving gradually towards the tooth tips, and derive mainly from the late 13th – mid 14th centuries (e.g. D50 (Fig. 6.5), D323 (Fig. 6.6) and D425 (Fig. 6.8)). These are known in 12th-14th century contexts in a number of Russian towns, such as Smolensk (Astashova, 1993, 72-73), Beloozero (Golubeva 1973, 171-172, Fig. 62: 1) Suzdal (Sedova 1997, Fig. 39: 5), and Vshchizh², as well as in the burial grounds in the lands eastwards of Lake Onega (Makarov 1990, 56, Table XXVII: 16).

¹ Unpublished material from the archive of A.F.Medvedev.

² Unpublished material from the archive of A.F.Medvedev.

A minority of convex-sided combs feature either B-shaped (D383 (Fig. 6.6)), or rectangular cross-sectional (D516) side-plates, and have convex lines of the end-plates turning sharply into the tooth tip lines. These derive from late 12th – early 13th century contexts. Similar combs have been encountered from contemporary contexts at Uppsala (Broberg and Hasselmo 1980, 80, Fig. 58: 10), the Polish towns of Poznan (Hensel and Broniewska 1961, 165, Ryc. 88:b) and Gdansk (Hilczerówna 1961, 122, Ryc. 54) and Estonian towns of Tallinn, Tartu and Enivere (Luik 1998, 105, Fig. 90-91) as well as amongst the late Norse combs from Sanday in the Orkneys¹.

B-shaped

B-shaped sided combs having a variety of side-plates (only B-shaped cross-sectional side-plates are unknown) (Table 6.13), form the smallest group and they derive only from 13th century layers. These certainly belong to the imported items from the lands around the Baltic Sea. Numerous parallels have been encountered in Schleswig (Ulbricht 1984, Taf. 31:2, 6; 77:6-8) and Ribe (Andersen 1968, 36-39, Fig. 21-24, 27) in Jutland, Oslo (Wiberg 1987, 418, Fig. 4; a, f) and Trondheim (Flodin 1989, Ill. 28) in Norway, Nyköping, Söderköping and Uppsala in Central Sweden (Broberg and Hasselmo, 1981, 74-85, Fig. 49:4, 8, 53: 9-10, 58: 9, 59:2; Carlsson 1991, 117: 855, 983, 1448), Lödöse (Broberg and Hasselmo, 1981, 85, Fig. 64:10) and Tommarp (Thun 1967, 84: i-k) in Skåne, Isle of Usedom in Mecklenburg coastal area (Lampe 1981, 175-176, Abb. 5: a, f, 6), Polish Gdansk (Hilczerówna 1961, 126-127, Ryc. 58-59) and in the Eastern Baltic towns of Tallinn, Kaberla, Pöide (Luik 1998, 108-109, Fig. 95-96) and Riga (Caune 1983, 116, att. 39:15).

Combs featuring concave (2) and ornate sides deserve a closer look despite being amongst the least common specimens. Although they are always very low in numbers, which is most likely indicative of imports, their quotas are at highest during the early period (12th century), which could throw some light as to products of which region gave an impetus to the manufacture of class 3 combs in Novgorod.

¹ Unpublished material: PL 4495 (Museum in Kirkwall)

Concave 2

Combs featuring evenly curved concave sides and trapezoid cross-sectional side-plates (D314, D366, D385 (Fig. 6.5) and D497) derive from the later 13th century layers and are stylistically very close to other local products. Specimens which have sinuous (e.g. D112 (Fig. 6.7) and D529 (Fig. 6.7)), plano-convex (e.g. D192 and D526 (both Fig. 6.7)) and flat rectangular-cross-sectional plates (e.g. D160 (Fig. 6.11)), derive from the 12th - mid 13th century contexts and most definitely belong to imported items.

Parallels to these combs are known in Schelswig (Ulbricht 1984, Taf. 32:8, 77:3-5), Århus (Andersen and Madsen 1985, 70, Fig. 40: JV) and Ribe (Andersen 1968, 35-36, Fig. 18: a-c, 19) in Jutland, Tommarp (Thun 1967, 84: f-g) in Skåne, Uppsala (Broberg and Hasselmo, 1981, 80-81, Fig. 58: 1-3, 59:3; Carlsson 1991, 117: 190), Oslo (Molaug 1975, 238, Abb 17: 3; Wiberg 1987, 418, Fig. 4; d), Isle of Usedom in Mecklenburg (Lampe 1981, 175-176, Abb. 5: b-d, 6), Gdansk (Hilczerówna 1961, 123-125, Ryc. 55-57), in a number of towns in Estonia (Luik 1998, 87-102, Fig.68-86; Luik 2001, 322-328, Fig. 7-11) as well as in Riga (Caune 1983, 116, att. 39:14).

Ornate

Combs with ornate sides come from mid 12th – late 13th century contexts and most often feature sinuous cross-sectional side-plates (Tables 72 and 73). The shape of the end-plates varies, however, most common variant is the form which can be called ‘elaborated B-shaped’. These end-plates, most frequently featured on the 13th century specimens, have a pointed or rounded ‘tongue’, protruding in between the outwardly curved top and bottom halves of the side and often featuring a suspension hole in it (D244, D382 (Fig. 6.6), D395 and D413). Parallels to these combs are known in the assemblages from Schelswig (Ulbricht 1984, Taf. 31:7), Ribe (Andersen 1968, 38-39, Fig. 25, 26, 28; Ambrosiani 1981, 129, Fig. 80:1), Århus (Andersen and Madsen 1985, 70, Fig. 40: ZM), Trondheim (Flodin 1989, Ill. 34), Lund (Mårtensson and Wahlöö 1970, 61; Persson 1976, 330, Fig. 295: 67D) Tommarp (Thun 1967, 84: h), in Skåne, Söderköping and Uppsala in Central Sweden (Broberg and Hasselmo, 1981, 79-81, Fig. 53: 12, 56: 3, 59: 5), Estonian

Ostepää and Lihula (Luik 1998, 109-111, Fig. 97-98) and as a single find in Smolensk (Astashova, 1993, 73, Fig. 5: 4).

Another variant is a straight-sided end-plate elaborated with one to four indents at the middle of the comb height. Parallels to the only example from Novgorod (early 13th century D372) are known in Schelswig (Ulbricht 1984, Taf. 32:1, 76:3, 77:2), Ribe (Andersen 1968, 36, Fig. 20), Lund (Persson 1976, 330, Fig. 295: 57D, 54E) Central Swedish Nyköping, Söderköping and Uppsala (Broberg and Hasselmo, 1981, 74-82, Fig. 49: 5-6, 51: 2-4, 58: 4-6, 61: 5), Estonian Rakvere, Tartu, Tallinn (Luik 1998, 113-117, Fig. 99-102, Luik 2001, 322-328, Fig. 12-14) and Riga (Caune 1983, 116, att. 39:13, 16).

The early 13th century specimen D387 (Fig. 6.17) has a fanciful line of the ornate end-plate. Similar combs are known in Schelswig (Ulbricht 1984, Taf. 32:3-4, 77:1), Ribe (Andersen 1968, 39, Fig. 29) Lund in Skåne (Mårtensson and Wahlöö 1970, 61) and Örebro in Central Sweden (Broberg and Hasselmo, 1981, 83, Fig. 63: 7-8).

The oldest specimen with ornate sides is a large comb D361 (Fig. 6.9) from a mid 12th century context. It has an inverted B-shaped double concave line of the end-plate, two pairs of side-plates and openwork decoration of the billets. The comb definitely belongs to the one-off category and the closest parallel to it comes from Schleswig (Ulbricht 1984, Taf. 31:4).

Another one-off object is definitely the unique comb case for a double-sided composite comb (D381 (Fig. 6.17)) from an early 13th century context. Cases for double-sided composite combs are common during the late Roman and especially during the Migration period on the Continent, most of them coming from the Frankish cemeteries in the Köln area and Alammanic burials in Württemberg and Südbaden, Bayern and in upper Austria (Ambrosiani 1981, 18; MacGregor 1985, 98 Theune-Großkopf 1994, 87-90, Fig. 4, 9). Medieval examples, however, are extremely rare with the only example known to the author deriving from a 14th century context in Tallinn (Luik 2001, 323, Fig. 15). This is a case with a matching comb, both made out of elk antler and bearing an L.RDB ornamentation.

Bone specimen D381 has survived partially, with a pair of side-plates riveted with two pegs to an end-plate with an ornate side line, which curves outwardly from the top and bottom to form a pointed end at the middle of the plate's height. A suspension hole is drilled close to the protruding pointed end. The other pair of side-plates and the other end-plate, which are normally pivoting elements of the case, are missing. Both the surviving end-plate and side-plates are decorated with bands of ring-and-dot motifs, the side-plates being also enhanced with a longitudinal groove through the middle and groups of three ring-and-dot motifs. Judging by the dimensions of the surviving elements of the case, it was manufactured to accommodate a long double-sided comb which, unlike its counterpart from Tallinn had one pair of flat rectangular cross-sectional side-plates, most likely decorated with RDB ornament. All morphological features, including flat rectangular cross-sectional side-plates with a longitudinal groove, the ornate end-plate as well as the decorative style, speak in favour of an imported item.

6.2.2b Size

Double-sided composite combs have been encountered in different sizes, with comb height varying from 33mm to 82mm and comb width from 36mm to 130mm. Due to the composite construction, class 3 comb size, unlike that of simple combs, is less dependent on the amount of compacta in the raw material and, therefore, was more determined by the comb-maker and by existing fashions. Sizes of 259 complete combs vary from 2194sq.mm to 7011sq.mm, revealing a much less wide range of sizes than class 2a combs (section 4.2.1a). The average class 3 comb size¹ ($\sim S(3)=4332\text{sq.mm}$) is higher than that of class 2a combs ($\sim S(2a)=3218\text{sq.mm}$). Class 3 combs feature smaller sizes than simple combs in wood (see above section 5.3.1a), as well as the lower average size ($\sim S(2b)=6400\text{sq.mm}$).

Figure 6.18 demonstrates the frequency of various sizes as revealed on the basis of the assemblage of complete combs as a whole, the sub-groups of rectangular and trapezoid forms (Fig. 6.18a), as well as sub-groups of the main proportional variants (Fig. 6.18b). It can be clearly seen that rectangular combs ($\sim S(3-r)=4566\text{sq.mm}$) and

¹ Abbreviated as $\sim S$, with $\sim S(3)$ for class 3 combs, $\sim S(2a)$ for class 2a combs and $\sim S(2b)$ for class 2b combs.

combs of long proportions ($\sim S(3-l)=4530\text{sq.mm}$) are on average larger than specimens of trapezoid outline ($\sim S(3-t)=4061\text{sq.mm}$) and squat proportions ($\sim S(3-s)=4147\text{sq.mm}$). The curves of the former two groups look similar to those of the latter two. This is not surprising, since, as shown above in this section, rectangular outlined combs are more often encountered in long proportional variants, whereas trapezoid combs are most common in squat proportions. It is also worth noting that combs with trapezoid outline and specimens of squat proportions, although being on average larger than their counterparts of class 2a, have similar curves of size fluctuation to those of simple combs in skeletal materials (Fig. 6.19). The implication of this phenomenon is discussed below.

Table 74 Chronological changes in the size of class 3 combs

Date	Proportions						Forms				All complete	
	long		squat		other		rectangular		trapezoid		No. of combs	$\sim S$
	No. of combs	$\sim S$	No. of combs	$\sim S$	No. of combs	$\sim S$	No. of combs	$\sim S$	No. of combs	$\sim S$		
e.12th C.	1	5198	1	3520	0	-	2	4359	0	-	2	4359
m.12th C.	2	3698	2	4549	3	4624	3	4802	4	3990	7	4338
l.12th C.	8	4458	18	4053	6	3699	10	4090	22	4087	32	4088
e.13th C.	28	4449	28	4180	6	3875	28	4518	34	4069	62	4272
m.13th C.	32	4559	24	4082	2	4595	32	4567	26	4110	58	4363
l.13th C.	24	4849	5	4173	1	3690	23	4945	7	3887	30	4698
e.14th C.	13	4781	1	4483	0	-	13	4825	1	3901	14	4759
m.14th C.	1	4770	1	4320	0	-	2	4545	0	-	2	4545
Total complete dated	109	4606	80	4128	18	4011	113	4622	94	4066	207	4369
All complete	135	4530	100	4147	24	3988	139	4566	120	4061	259	4332

Table 74 demonstrates the chronological trend towards larger sizes of class 3 combs in the mid-late 13th to mid 14th centuries. Although combs of trapezoid outline reveal this tendency earlier (in the late 12th to mid 13th century), specimens of rectangular outline became larger on average during the late 13th – early 14th century. Further details on trapezoid and rectangular combs are contained in Table 75 showing chronological changes in the size and dimensions of the main forms of class 3 combs. It is quite noticeable that the enlargement of trapezoid combs in the late 12th

– early 13th century occurred at the expense of the comb heights, whilst enlargement of the rectangular combs of the late 13th – early 14th century was due to an increase of both heights and widths.

Table 75 Chronological changes in the size and dimensions of rectangular and trapezoid class 3 combs

Date	Rectangular				Trapezoid			
	No. of combs	~W width	~H height	~S	No. of combs	~W width	~H height	~S
e.12th C.	2	79.3	55.0	4359	0	-	-	-
m.12th C.	3	94.2	52.0	4802	4	65.9	60.5	3990
l.12th C.	10	83.2	49.2	4090	22	71.7	56.8	4087
e.13th C.	28	95.6	47.5	4518	34	71.7	56.5	4069
m.13th C.	32	93.5	48.7	4567	26	72.9	56.3	4110
l.13th C.	23	98.5	50.3	4945	7	73.2	53.4	3887
e.14th C.	13	95.6	50.5	4825	1	83.0	47.0	3901
m.14th C.	2	89.0	52.5	4545	0	-	-	-
Total complete dated	113	94.1	49.3	4622	94	72.0	56.4	4066
All complete	139	93.8	48.8	4566	120	72.1	56.3	4161

The average sizes of combs in different chronological periods, varying from 4088sq.mm to 4759sq.mm (Table 6.14, rightmost column), cluster around the middle peak on the charts in Figure 6.18 and may be called medium sized (76 combs, 29.3% of the dated objects) (e.g. D92 (Fig. 6.14), D112 (Fig. 6.8), D192 (Fig. 6.7), D374 (Fig. 6.22), D390 (Fig. 6.5), D406 (Fig. 6.4), D420 (Fig. 6.9) and D522 (Fig. 6.15)). Those of a size less than 4088sq.mm (the lowest average S variable) qualify as being small sized (106 items, 40.9%) (D28, D38, D217 (all Fig. 6.22), D31 (Fig. 6.4), D383 (Fig. 6.6), D389 (Fig. 6.16), D436 (Fig. 6.3) and D544 (Fig. 6.8)), those with S over 4759sq.mm (the highest average S variable) being large sized (77 examples, 29.7%) (D30 (Fig. 6.4), D69, D104, D214 (all Fig. 6.24), D166 (Fig. 6.14), D222 (Fig. 6.8), D284, D312 (both Fig. 6.3), D323, D382 (both Fig. 6.6), D361 (Fig. 6.9) and D385 (Fig. 6.5)). In the group of small combs, a sub-group of miniature combs (S<3000sq.mm: 14 combs, 13.2% of all small-sized) can be distinguished (Fig. 6.18). In a total of twelve dated smallest class 3 specimens deriving from mid 12th to mid 13th century contexts, eleven combs come from the 12th – early 13th centuries,

where they account for over 20% of small examples (e.g. D5, D42, D171 (all Fig. 6.15), D67 (Fig. 6.14) and D201 (Fig. 6.22).

The dynamics of chronological changes in the occurrence of different size groups is shown in Figure 6.20. Ignoring the extremes of the chronological sequence because of the paucity of complete examples, one can see that the quota of medium sized combs is at its lowest in the mid 12th century (14.3%) and at its highest in the late 13th century. Small sized combs, which up to the early 13th century, accounted for no less than 40% of complete specimens, decrease proportionally later on at the expense of large combs, forming about 50% of late 13th – early 14th century objects. We recollect that the maximum quota of large class 2a combs (42%) as well as the highest average size are found in the late 13th century simple combs in skeletal materials (Fig. 4.27, Table 22).

Small sized double-sided combs, which are comparable in size with medium sized simple combs in skeletal materials, form a larger group both in terms of numbers of examples as well as proportionally amongst the complete specimens of trapezoid outline (Fig. 6.21), demonstrating again some similarity in comb size fluctuation between trapezoid class 3 combs and their one-piece counterparts in skeletal materials. For a whole host of reasons discussed in this chapter (single-billeted examples of composite construction, forms and proportions, curves of sides and bottom line, fluctuation of sizes, chronological distribution) it appears that trapezoid class 3 combs are composite skeuomorphs of simple combs of class 2a.

6.2.2c Teeth

Class 3 combs have two rows of teeth, with the usual marked division of fine teeth on one side and more widely spaced coarse teeth on the other. Teeth were cut after the combs had been assembled. A characteristic triangle at the base of teeth bordering the side-plates implies that the saw was held at an angle to each face and the teeth were cut from both sides. As was convincingly demonstrated during experimental comb-making by Galloway and Newcomer (1981, 80-82), this manner of cutting teeth provided for stability of the teeth during the manufacturing process and protection against wear-and-tear.

The angled cuts would have inevitably led to saw marks on the side-plates, seen almost invariably on the upper and lower edges of plano-convex cross-sectional side-plates (e.g. D67 (Fig. 6.14), D192 and D526 (both Fig. 6.7)) and on sinuous cross-sectional plates (e.g. D112, D544 (both Fig. 6.8), D361 (Fig. 6.9), D382 (Fig. 6.6) and D529 (Fig. 6.6)). The fact that saw cuts are encountered so rarely on most common deep trapezoid cross-sectional side-plates has led us to conclude, that these having been originally most likely of plano-convex profile, were reshaped into their trapezoid profile after the teeth had been cut in order to remove saw-cuts, with only the deepest cuts still remaining (e.g. D30 and D406 (both Fig. 6.4)).

The entire row of teeth is beveled with files to obtain a lens-like cross-section, with most combs featuring individual teeth on both faces tapered towards the tips. However, a different fashion of tapering very coarse teeth in a long slope towards the tips, thus giving them a triangular form in the facial view, gained popularity in the late 13th –early 14th century (e.g. D385 and D390 (both Fig. 6.5)).

The vast majority of combs in the assemblage exhibit equal length of teeth within either row, undermining the common assumption that the gradual shortening of teeth towards both ends provided for additional strength (Galloway and Newcomer 1981, 81). A total of only thirteen combs¹ (all dated from the 12th – early 13th century contexts) feature an arc or diagonal lines of the tooth graduation upon the end-plates. Almost all of those (with the exception of straight-sided specimens D67 (Fig. 6.14) and D215²) have either concave⁽²⁾ (e.g. D192, D526 and D529 (all Fig. 6.7)) or B-shaped (e.g. D544 (Fig. 6.8)) sides, features recognised as being indicative of imported items. Ten examples with the tooth graduation have surviving side-plates, which are invariably of either a plano-convex (e.g. D67 (Fig. 6.14), D192, D215, D526 (both Fig. 6.7)) or sinuous (D112, D544 (both Fig. 6.8) and D529 (Fig. 6.7)) cross-section. It seems reasonable, therefore, to state that the combination of plano-convex cross-sectional side-plates and tooth graduation is another pointer towards an imported comb. It is also worth noting that seven of the eleven combs with tooth graduation³ exhibit an extravagant use of numerous copper alloy rivets, a feature

¹ D67, D112, D192, D215, D229, D298, D418, D478, D526, D527, D528, D529 and D544.

² Kolchin 1958, 100, Fig. 5: 7(left)

³ D112, D298, D418, D478, D528, D529 and D544.

frequently seen on combs in the assemblages from Scandinavia and the Southern Baltic (e.g. D529 (Fig. 6.7), D112 and D544 (both Fig. 6.8)).

Class 3 combs with tooth graduation are very common amongst 12th-14th century assemblages from the Balto-Scandinavian world, however, few sites can boast the widest range of specimens exhibiting this feature and all possible combinations of straight, concave, convex and ornate sides with plano-convex, sinuous and rectangular cross-sectional side-plates. These are Schleswig (Ulbricht 1984, Taf. 75:1, 3, 6-8, 77: 3-4, 6-7) and Ribe (Andersen 1968, 33-39, Fig. 15, 17a-b, 18, 21, 26-27; Ambrosiani 1981, 129, Fig. 80:4) in Jutland, Lund (Blomqvist 1943, 153-159, Bild 54, 57, 58, 62, 64, 67, 69, 75; Persson 1976, 330-329, Fig. 294:69D, 295:65D) in Skåne; Trondheim (Flodin 1989, Ill. 28, 29, 31, 33) and Oslo (Molaug 1975, 238, Abb 17: 3; Wiberg 1987, 418, Fig. 4: a, b, d-f) in Norway and Söderköping (Broberg and Hasselmo, 1981, 77, 53:7-10) in Central Sweden. In Russian towns there are exceptional finds in the assemblages of Smolensk (Astashova 1993, 72) and Beloozero (Golubeva 1973, 171-173, Fig. 62: 2).

Apart from the sites listed above, straight sided combs with tooth graduation are known as single finds only in the Orkneys (plano-convex cross-sectional side-plates)¹, Central Swedish Lödöse (sinuous cross-sectional side-plates) (Broberg and Hasselmo, 1981, 85, Fig. 64:8-9) and Estonian Tallinn (missing side-plates) (Luik 2001, 327, Fig. 9).

Combs with concave(2) and B-shaped sides featuring either plano-convex or sinuous cross-sectional side-plates are not uncommon in Central Swedish Uppsala, Örebro and Nyköping (Broberg and Hasselmo, 1981, 75-83, Fig. 49:8, 58:9, 59:2,3, 63:7; Carlsson 1991, 117: 855, 983,1448)), Lödöse (Broberg and Hasselmo, 1981, 85, Fig. 64:10) and Tommarp (Thun 1967, 84: f, g, I, k) in Skåne, Gdansk (Hilczerówna 1961, 123-127, Ryc. 55-59), Isle of Usedom in Mecklenburg (Lampe 1981, 175-176, Abb. 5: a, b, f, 6). Estonian Tallinn and Ostepää have single finds of B-shaped-sided combs with sinuous cross-sectional side-plates and tooth graduation in their collections (Luik 1998, 109, Fig. 95-96).

¹ Unpublished material: PL 4480 (Museum in Kirkwall)

Tooth graduation appears to be a characteristic feature pertaining to the Scandinavian and Southern Baltic medieval tradition of comb-making. It is worth recollecting that single-sided composite combs (a legacy of the Viking Age), conventionally having teeth graduating towards the ends, continued to be manufactured in this part of the world well into the 13th century and, in some areas, even longer.

Coming back to the Novgorod assemblage with regard to teeth, it should be mentioned that the vast majority of combs feature a fairly equal height of coarse and fine rows of teeth, although a few specimens deriving from late 12th –early 13th century contexts exhibit noticeably greater heights of either fine (D21, D161, D166 (Fig. 6.14), D171, D522 (both Fig. 6.15), D194, D421, D524 and D533) or coarse teeth (D12, D40 and D186). The discrepancy in the heights of teeth was shown to be fairly common on the 12th –13th century simple combs in skeletal materials from the Novgorod assemblage (section 4.2.1b). With the exception of rectangular specimen D161, all these are trapezoid combs revealing another skeuomorphic feature linking them to the one-piece models.

It was demonstrated above (sections 4.2.1b, 5.3.1b) that the degree of division in density between coarse and fine teeth is a diagnostic chronological feature. In order to examine chronological changes concerning this variable, 170 combs were selected at random for precise measurement of the teeth density. The density of coarse teeth varies from 2 to 6 teeth per 10mm (average 3.1), with fine teeth varying in density from 7 to 14 teeth per 10mm (average 9.1). The degree of division in density between coarse and fine teeth is expressed as a coarse to fine teeth density ratio (*tdr*) and varies from 0.20 to 0.75. The average *tdr* is 0.34, which is lower than the average *tdr* for double sided simple combs in skeletal materials (*tdr*=0.54) (section 4.2.1b, Table 23) and in wood (*tdr*=0.40) (section 5.3.1b, Table 57), implying that tooth density division is most pronounced on double-sided composite combs. A total of 166 combs with measured teeth (98.2%) exhibit a marked division between coarse and fine teeth (*tdr* ≤ 0.50), with only a handful of three combs featuring a less pronounced difference in gauge of coarse and fine teeth (early 13th century D191, D428 (Fig. 6.11) and D475 (both from undated contexts)). A total of 74 class 3

combs from the group with measured densities of both rows of teeth deriving from dated contexts are quantified in Table 76.

During the period from the late 12th to the late 13th century (most numerous combs) the average *tdr* is at its highest and the range of variables at its widest in the early 13th century. Combs featuring *tdr* higher than any of the average chronological variables listed in Table 76, form a small group of 32 specimens (18.8%). The fact that all three examples with tooth graduation (imports), which happened to be amongst measured combs (D298, D418 and D478) occurred in this group, highlighted the necessity to have a closer look at the morphological features of the specimens with high *tdr* (>0.39 for the Novgorod assemblage).

Table 76 Class 3 combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth

Date	Number of combs	Average coarse teeth density (per 10mm)	Average fine teeth density (per 10mm)	Average coarse/fine teeth density (per 10mm) ratio <i>tdr</i> *
m.12th C.	5	3.2	8.8	0.37 (0.30-0.50)
l.12th C.	12	2.9	9.4	0.31 (0.22-0.46)
e.13th C.	24	3.4	8.8	0.39 (0.28-0.75)
m.13th C.	16	2.9	9.2	0.32 (0.20-0.50)
l.13th C.	13	2.8	8.7	0.33 (0.25-0.44)
e.14th C.	2	3.0	8.0	0.38 (0.25-0.50)
m.14th C.	1	2.5	7.0	0.36
l.14th C.	1	3.0	8.0	0.38
Total dated	74	3.1	8.9	0.35 (0.20-0.75)
All	170	3.1	9.1	0.34 (0.20-0.75)

The group contains seven out of eight measured examples with sinuous cross-sectional side-plates (e.g. D361 (Fig. 6.9), D382 (Fig. 6.6) and D544 (Fig. 6.8)) and four out of five measured examples with flat rectangular cross-sectional side-plates (e.g. D428 (Fig. 6.11)), these obviously being imports. Five out of six measured specimens with numerous rivets (e.g. D425 and D544 (both Fig. 6.8) and all three measured examples with obliquely set pairs of rivets (e.g. D383 (Fig. 6.6)) are included in the group, both riveting systems being definite indicators for imports. Concave(1) sided combs, most common in the Novgorod assemblage, account for only 7.4% of specimens in this group, whereas the percentages of concave(2),

ornate, B-shaped-sided combs are several times higher than in the overall assemblage and in the sub-assemblage of measured specimens. Both of the two complete combs with two pairs of side-plates (D361 and D420 (both Fig. 6.9)) are present in the group, with a total of 20 specimens (62.5%) qualifying for being imports.

It seems logical to conclude that a high *tdr* (>0.39) is another diagnostic indicator for imported items in the Novgorod assemblage¹.

6.2.3 Decoration

The impressiveness of a double-sided composite comb can be enhanced in many ways. The most common means of decoration is ornamenting constructive parts of a comb, such as side-plates, end-plates or central billets with carved or fret-work elements. Using optically attractive shapes, such as ornate- or B-shaped-sided end-plates or sinuous cross-sectional side-plates, can also be very effective. Finally, piercing a comb with numerous copper alloy rivets must have produced a great ornamental impression in combination with the creamy colours of skeletal materials.

However, most class 3 combs in the Novgorod assemblage are not decorated at all. A total of 189 combs (73.0%) in the sub-assemblage of complete specimens with the full array of constructive elements are totally plain. Side-plates are the parts which most frequently bear some kind of decoration.

6.2.3a Decoration of side-plates

In the sub-assemblage of 507 specimens with surviving side-plates, 395 (77.9%) items have side-plates devoid of any decoration, this being encountered only on trapezoid (379 specimens, 84.9%), plano-convex (11 specimens, 44.0%) and rectangular cross-sectional side-plates (5 specimens, 33.3%). The occurrence of

¹ A total of thirteen class 3 combs from Schild excavation in Schleswig (11th-14th CC.) measured by the author, featured *tdr* ranging from 0.36 to 0.80, coarse teeth density from 4 to 7 teeth per 10mm, fine teeth density from 7 to 11 teeth per 10mm, with the average *tdr* being 0.49, average coarse teeth density 4.7 teeth per 10mm and average fine teeth density 9.5 teeth per 10mm

undecorated side-plates on dated combs from the Novgorod assemblage is shown in Table 77.

The highest percentage of combs with undecorated side-plates occurred in the late 12th – mid 13th centuries (e.g. D284 and D312 (both Fig. 6.3), D192 and D526 (both Fig. 6.7), D41 and D166 (both Fig. 6.14), D5, D9, D42, D171 and D522 (all Fig. 6.15), D38 and D554 (both Fig. 6.22)).

Table 77 The frequency of class 3 combs with undecorated side-plates as revealed by the dated specimens

Date	Combs with undecorated side-plates		All combs with surviving side-plates
	Number of combs	% of all with surviving side-plates	
e.12th C.	2	66.7	3
m.12th C.	9	75.0	12
l.12th C.	45	88.2	51
e.13th C.	80	79.2	101
m.13th C.	95	79.2	120
l.13th C.	51	75.0	68
e.14th C.	15	60.0	25
m.14th C.	1	25.0	4
l.14th C.	2	66.7	3
e.15th C.	1	100.0	1
Total	301	77.6	388

Comparing the chronological patterns of the frequency of class 2a combs with undecorated central zones, which can be seen as being analogous to composite combs with plain side-plates, one can observe that the trend towards the popularity of undecorated simple combs became very pronounced from the early 13th century. By the mid 13th century, in other words by the time of the predominance of class 3 combs over their counterparts of simple construction, the majority of simple combs featured plain central zones (section 4.2.2, Table 27).

As can be clearly seen in Table 78, plain side-plates are especially common on concave-sided combs of the Novgorod style (concave(1)) and on convex-sided specimens. They are also frequently encountered on straight- and angular-sided combs.

Table 78 The frequency of plain and decorated side-plates on class 3 combs with different side lines

Sides	Plain side-plates			Decorated side-plates			All
	No.	% of all with plain side-plates	% of all with particular side line	No.	% of all with plain side-plates	% of all with particular side line	
concave (1)	204	55.7	93.6	14	13.6	6.4	218
straight	87	23.8	75.7	28	27.2	24.3	115
angular	46	12.6	57.5	34	33.0	42.5	80
convex	23	6.3	79.3	6	5.8	20.7	29
concave (2)	4	1.1	26.7	11	10.7	73.3	15
ornate	0	0.0	-	7	6.8	100.0	7
B-shaped	2	0.5	40.0	3	2.9	60.0	5
Total	366	100.0	78.0	103	100.0	22.0	469

The chronological distribution of these four groups of combs, most frequently encountered with plain side-plates, is shown in Table 79. Concave(1) and straight-sided combs with undecorated side-plates form proportionally and numerically the largest groups from the mid 12th to early 13th century (e.g. concave(1)-sided specimens D312 (Fig. 6.3), D31 (Fig. 6.4), D41 (Fig. 6.14), D5, D9, D42 and D522 (all Fig. 6.15), D28, D38, D201 and D554 (both Fig. 6.22); straight-sided specimens D30 (Fig. 6.4) and D32 (Fig. 6.23)). In the early 14th century, when a trend towards decorated combs became noticeable (Table 77), straight-sided specimens were encountered with plain side-plates more often than any other types (e.g. D83 and D91 (both Fig. 6.25)). Angular- and convex-sided combs demonstrate higher numbers and percentages in the late 13th – early 14th centuries (e.g. angular-sided specimens D390 (Fig. 6.5) and D94 (Fig. 6.25), convex-sided specimens D142 and D221 (both Fig. 6.25)).

Combs with decorated side-plates account for 22.1% (112 items) of all specimens with surviving side-plates (22.4% (87 items) of dated specimens (Table 77)). They are relatively more common in the early-mid 12th and in the late 13th – 14th centuries (lower percentages of plain side-plates observable in Table 78) and are encountered on the majority of concave(2), ornate- and B-shaped-sided combs.

Table 79 Chronological distribution of concave(1), straight-, angular- and convex-sided class 3 combs featuring plain side-plates

Date	concave (1)		straight		angular		convex		All dated
	No. of combs	%	No. of combs	%	No. of combs	%	No. of combs	%	
e.12th C.	1	33.3	0	-	1	33.3	0	-	3
m.12th C.	6	50.0	3	25.0	0	-	0	-	12
l.12th C.	33	64.7	6	11.8	0	-	2	3.9	51
e.13th C.	45	44.6	18	17.8	3	3.0	4	4.0	101
m.13th C.	46	38.3	18	15.0	14	11.7	4	3.3	120
l.13th C.	16	23.5	8	11.8	15	22.1	6	8.8	68
e.14th C.	2	8.0	6	24.0	4	16.0	2	8.0	25
m.14th C.	1	25.0	0	-	0	-	0	-	4
l.14th C.	1	33.3	0	-	0	-	0	-	3
e.15th C.	0	-	1	100.0	0	-	0	-	1
Total	151	38.9	60	15.5	37	9.5	18	4.6	388

Carved decorations

Linear decorations

Linear horizontal marginal¹

A total of 18 combs in the sub-assembly of 112 specimens with decorated side-plates (16.1%) feature linear incisions along the top and bottom edges of the side-plates.

Ten combs² deriving from late 12th to late 14th century (most frequently from the 13th century), have no other decorative elements (L-patterned, with L1, L2, L3 and L4 variations of the pattern, see Fig. 4.50) (e.g. D285 (Fig. 6.5) and D391 (Fig. 6.4)). These patterns are encountered mainly on trapezoid cross-sectional side-plates, with two examples on plano-convex cross-sectional side-plates (mid 13th century specimens D123 and D414) and one example on a flat rectangular cross-sectional side-plate (late 14th century comb D99). The latter bone comb with missing end-plates is the only specimen featuring the L1 pattern. Parallels to this can be seen on straight-, concave-, B-shaped- and ornate-sided combs in Ribe (Andersen 1968, 33-

¹ Abbreviated as L in the coding system of Database D.

² D24, D43, D99, D104, D123, D228, D285, D391, D414 and D446.

37 Fig.15, 17b, 18a, 20, 23; Ambrosiani 1981, 129, Fig. 80:4), Århus (Andersen and Madsen 1985, 70, Fig. 40: JV), Schleswig (Ulbricht 1984, Taf. 32: 1, 2), Uppsala (Carlsson 1991, 116, 39:1519), Gdansk (Hilczerówna 1961, 72, Fig. 29:a, c), Pärnu, Tartu and Tallinn (Luik 1998, 100-101, Fig. 84-86).

The early 13th century comb D104 (Fig. 6.24) has a specific version of the L pattern executed by a saw to produce a staged pattern on the trapezoid cross-sectional side-plate.

Eight combs¹ feature marginal lines along the top and bottom edges incorporated into various patterns along with other decorative motifs, with only two mid 13th century examples occurring on trapezoid cross-sectional plates. Straight-sided comb D152 (Fig. 6.26) has triple linear incisions along the sloping sides and a deep groove along the middle of the flat central area (see *Groove* patterns below), whereas angular-sided specimen D291 features marginal double linear incisions and RDB pattern in the middle.

L.RDB patterns are very common on class 3 combs from the 13th-14th century contexts in the lands around the Baltic. However, these patterns occur on flat rectangular or sinuous cross-sectional plates featured mainly on concave(2)- and ornate-sided combs, often with two pairs of side-plates and end-plate RDE decoration. These can be seen in the assemblages from Söderköping in Central Sweden (Broberg and Hasselmo, 1981, 75, Fig. 51:3), Lund (Blomqvist 1943, 157-159, Bild 63, 73-74) in Skåne and the Eastern Baltic sites, such as Riga (Caune 1983, 116, Att 39:16) Ostepää, Rakvere, Tartu and Tallinn (Luik 1998, 97-99, 116, Fig. 81-83, 102; Luik 2001, 237, Fig.11-13, 15, 17). L.RDB patterned side-plates occur on B-shape-sided combs in Schleswig (Ulbricht 1984, Taf. 31:6) and Riga Caune 1983, 116, Att 39: 15) and on convex-sided comb in Polish Poznan (Hensel and Broniewska 1961, 165, Ryc. 88:b).

It seems obvious that ornate-sided comb D361 and concave-sided D420 with two pairs of side-plates (both Fig. 6.9), as well as D160 (Fig. 6.11) with a single pair of side-plates and RDE end-plate decoration (see below in this section), all featuring

¹ D67, D152, D160, D291, D361, D387, D420 and D428

L.RDB patterns, are imported items, whereas D291 is a local product decorated with this pattern, recognised as being fashionable in Europe at the time.

Straight-sided late 12th century comb B67 (Fig. 6.14), also featuring L.RDB pattern on its plano-convex cross-sectional side-plates, has been recognised as an import from its features, which include a graduated tooth line (sections 6.2.2a and 6.2.2c). It stands apart from other L.RDB patterned counterparts originating in Western European lands by its squat proportions and additional decorative element in the form of vertical multiple incisions at the end of the side-plates being incorporated in the pattern. The provenance of this comb can be located with more precision, since combs with similar morphological peculiarities are known only amongst specimens from Pessenstraße excavations in Schleswig (Ulbricht 1984, Taf. 75).

Concave(2)-sided specimen D428 (Fig. 6.11), featuring RDE motifs in combination with marginal lines (L.RDE pattern) on flat rectangular cross-sectional side-plates, and RDE motifs on end-plates, is an obvious import. L.RDE patterned side-plates on concave-sided combs with endplate RDE decoration are known in Lund (Persson 1976, 330 Fig. 295:56D; Blomqvist 1943, 157, Bild 60), Uppsala (Carlsson 1991, 117, 40:307) and Eastern Baltic sites, such as Riga (Caune 1983, 116, Att 39:13-14), Viljandi, Tallinn, Kuusalu, Tartu (Luik 1998, 91-95, 119 Fig. 74-76, 78-80, 108; Luik 2001, 327, Fig. 7-8). In Tartu and Tallinn (Luik 1998, 75, Fig. 56-57) L.RDE patterned side-plates also occur on straight-sided combs.

Ornate-sided comb D387 (Fig. 6.17), incorporating a belt of multiple oblique incisions, alternating in their orientation in the central area of the side-plates outlined by multiple marginal lines, probably originates in the Southern Baltic area where both ornate end-plates and decorations with oblique lines are very common, although no direct parallels have been found up to now.

Grooves¹

A total of 23 class 3 combs (20.5%) feature a specific decorative feature in the form of a longitudinal single or (much less frequently) double deep groove cut at the middle of the height of the side-plates.

Thirteen bone straight- (e.g. D180 (Fig. 6.11)) or convex-sided combs (e.g. D383 (Fig. 6.6)) have single longitudinal grooves on their shallow plano-convex, B-shaped or (more often) rectangular cross-sectional side-plates². These specimens derive from 13th – early 14th century contexts, but are most frequently encountered amongst mid-late 13th century specimens and most likely originate in the Eastern part of the Balto-Scandinavian world. Similar combs are very common in Central Sweden (Söderköping) (Broberg and Hasselmo, 1981, 77-79, Fig. 53:11, 55:2, 56:2) and Estonia (Lihula, Ostepää, Enivere and Tallinn) (Luik 1998, 79-81, 105, Fig. 60-64, 90-91; Luik 2001, 327, Fig. 6). Single finds are known in the west of the Baltic area (Schleswig (Ulbricht 1984, Taf. 32:6)).

Ornate-sided comb case D381 (Fig. 6.17) uncovered from an early 13th century context, features a combination of an RDB pattern and groups of RD motifs separated by the central groove on its rectangular cross-sectional side-plates. Grooved rectangular side-plates with RDB pattern are known on a fragmented find with missing end-plates from a 13th century context in Estonian Haapsalu (Luik 1998, 117, Fig. 104).

Two 13th century bone ornate-sided combs, which feature a double groove in the middle of B-shaped (D413) and sinuous cross-sectional side-plates (D382 (Fig. 6.6)), are also obvious imports. These are known in Sweden (Söderköping (Broberg and Hasselmo, 1981, 79, Fig. 56:3)) and Norway (Oslo (Wiberg 1987, 418, Fig. 4:a)), as well as in the coastal (western) area of Estonia (Tallinn, Pöide, Rakvere, Lihula, and Soontagana) (Luik 1998, 108-110, 113, 121 Fig. 95-98, 99, 111-112). In Russian lands, a single find bearing a carved mark resembling geometrical symbols of ownership (used by merchants from the countries of the Hanseatic League for

¹ Abbreviated as Gr in the coding system of Database D.

² D15, D79, D96, D158, D164, D180, D187, D200, D283, D316, D383, D430 and D458.

marking their merchandise (see section 5.3.2)), was uncovered in Smolensk (Astashova, 1993, 73, Fig. 5: 4).

Another seven combs with longitudinal grooves¹ on trapezoid or (in the case of specimens D448 and D477 deep plano-convex cross-sectional side-plates, have angular sides (convex (1) in the case of specimen D477 and, apart from bone specimen D454, are made out of antler. They feature grooves, either as the only decorative element on the side-plate (D448 and D454 (Fig. 6.26)) or, in combination with linear marginal decoration (D152 (Fig. 6.26)), multiple vertical lines at the ends (D205 and D405) and RDB motifs (D219 and D477. Specimen D454 (Fig. 6.26) also has end-plates decorated with groups of three round openings. These hybrid products appear to be local interpretations of western makes of class 3 combs with longitudinal grooves. A few dated examples suggest that most of these combs were made in the mid-late 13th century, similar combs being encountered amongst 13th century examples from Beloozero (Golubeva 1973, 172).

Saltires

A total of 31 combs (27.7% of decorated specimens) feature multiple saltire crosses, executed with double lines. They are known as a single decorative motif (four examples, e.g. D406 (Fig. 6.4)) or in combination with multiple vertical incisions alternating with saltire elements (27 combs, e.g. 384 (Fig. 6.26) and D385 (Fig. 6.5)). Only fragmented straight-sided antler specimen D229, which comes from an uncertain context and is believed to be an import on the grounds of the tooth graduation, has plano-convex cross-sectional side-plates. The remaining 30 combs, ranging in date from the late 12th to the mid 14th centuries, but being most common in mid 13th – early 14th century contexts, have trapezoid cross-sectional plates riveted as a rule with two rows of off-set pegs (20 examples) and angular end-plates (21 examples) (e.g. D384 (Fig. 6.26)). Other combinations include straight- (four examples, e.g. D386 (Fig. 6.26)) and concave-sided (5 examples, e.g. D385 (Fig. 6.5)) end-plates and a single row of rivets (7 examples, e.g. D406 (Fig. 6.4)). Bone examples are most common (26 specimens), although combs in antler (D44 and D290) and objects combining these raw materials (D64 and D411) are also known.

¹ D152, D205, D219, D405, D448, D454 and D477.

Multiple saltire motifs (only, or in combination with multiple vertical incisions) are common patterns on straight- or ornate-sided class 3 combs from around the Baltic. However, unlike the specimens discussed above, which appear to be local products in Novgorod, they occur on side-plates with different cross-sections riveted, as a rule, with pairs of vertically or obliquely set pegs and, occasionally, with a single row of pegs set at low frequency. These are known on specimens from Söderköping, Uppsala and Örebro in Central Sweden (Broberg and Hasselmo, 1981, 76-83, Fig. 51:5, 58:6, 61: 2-3, 5, 63:7), Lund in Skåne (Blomqvist 1943, 153: Fig. 53; Persson 1976, 329 Fig. 294:68D), Schleswig (Ulbricht 1984, Taf. 31:4), as well as from Riga (Caune 1983, 116, Att 39:12); Lihula, Tallinn and Tartu (Luik 1998, 73-74, 83, 117, Fig. 55, 65, 103; Luik 2001, 321-327, Fig. 2) in the East Baltic.

Vertical lines

A total of 31 combs (27.7% of all decorated) feature vertical lines either at the ends of side-plates in combination with linear marginal decoration or central grooves. Only angular-sided D72 from an early 14th century deposit has terminal vertical incisions as the only decorative element on its trapezoid cross-sectional side-plates.

Non-linear decorations

Ring-and-dot decorations

A total of 39 combs (34.8%) exhibit ring-and-dot decorations arranged mainly in RDB patterns. Ten specimens combining RD elements with either marginal lines or grooves have been discussed above.

The earliest specimen featuring RDB decoration on plano-convex cross-sectional side-plate is the early 12th century rectangular D215 (Kolchin 1958, 100, Fig. 5: 7(left)) of squat proportions and with teeth gradually shortening towards the ends, a feature highlighting its foreign origin. Similar combs are known among class 3 specimens from Lund (Blomqvist 1943, 157, Bild 61-62) and Ribe (Andersen 1968, 34, Fig. 16).

Mid 13th century specimen D167 with missing end-plates features a band of RD motifs in alignment with a row of circular openings. A parallel to this can be seen in an ornate-sided comb from Ribe (Andersen 1967, 39 Fig. 29).

Another 27 combs exhibit RDB patterns, most often on trapezoid (21 examples) and plano-convex (6 examples). Only one bone specimen has sinuous cross-sectional side-plates (mid 12th century concave(2)-sided comb D356). The same combination of morphological features (including decorations) can be seen on combs from Uppsala (Broberg and Hasselmo, 1981, 80, Fig. 58:3, 5).

The remaining 26 combs with RDB patterns on trapezoid and plano-convex cross-sectional side-plates appear to be local products. In the 12th-earlier 13th century they are represented by squared or squat concave(1)- or straight-sided combs made in antler more often than in bone, featuring either a single band of RD elements (e.g. D249 (Fig. 6.24)) or a meandering line of RD motifs (e.g. D69 (Fig. 6.24)). Later 13th – 14th century combs are of long proportions and are made in bone much more often than in antler. They feature either a single or a double band of RD motifs alternating with rivets placed either in one row or off-set in two rows, and have angular (e.g. D203 and D204 (both Fig. 6.27)), convex (e.g. D50 (Fig. 6.5) and D139 (Fig. 6.27)) or straight sides (e.g. D392 (Fig. 6.27)). Parallels to these are known in Beloozero (Golubeva 1973, 172)¹.

Fret-work decorations

Four combs in the sub-assembly of specimens with decorated side-plates (3.6%) have decorative circular openings in the side-plates which, in the case of comb D418, appear to have been highlighted by an underlying bronze sheet. Apart from antler comb D167 with a combination of RDB and openwork decoration, which was described above, two other combs of long proportions feature bone billets and either bone (D418 (Fig. 6.8)) or bone and antler (D449) side-plates. These derive from the contexts dated to the first half of the 13th century and are obvious imports, with parallels being found in Schleswig (Ulbricht 1984, Taf. 76:4), Tommarp (Thun 1967, 84, Fig. 28:g) and Ribe (Andersen 1968, 39, Fig. 26-29).

¹ Unpublished combs from the archive of A.F. Medvedev.

Bone specimen D214 (Fig. 6.24), deriving from a context dated to the turn of the 13th century, is very original. It has an outline typical for locally produced specimens of class 2a and class 3 combs with concave(1) sides and a convex bottom line. The trapezoid cross-sectional side-plate (of unusually great height), which partially survived on one face has small circular openings arranged in a floret pattern. This pattern appears to be similar to some of Novgorod style carved RDF patterns (Fig. 4.54) popular in the town around the same time. The fret-work decorations, however, never occurred on locally made combs and almost invariably indicate imported items. Furthermore, the riveting pattern is highly unusual for both local and foreign combs. It seems most likely, that this comb belongs to the rare examples of 'special-order' products which demonstrate a noticeable elaboration of the original model, enriched with borrowed decorative ideas (openwork ornament), combined with the highest level of execution.

Relief decorations

A total of eight combs deriving from late 12th –13th century layers have been assigned to the group of combs with decorated side-plates, despite being devoid of carved or fret-work ornamental elements. The decorative impressiveness of these is achieved by means of a sinuous profile of the side-plates (D244 and D429), often combined with extravagant riveting, producing additional ornamental effects (D112 and D544 (both Fig. 6.8), D298, D395, D478 and D529 (Fig. 6.7)). Specimens with this decorative concept are common in Jutland (Ulbricht 1984, Taf. 32:5, 77:3, 4, 6, 7; Ambroosiani 1981, 129, Fig. 80:1), Norway (Wiberg 1987, 418, Fig. 4:a; Flodin 1989, Ill. 28-30) and related late Norse contexts in the Orkneys (Sanday)¹.

6.2.3b Decoration of end-plates

A total of 18 combs (3.7% of 489 specimens with surviving end-plates) in the assemblage have decorated end-plates, most of which (16 specimens) occur in combination with decorated side-plates. It is more likely that specimen D372, surviving as the only ornate-sided end-plate, had decorated side-plates in the past, whereas complete mid 13th century comb D407 (Fig. 6.23) has double ring-and-dot

¹ Unpublished material from the Museum in Kirkwall (PL 4480, PL 4495).

motifs on the lower part of the end-plates as the only decorative element. RDE decorations in the form of compositions of two or three motifs on both the upper and lower parts of the end-plates are most common and occur on 15 combs made locally or elsewhere.

The latter are ornate (early 13th century D372) or concave(2)-sided combs (mid 13th century comb D160 and D428 from undated context (both Fig. 6.11) which find numerous parallels in the assemblages from medieval sites around the Baltic. Thus, concave(2)-sided end-plates with RDE ornaments are encountered on combs from Uppsala (Carlsson 1991, 117, 40:307) and Lund (Persson 1976, 330 Fig. 295:56D; Blomqvist 1943, 157, Bild 60) in Scandinavia, as well as in Riga (Caune 1983, 116, Att 39:13-14) Viljandi, Tallinn, Kuusalu and Tartu (Luik 1998, 91-95, Fig. 74-76, 77-80; Luik 2001, 327, Fig. 7-9, 13) in the East Baltic lands. Ornate-sided end-plates with RDE decoration are known in Ribe (Andersen 1968, 38, Fig. 28) and Schleswig (Ulbricht 1984, Taf. 32:4) in Jutland, and in Central Swedish Örebro and Söderköping (Broberg and Hasselmo, 1981, 76, 83, Fig. 51:4, 63:7).

Twelve RDE-patterned (end-plates) specimens, mainly with concave(1) (e.g. D407 and D477) and angular (e.g. D203 and D204 (both Fig. 6.27)) sides, but occasionally with straight (D437) and convex (D118) sides, belong to the group of locally made products. Apart from the squat trapezoid specimen D407 (Fig. 6.23), these are long combs of rectangular outline deriving predominantly from later 13th century contexts.

RDB decoration along the ornate side of the end-plate has been encountered only on comb case D381 (Fig. 6.17). This type of end-plate decoration is known on ornate- and convex-sided combs from Lund (Persson 1976, 329 Fig. 294:68D; Blomqvist 1943, 157-159, Bild 65, 71) and B-shape-sided combs from Oslo (Wiberg 1987, 418, Fig. 4:f) and Tallinn (Luik 1998, 109, Fig. 96).

Openwork decoration occurs twice on a presumably locally made comb D454 (Fig. 6.) discussed above (section 6.2.3a, grooved linear decorations), and on the large comb D381 (Fig. 6.9), which features suggest a foreign origin. Openwork

decorations of end-plates are featured on combs from Lund (Blomqvist 1943, 157, Bild 65) and Ribe (Andersen 1968, 38, Fig. 5).

6.2.3c Decoration of the side edges

In comparison with simple combs both in skeletal materials and wood (sections 4.2.2b and 5.3.2), decoration of face ends (end-plate decoration) is more common on class 3 combs.

Side edge decoration, which was fairly common on the 12th-13th century class 2a combs in the Novgorod assemblage (section 4.2.2c), has been encountered only on twelve class 3 combs deriving from the contexts dated to the late 12th –first half of the 13th century. This is exactly the period when side edge decoration became very popular on class 2a combs in Novgorod (Table 30). Class 3 specimens are trapezoid combs of squat and squared proportions, with the Novgorod style concave line of the sides (straight sides in the case of D391 (Fig. 6.4)) and trapezoid side-plates, which have already revealed a variety of skeuomorphic features linking them with class 2a combs.

As on class 2a combs, multiple incisions of oblique lines carved with a knife to imitate a twisted rope (Lo pattern (Fig. 4.60)) is the most common type of side edge decoration on class 3 combs (8 combs, e.g. D249 (both Fig. 6.24)). Linear incisions in the middle zone of the side edges (L patterns) occur twice in L1 variant (D307 and D491) and once in L2 variant (D135). Multiple chevron motifs covering edges from top to bottom (CV pattern) are featured on late 12th century specimen D391 (Fig. 6.4).

The majority of class 3 specimens with side edge decoration have plain side-plates, these being analogous to simple combs in skeletal materials with this decorative feature and plain central zones, especially common in the 13th century (see Table 27). There are only three examples exhibiting a combination of decorated side-plates and side edge decoration (D150, 249 (Fig. 6.24) and D391 (Fig. 6.4)).

6.2.3c Decoration billets

Openwork decoration of the central parts of billets occurred on three combs with two pairs of side-plates (D361 and D420 (both Fig. 6.9) and D380). This decorative feature pertains to combs manufactured in Western Europe mainly in the 13th-14th centuries and known in the assemblages from Oslo (Wiberg 1987, 418, Fig. 4:e), Trondheim (Flodin 1989, Ill. 31, 34), Schleswig (Ulbricht 1984, Taf. 31:4), Central Swedish Nyköping and Uppsala (Broberg and Hasselmo, 1981, 75, Fig. 49:9, 1, 2, 4; Carlsson 1991, 117, 40:190), as well as Tallinn Ostepää, Rakvere and Lihulain in the East Baltic (Luik 1998, 83, 98-99, Fig. 65, 81-83; Luik 2001, 237, Fig.13).

6.2.4 Raw Materials

Matters concerning the usage of raw materials were briefly mentioned above (section 6.2.1) in connection with billets and side-plates and it was demonstrated that cases of mixed raw material amongst billets or among the side-plates on one comb are extremely rare and most likely indicative of repair or re-assembly of combs with damaged elements. It seems logical, therefore, to examine the problem closely on the basis of specimens which survived with at least one intact billet and one, even fragmented, side-plate. A total of 506 specimens in the assemblage answer these requirements, with 286 examples of antler combs (56.5%), 189 bone combs (37.5%) and 30 specimens (5.9%) assembled from mixed skeletal materials (antler, bone, walrus ivory).

Table 80, containing 386 dated specimens, shows a relatively high percentage of bone combs amongst the few earliest examples of class 3 combs from the early-mid 12th century. This supports the argument that class 3 combs were introduced in Novgorod from outside by comb-makers (or traders) who were more accustomed to utilising bone for manufacturing composite combs.

More numerous combs from the late 12th are made predominantly of antler, but even later, in the early-mid 13th century the percentage of specimens made in antler is high. During the late 13th to mid 14th century one can see a noticeable shift towards utilisation of bone for class 3 combs.

Table 80 Chronological distribution of class 3 combs made of antler, bone and mixed skeletal materials

Date	Antler		Bone		Mixed		All
	No. of combs	%	No. of combs	%	No. of combs	%	
e.12th C.	1	33.3	2	66.7	0	-	3
m.12th C.	5	41.7	5	41.7	2	16.7	12
l.12th C.	38	74.5	9	17.6	4	7.8	51
e.13th C.	59	57.8	34	33.3	9	8.8	102
m.13th C.	73	61.3	44	37.0	2	1.7	119
l.13th C.	32	48.5	32	48.5	2	3.0	66
e.14th C.	8	32.0	14	56.0	3	12.0	25
m.14th C.	1	25.0	3	75.0	0	-	4
l.14th C.	2	66.7	1	33.3	0	-	3
e.15th C.	0	-	1	100.0	0	-	1
Total	219	56.7	145	37.6	22	5.7	386

Specimens featuring mixed skeletal materials are most common in the mid 12th – early 13th century and then again in the early 14th century. There are two types of mixtures: a bone and antler mixture (18 combs, 60% of all specimens with mixed raw materials) with an almost invariable allocation of bone for billets and antler for side-plates, and a walrus ivory + bone/antler mixture (12 combs, 40%), where billets in walrus ivory are combined with antler or (more rarely) bone side-plates. The former combination occurs as early as the mid 12th century (D28 and D201 (both Fig. 6.22)), but is also very common in the early 13th century (e.g. D38 and D554 (both Fig. 6.22)). The youngest comb with this kind of mixture of raw materials was uncovered from an early 14th century context (D277) and since its morphological features do not contradict the date, this comb provides evidence for the latest usage of walrus ivory amongst all combs found in Novgorod. The period of utilisation of walrus ivory in the manufacture of class 3 combs coincides with that for simple combs in this exotic material and with the occurrence of walrus ivory debris amongst skeletal waste materials (sections 4.2.3 and 4.5.2, Tables 32 and 33).

Combination of antler and bone is not known before the late 12th century when all four dated specimens in mixed skeletal materials reveal the usage of bone and antler, with one example of a foreign make (D192 (Fig. 6.7)) and three of seemingly local manufacture (D21, D41 (Fig. 6.14) and D282). Amongst the items dated to the early 13th century another four specimens pertaining to the local tradition (D5 (Fig. 6.15),

D7, D97 and D411) feature bone-antler mixture of raw materials. The highest numbers of these combs in the late 12th – early 13th century, characterised by the predominant usage of antler (Table 80), coincides again with the presence of highly rare examples of bone simple combs in the bulk of antler specimens from the peak period of the occurrence of class 2a combs in Novgorod. (section 4.2.3, Table 32).

Table 81 The composition of raw materials in the groups of locally made and imported class 3 combs

Products	Antler		Bone		Mixed		All	% in a total of 506 combs
	No.	%	No.	%	No.	%		
local	279	60.3	156	33.7	28	6.0	463	91.5
imports	7	16.3	34	79.1	2	4.7	43	8.5
Total	286	56.5	190	37.5	30	5.9	506	100.0

Through the analysis of the morphological features of class 3 combs in the Novgorod assemblage and the comparative analysis of those in the assemblages from other sites in Russia and around the Baltic, a total of 48 specimens (8.7%) have been identified as imports. In the sub-assemblage of 506 combs, which are examined in this section with regard to the utilised raw materials, 43 specimens (8.5%) belong to the group of imported items¹. Table 81 demonstrates that the frequency of combs made in antler and mixed skeletal materials (always a bone-antler combination) is much lower in this group.

Dated imported items are quantified in Table 82. Unfortunately, there are only three class 3 combs which derive from contexts unambiguously dated to the early 12th century (see above the discussion of the controversial dating of angular-sided specimen D4 in section 6.2.2.a), and only one specimen D215 (Kolchin 1958, 100, Fig. 5: 7(left)) recognised as an import. The quota of imported combs amongst the earliest specimens from the early-mid 12th century is high, but the small size of the sample diminishes the value of this evidence. However, it is very characteristic that all three oldest specimens are made out of bone. The next peak of the occurrence of foreign products can be seen in the early 13th century, but this time over a quarter of

¹ A total of 48 combs in the overall assemblage of 551 class 3 combs (8.7%) have been identified as imports.

specimens are made out of antler. Antler combs of foreign origin are known only among specimens dated to the late 12th – mid 13th century.

Nine late 13th –14th century examples of foreign manufacture are exclusively bone combs, eight of these being from the late 13th - early 14th century.

Table 82 Chronological changes in the composition of raw materials utilised in imported combs

Date	Antler		Bone		Mixed		All imports		All dated
	No. of combs	% of all imports	No. of combs	% of all imports	No. of combs	% of all imports	No. of combs	% of all imports	
e.12th C.	0	-	1	100.0	0	-	1	33.3	3
m.12th C.	0	-	2	100.0	0	-	2	16.7	12
l.12th C.	1	25.0	2	50.0	1	25.0	4	7.8	51
e.13th C.	3	27.3	8	72.7	0	-	11	10.8	102
m.13th C.	1	12.5	7	87.5	0	-	8	6.7	119
l.13th C.	0	-	5	100.0	0	-	5	7.6	66
e.14th C.	0	-	3	100.0	0	-	3	12.0	25
m.14th C.	0	-	0	-	0	-	0	-	4
l.14th C.	0	-	1	100.0	0	-	1	33.3	3
e.15th C.	0	-	0	-	0	-	0	-	1
Total	5	14.3	29	82.9	1	2.8	35	9.1	386

6.3 Review of the Main Stylistic Groups of Class 3 Combs with Comparative Analyses of Assemblages from Contemporary Sites in and outside Russia

The first examples of double-sided combs were introduced around the turn of the 12th century, when specimens of simple construction in skeletal materials and wood reigned absolutely in the comb repertoire (Fig. 6.2). The stylistic peculiarities of the earliest combs, which appear to originate in the Southern Baltic, gave an impetus to local attempts to make combs of composite construction. Over 90% of the combs in the assemblage appear to have been made locally (see below section 6.5) and the close examination of the combs' morphological traits undertaken above has revealed certain tendencies of predominant trends characteristic for different chronological

periods. Two periods, which partially overlap chronologically, can be distinguished with characteristic repertoires of class 3 comb forms and decorative styles: First Period (1100-1250) and Second Period (1230-1400), which almost exactly coincide with the Second and Third Periods differentiated for class 2a combs (sections 4.3 and 4.4).

First Period (1100-1250)

Combs pertaining to the First Period account for about 200 dated specimens and, along with examples from uncertain contexts allocated to this group by the combination of their morphological traits, encompass a collection of over 250 combs in the assemblage. They are made predominantly from antler entirely, with antler also utilised in combination with walrus ivory and, from the late 12th century, bone (section 6.2.4).

Very distinctive elements are trapezoid or (much more rarely) plano-convex cross-sectional side-plates riveted to only two or three billets with a single row of copper alloy pegs set at low frequency (R1(lf)). The vast majority of combs are undecorated with very few featuring L- or RDB patterns on the side-plates, RDE motifs on the end-plates and ornamented side edges (section 6.2.3, Fig. 6.23 and 6.24).

There are two main forms: rectangular combs ($dss \geq 0.86$) and trapezoid combs ($dss < 0.86$) with either straight or concave sides having a turning point in the upper part of the comb height (concave(1) or 'Novgorod style' concave). The former are often encountered in long proportions ($hwr \leq 0.65$), although squat ($0.65 < hwr \leq 0.90$) and squared ($0.90 \leq hwr < 1.10$) proportions typical for trapezoid forms (these being constantly more popular forms), are not uncommon (Tables 68 and 69). Average sizes of the combs from the First Period are below the overall average size (S 4369sq.mm) (Table 74) and small sized combs (S < 4088sq.mm) form the largest group, accounting for over 40% of all contemporary specimens (Fig.6.20).

Finally, the majority of class 3 combs feature a very marked division in the density of coarse and fine teeth ($\sim tdr = 0.35$).

In general, class 3 combs reveal such a remarkable similarity to the far more numerous contemporary simple combs in skeletal materials (sections 4.3 and 4.4, Table 38), that they can be called skeuomorphs, in other words, interpretations of the main styles of simple combs in a trendy composite construction with a host of stylistic 'quotations'.

Outside Novgorod, these combs are known either from the settlements belonging to the Novgorod state (Ladoga (Davidan 1962), Pskov (Kharlashov 1994), Staraja Russa¹ and the Princely residence in Rytic Gorodishche (Verkhorubova and Shorin 1985²), in the Russian Principalities of Polotsk (Novogrudok (Gurevich 1981)), Smolensk (Astashova 1993) and Suzdal (Suzdal (Sedova 1997) and Beloozero (Golubeva 1973)), respectively on the west, south-west and south-east frontiers of the Novgorod state, or in eastern Estonian sites of Tartu (aka Yuriev), Oatepää and Lõhavere (Luik 1998) close to the northwest frontiers of Novgorod (Fig. 4.64 and 4.66).

Examples featuring a radically different range of morphological traits are referred to as 'imported' here, but the implications of this term are discussed below (section 6.5). These combs, accounting for approximately 12% of the combs from this Period, have a characteristic less pronounced tooth density division and common tooth graduation and are made predominantly in bone (with a few antler specimens). They showed a tendency to increase in numbers from the late 12th century and became especially noticeable numerically and proportionally in the early 13th century (Table 82). Combs of this group are of rectangular forms and long proportions and have mainly sinuous (or, less often, plano-convex) cross-sectional side-plates and ornate or evenly curved concave sides with the turning point at the middle of the comb height (concave(2)) (Fig. 6.7 and 6.8). Openwork decoration of the side-plates and the use of numerous thin copper alloy rivets set at high frequency in one or two rows, of all distinctive decorative features of these combs are the most indicative of the provenance of these combs in the Western parts of the Balto-Scandinavian world

¹ Unpublished material from the excavations of the 1960s-1990s by A.F.Medvedev and V.G.Mironova (NGM; and NGM(SR) affiliate)

² See also specimens D549-D551 in database D.

(the Danish and Norwegian kingdoms) (Blomqvist 1943; Thun 1967; Andersen 1968; Persson 1976; Ulbricht 1984; Wiberg 1987, Flodin 1989).

Second Period (1230-1400)

During the Second Period distinctively different comb types became common. These account for over 200 dated specimens and along with examples from uncertain contexts allocated to this group by the combination of their morphological traits encompass a collection of nearly 300 combs in the assemblage. Bone became equally common in the bulk of raw materials utilised by comb-makers, and in the course of this Period it gradually superseded antler, with examples featuring mixed skeletal materials being fewer and mainly of antler-bone combination (section 6.2.4).

There is an obvious succession in the tradition of making double-sided composite combs, which still had predominantly trapezoid (and, as second most common, plano-convex) cross-sectional side-plates, were more often undecorated and featured a marked difference in gauge between coarse and fine teeth. The main changes have more to do with the comb outline, riveting systems and types of decoration. The major shift is away from trapezoid forms and squat proportions and towards the most popular rectangular forms and long proportions mainly with straight, angular or convex sides (Tables 68, 69 and 72). The only type from the previous Period to remain common, is the rectangular straight-sided undecorated combs. These, however, more often feature two rows of off-set rivets (R2(off-set)) (Fig. 6.25)). This riveting system becomes increasingly more frequently encountered in the second half of the 13th century and, by the beginning of the 14th century, supersedes the previously predominant R1(lf) riveting system. Convex-sided combs of this Period reveal a high correlation with another riveting system of pairs of vertically set rivets, which appears to have been copied from the foreign makes popular in the Eastern Baltic areas.

Some decorative patterns, including those incorporating longitudinal grooves, saltire motifs, and single or double bands of RD elements, as well as RDE decorations of the end-plates on the combs of the Second Period, were also copied from the popular western types (Fig. 6.26 and 6.27).

Comb types similar to the most popular types in Novgorod of the Second Period have been encountered in Smolensk (Astashova 1993), Beloozero (Golubeva 1973), Vshchizh near Chernigov¹, Rytic Gorodishche (Verkhorubova and Shorin 1985) and, as a singular find, in Tallinn (Luik 1998).

Fewer examples of imported combs of the Second Period (ca. 7.5%) specify a different nexus, embracing Novgorod with areas in the Eastern Baltic and Central Sweden (Broberg and Hasselmo 1981; Lampe 1981; Caune 1983; Carlsson 1991; Luik 1998, 2001). These are rectangular bone combs of long proportions with straight, concave(2) and B-shaped sides, featuring B-shape-and flat rectangular side-plates decorated with L1, L.RDE and grooved patterns, most often riveted to the billets with pairs of obliquely set pairs of pegs. Small combs with concave(2) and ornate sides, two pairs of side-plates and circular openings in the central part of billets not covered by the side-plates, also originate in this region, most probably in Central Sweden, where unfinished combs of this type are known.

6.4 Chronological and Spatial Distribution of Double-Sided Composite Combs in Novgorod Properties.

Like many other objects, class 3 combs are unevenly distributed within excavated areas of Novgorod. In Table 83 the finds are compiled and quantified by excavation site; there are also areas of the sites and indices of concentration showing the number of finds per 100 sq.m. With the average for Novgorod concentration of finds being 2.3 finds per 100 sq.m, one can see that indices for the sites and the Ends vary only slightly. In general, class 3 combs are less densely distributed on the Trade side of the town (Slavensky and Plotnitsky Ends) than on the St-Sophia's side (Nerevsly, Liudin and Zagorodsky Ends). It was shown above (section 4.4), however, that indices of concentration cannot be taken at face value in the case of objects with a long life span, since the chronological margins of their occurrence are fairly wide and not all sites represent the whole sequence of the relevant deposits. On the Fedorovsky site, for instance, later 13th –14th century deposits have been almost

¹ Unpublished material from the archive of A.F.Medvedev

completely destroyed by later development, which also disturbed some of the earlier layers.

Table 83 The occurrence of double-sided composite combs on Novgorod sites

Town side	End	Site	Number of class 3 combs	Site size (sq.m)	Index of ¹ concentration		
					Sites	Ends	Sides
St. Sophia's	Nerevsky	Dmitrievsky	0	360	0.0	2.3	2.6
		Kozmodemyansky	2	140	1.4		
		Liudogoshchensky*	5	160	3.1		
		Nerevsky*	215	8840	2.4		
		Tikhvinsky*	11	364	3.0		
	Liud.	Troitsky*	192	6336	3.0	3.0	
	Zag.	Mikhailo-Arkhangelsky*	21	656	3.2	3.2	
	Kremlin		0	100	-	-	
Trade	Slavensky	Buyany	1	160	0.6	1.4	1.4
		Duboshin*	11	160	6.9		
		Gotsky	0	552	-		
		Il'insky*	33	1430	2.3		
		Kirovsky	0	320	0.0		
		Mikhailovsky*	5	440	1.1		
		Nutny	3	674	0.4		
		Rogatitsky	1	140	0.7		
		Torgovy	2	160	1.3		
	Plot.	Fedorovsky*	36	2534	1.4	1.4	
<i>Casual finds</i>		13	-	-	-	-	
Total		551	23,526	2.3	2.3	2.3	

* Sites featuring imported combs in their collections.

The problem of overlapping margins of the chronological Periods defined above (section 6.3) has been approached in the same manner as in the case of simple combs in skeletal materials (section 4.4). A crucial historical event with a specific date lying within the overlapping margins of the two Periods (namely the fall of Kiev to the Tartar-Mongols and the beginning of the so called 'Tartar-Mongol yoke') has been chosen for the technical necessity to allocate the few combs deriving from deposits dated to those 'grey' decades to a particular Period in order to allow comparison of

¹ Index of concentration shows number of finds per 100 sq.m of excavated area; indices equal or higher than those for the whole assemblage (bottom line) are given in Bold.

the densities of class 3 combs on different sites and on excavated properties within the sites in more detail.

Table 84 The concentration of class 3 combs within the two chronological Periods

Period	No. of class 3 combs	Index of concentration	Excavated area (sq.m)	No. of imports	% of all combs
First Period (1100-1239)	194	0.8	23,526	23	11.9
Second Period (1240-1400)	227	1.0		17	7.5
Total dated	421	1.8		40	9.5

Table 84 contains 421 dated combs from the town quantified by two chronological Periods, and demonstrates indices of average concentration of class 3 combs calculated for each Period. Combs identified as imports (i.e. definitely manufactured outside the Novgorod state) are quantified separately by Period and are presented in terms of numbers and percentages of all contemporary class 3 combs. The average indices of concentration will be treated as guide marks in the comparative analysis below.

Seven sites in different Ends of the town reveal indices of concentration higher than the average figures (Table 83), with only three of them (Nerevsky, Troitsky and Duboshin sites) having established reliable chronologies and thus presenting substantial sub-assemblages of dated specimens. Table 85 contains dated combs from these three sites, quantified by Periods, as well as the dated examples from the Fedorovsky site, revealing fairly numerous finds from the deposits of the First Period. The index of concentration of class 3 combs for the Fedorovsky First Period is not particularly impressive, but one should always bear in mind that the quota of unstratified objects from this site is very high (in this case 41.7%). The undated 15 combs stylistically belong to the same Period, which increases the density of these objects to approximately the same level as that of the Netevsky and Troitsky sites. The Fedorovsky site also reveals the highest percentage of imported items of the First Period. The highest percentage of imports of the Second Period can be seen in the small sample from the Duboshin site in the Slavensky End.

Table 85 The concentration of class 3 combs within the two chronological Periods on the most productive sites with established chronology

Site	First Period			Second Period			Total dated	Excavated area (sq.m)
	No. of combs	Index of concentration	Imports*	No. of combs	Index of concentration	Imports		
Nerevsky	93	1.1	9 (9.7)	106	1.2	6 (5.7)	199	8840
Troitsky	72	1.1	4 (5.6)	112	1.8	9 (8.0)	184	6336
Duboshin	2	1.3	0	7	4.4	2 (28.6)	9	160
Fedorovsky	21	0.8	7 (33.3)	0	-	0	21	2534
All dated from the town	194	0.8	23 (11.9)	227	1.0	17 (7.5)	421	23,526

* Percentages of imports among the contemporary combs are given in brackets, those higher than the average for the Period (bottom line) being in bold.

The comparison of numbers of class 2a and class 3 combs from contemporary Periods (Tables 4.22, 4.23, 4.25, 4.27, 6.23 and 6.24) demonstrates a stable pattern of predominance of simple combs in skeletal materials in the 12th – earlier 13th century (Second Period in the history of class 2a combs and First Period in the history of class 3 combs), with a shift in favour of combs of composite construction from the mid 13th century onwards (Third and partially Fourth periods (class 2a) versus Second Period (class3)).

Finds from the remaining four sites with high densities of class 3 combs have been quantified by Period in Table 86 on the basis of examination of their morphological traits, rather than on the stratigraphical evidence. All three sites located on the St.-Sophia's side of the town within the Nerevsky (Liudogoshchensky and Tikhvinsky sites) and Zagorodsky (Mikhailo-Arkhangelsky site) Ends demonstrate moderately high densities of finds in both Periods, whereas the Il'insky site in the Slavensky End reveals high concentrations of class 3 combs only during the First Period. Although the numbers of imported combs are low, they are noticeable proportionally on the

Tikhvinsky site in both Periods and on the Liudogoshchensky site during the Second Period.

Table 86 The concentration of class 3 combs allocated within the two chronological Periods on evidence from morphological analysis of the objects from the sites with uncertain chronology

Site	First Period			Second Period			Excavated area (sq.m)
	No. of combs	Index of concentration*	Imports**	No. of combs	Index of concentration*	Imports**	
Liudogoshchensky	2	1.3	0	3	1.9	1 (33.3)	160
Mikhailo-Arkhangelsky	14	2.1	1 (7.1)	7	1.1	0	656
Tikhvinsky	4	1.1	1 (25.0)	7	1.9	2 (28.6)	364
Il'insky	14	1.0	1 (7.1)	9	0.6	0	1430

* Indices equal or higher than the average for each Period are given in Bold.

* Percentages of imports among the contemporary combs are given in brackets, those higher than the average figures for the Period being in bold

For a more detailed study of the patterns of chronological and spatial distribution of double-sided composite combs on the properties in different parts of the town, however, the three largest assemblages from the sites with reliable chronologies have been selected, namely the Nerevsky, the Troitsky and the Fedorovsky assemblages.

The Nerevsky End

The most numerous collection of 215 double-sided composite combs has been retained from the Nerevsky site, with 199 dated specimens quantified in Table 85 by Period and 195 examples with undoubted provenance¹ quantified by Period and property in Table 87. It is worth noting that, during the First Period, the densities of class 3 combs are equal on the giant sites in the Nerevsky and the Liudin Ends, which implies that, in reality, the concentration of these combs on the properties

¹ Specimens D290, D358, D401 and D403 have been excluded due to the ambiguity of their context.

excavated on the Nerevsky site was higher. Comparisons of distribution patterns of mass objects from these two major sites have invariably shown lower densities of artefacts on the Nerevsky site, which was argued to be a result of somewhat lower standards of recovery in the 1950s-early 1960s (sections 3.4 and 4.4). Let us have a closer look at the situation on the Nerevsky properties during the First Period. Arbitrary boundaries of the Nerevsky properties compromising the differences between construction layers within two Periods are shown in Figure 6.28.

Table 87 Chronological and spatial distribution of class 3 combs on the properties of the Nerevsky End (Nerevsky site)¹

First Period				Second Period			
Context	No. of combs	Index of concentration	Excavated area (sq.m)	Context	No. of combs	Index of concentration	Excavated area (sq.m)
A	6	1.2	520	A	1	0.2	520
Б*	39	<u>2.9</u>	1330	Б*	15	1.1	1330
Г	3	0.5	550	Г	7	1.3	550
B	0	-	550	B	5	0.9	550
Д*	18	1.4	1300	Д	20	1.5	1300
Е*	11	0.9	1170	Е*	16	<u>2.2</u>	720
				Е1	4	0.9	450
И	9	0.8	1150	И*	24	<u>2.1</u>	1150
К	4	0.7	550	К*	8	1.5	550
streets	2	0.1	1600	streets	3	0.2	1600
Total	92	1.1	8720	Total	103	1.2	8720

* Properties featuring imported combs in their collections.

The highest concentration of class 3 combs in the First Period can be seen on property Б, this also being the only property which featured in its collection more class 3 combs than class 2a specimens, the most common comb class at this stage (Table 85 and Figure 4.67, Second Period). Property A, which in earlier times had revealed evidence for close links with property Б, also shows almost equal numbers

¹ Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

of simple and double-sided composite combs in skeletal materials and a moderately high concentration of the latter. As for the other Nerevsky properties, numbers of class 3 combs are invariably considerably lower than class 2a combs and a moderately high density of the former has been revealed only on property Д. Three specimens featuring a walrus ivory and antler mixture of raw materials derive from properties Б (D409), Г (D201 (Fig. 6.22)), and И (D259). The latter two properties have preserved the lowest numbers of class 3 combs, as well as the lowest densities of these, which can be compared only to a total absence of double-sided composite combs on property В and low numbers of these on property К, abandoned as a living area after a conflagration and accommodating an orchard during the 1160s-1190s.

Combs of foreign manufacture are known only from properties Б (5 combs, 12.8%), Д (2 combs, 11.1%) and Е (3 combs, 27.3%), however, the earliest examples of squat rectangular straight-sided specimens with plano-convex side-plates and tooth graduation (D215 and D229¹) derive from property Б. On the other hand, the most rare and exquisite specimens of undoubted foreign origin, including large comb D361 (Fig. 6.9) and comb case D381 (Fig. 6.17), were uncovered from property Е, which also revealed the highest percentage of imported specimens. It is worth recollecting here that a rare example of a simple comb of foreign manufacture (B816 (Fig. 4.45) with decorative bronze sheeting) derives from the same property.

During the Second Period, concentrations of class 3 comb finds remain roughly at the same level on the Nerevsky site, whereas most other sites (including the Lyudogoshchensky and Tikhvinsky sites in the Nerevsky End) reveal a certain increase in the density of double-sided composite combs (Tables 85 and 86). Double-sided combs of composite construction outnumber their one-piece counterparts from the contemporary deposits (Period 3 and to a certain extent Period 4, see Table 85) invariably on the Nerevsky properties, property И being the only one which produced almost equally high numbers of both comb classes in skeletal materials. The pattern of spatial distribution of class 3 combs changes noticeably, with the focus primarily on properties И, К, Д and Е, occupying the area adjacent to

¹ Comb D229 derives from a chronologically uncertain context on the Nerevsky trench XII, located entirely within the boundaries of property Б. It has been allocated to the group of the earliest imports on the evidence of its morphological traits.

the crossing of Velikaia and Kuzmodemianskaia Streets and belonging to the *boyar* clan of the Mishiniches (Yanin 1979) (Table 87, Fig. 6.28). The highest concentrations of finds has been revealed on properties И and Е (in different boundaries) and both finds of combs with billets made out of walrus ivory were retained from the other two Mishiniches' properties (Д (D277) and К (D261)). Of the remaining properties, only property Г, adjoining the cross-roads of Velikaia and Kholopia Streets from the north-west, reveals a moderately high concentration of class 3 combs. Specimens of foreign manufacture were uncovered from properties И (2 examples, 8.3%), Е (1 example, 6.2%), К (1 example, 12.5%) and Б (2 examples, 13.3%).

The Liudin End

The patterns of spatial distribution of double-sided composite combs on properties of the Liudin End during the two Periods can be seen in Table 88¹ and Figure 6.29. During the First Period, composite combs in skeletal materials outnumber their counterparts of simple construction on properties В and Б, located to the east of Proboinaia Street (see Second Period in Table 42, Figure 4.68). Equal (or fairly equal) numbers of class 2a and class 3 combs were uncovered from properties А, also adjoining Proboinaia Street from the east, and the same pattern seem to have occurred on the southernmost property ЮК to the west of Proboinaia Street. However, the small numbers of finds and the insufficiently excavated area of this property warn against any serious conclusions. The remaining properties feature many more simple than composite combs in skeletal materials amongst the finds allocated to the period, dated to 1100-1239.

The highest concentration of class 3 combs has been revealed on properties А and В, the latter, unfortunately, having been investigated only very marginally within the Troitsky site. The same can be said about property Р which, along with properties М, К and Б, demonstrates moderately high densities of double-sided composite combs. Imports are fairly rare amongst the combs from the First Period on the Troitsky site (four examples from four properties, 5.6%). However, they account for much higher

¹ Specimens D43, D165 and D191 have been excluded from the group of 184 dated combs due to the ambiguity of its context.

portions of combs in the assemblages from the properties they derive from (M (14.3%), B (25.5%), Г (33.3%) and юK (100%)).

Table 88 Chronological and spatial distribution of class 3 combs on the properties of the Liudin End (Troitsky site)¹

First Period				Second Period			
Context	No. of combs	Index of concentration	Excavated area (sq.m)	Context	No. of combs	Index of concentration	Excavated area (sq.m)
A	23	<u>2.9</u>	800	A	2	0.7	300
				A1*	5	1.4	350
B	6	1.1	570	B	0	-	350
B*	4	5.7	70	B	0	-	70
Г*	3	0.4	840	Г	24	3.3	720
E	1	0.2	460	E	6	1.4	440
				Ж	2	1.2	170
K	12	1.3	950	K*	8	1.0	800
юK*	1	0.7	150	юK	1	0.7	150
M*	7	1.2	600	M*	24	4.8	500
H	0	-	230	H*	9	2.7	330
P	10	1.6	630	P	5	2.3	220
III	0	-	210	И	16	3.9	410
				II	4	1.9	210
O	0	-	80	O*	4	5.0	80
other prop.	0	-	0	other prop.	1	0.2	490
streets	3	0.4	750	streets	0	-	750
Total	70	1.1	6340	Total	111	1.8	6340

* Properties featuring imported combs in their collections.

On most properties, objects of foreign manufacture were uncovered from early 13th century layers, and only a rare type, specimen D67 (Fig. 6.14), derives from the late

¹ Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

12th century context on property Г. On the evidence of the decorative features and other morphological traits of this comb, it was argued that the area of its manufacture could be located in the Southern Baltic, most likely in Schleswig (section 6.2.3a). It is worth recollecting that another rare comb type, a single-sided composite comb with T-shaped openings in the side-plates and bronze sheets underneath them (A153 (Fig. 3.36)), was also uncovered from the late 12th century context on this property.

Generally speaking, the patterns of distribution of comb finds (both class 2a and class 3), their densities and an admixture of exquisite rare comb types of foreign origin are very similar on property Г of the Liudin End and property E of the Nerevsky End, most likely being indicative of well-traveled inhabitants, if not of the involvement of the property owners in overseas trading operations. Distribution patterns also allow parallels to be drawn between properties A, Б and B in the Liudin End and properties A and Б in the Nerevsky End on the one hand, and Liudin property M and Nerevsky property Д, on the other. The implications behind these patterns are discussed below in section 6.5.

To finish the description of the First Period, it should be mentioned that three combs with walrus ivory billets found within this chronological stratum on the Troitsky site, derive from the mid 12th century layers of properties Б (D28 (Fig. 6.22)) and early 13th century layers on properties K (D170) and B (D38 (Fig. 6.22)), the former two properties containing also walrus ivory simple combs in their collections (section 4.4). Class 3 combs featuring a bone and antler mixture of raw materials come from the late 12th – early 13th century layers on properties A (D5 (Fig. 6.15), D7, D21 and D41 (Fig. 6.14)) and M (D97), the latter property also having revealed a remarkably high quota of simple bone combs (section 4.4) from the same chronological stratum.

During the Second Period, all properties located in the block outlined by Proboinaia, Chernitsina and Iarysheva Streets reveal high densities of class 3 combs, with properties O, M, И and Г demonstrating the highest indices of comb concentrations. All these properties also showed high densities of class 2a combs (Third Period in Table 42, Figure 4.68), most often found in roughly the same numbers as double-sided composite combs. Only properties Г and H present a different pattern with much fewer finds of simple specimens. Examples of imported class 3 combs derive

from properties M (one comb, 4.2%), H (two combs, 22.2%) and O (one comb, 33.3%). These were also found on properties A1 (one comb, 20.0%) and K (four combs, 50.0%) revealing, at this stage, low densities of double-sided composite combs.

The Plotnitsky End

Double-sided composite combs retained from the Fedorovsky site are unknown from contexts younger than the early 13th century. The patterns of spatial distribution of these objects will be analysed, therefore, only for the stretch of time which is referred to as the First Period in the history of class 3 combs in Novgorod (12th-early 13th century), and which roughly overlaps with the Second Period in the history of class 2a combs (Table 89, Figure 6.30). Of all properties excavated within the site, only property E to the south of Korzheva Street features more specimens of composite construction than simple combs in skeletal materials in the comb repertoire (Second Period in Table 44 and Figure 4.69).

Table 89 Spatial distribution of class 3 combs deriving from the deposits of the First Period on the properties excavated within the Fedorovsky site¹

Context	No. of combs	Index of concentration*	Excavated area (sq.m)
A*	2	0.8	252
B*	8	<u>2.0</u>	392
ВГД	5	0.7	746
E*	5	<u>1.3</u>	390
Ж	1	0.1	712
streets	0	-	42
Total	21	0.8	2534

* Properties featuring imported combs in their collections.

Properties B and E reveal higher than average densities of class 3 combs. The former property, as demonstrated in section 4.4, showed not only the highest concentration of simple combs among the properties excavated on the site, but also the highest concentration of walrus ivory combs (B1053-B1056 (all Fig. 4.62)). It was argued

¹ Indices equal to or slightly higher (up to 50%) than average (bottom line) are given in bold, indices much higher than average appearing in underlined bold.

that the combination of walrus ivory waste elements with high numbers (per area unit) of finished combs in walrus ivory constitute a pointer towards a production area for these luxury goods somewhere within the excavated area or nearby. The only example of a walrus ivory end-plate from a double-sided composite trapezoid comb with straight sides (D524), uncovered from an unstratified context within Fedorovsky trench II (Fig. 4.69), most likely derives from property B.

A very distinctive characteristic of the Fedorovsky assemblage is a high percentage of imported class 3 combs, which account for a third of all dated specimens (Table 85). Three properties have imported items in their collections, namely property A (one comb), property B (four combs) and property E (two combs) which account for 40-50% of the comb repertoire. Whereas combs of foreign manufacture from properties A and B derive from early 13th century layers (e.g. D526 and D529 (Fig. 6.7)), those from property E come from early 12th (D512) and late 12th century (D516) layers. The only parallel to this pattern can be seen on property B of the Nerevsky site (see above in this section).

6.5 Areas of Origin and Place of Manufacture

The first double-sided composite combs emerged in Novgorod at the turn of the 12th century, when single-sided composite combs disappeared from the archaeological record and specimens of simple construction in skeletal materials and wood reigned absolutely in the comb repertoire (Fig. 6.2).

6.5.1 Use, Loss and Disposal

It was shown above (chapter 3) that manufacturing of composite combs had no roots in this part of the world and that the early composite combs (single-sided) appeared in the town as personal items belonging to newcomers, rather than through trading. Simple combs in skeletal materials, which originated in the north of Europe as a direct 'translation' from objects pertaining to the Christian tradition of the Mediterranean world, on the contrary, appear soon to have become subjects of merchandise, revealing in the earliest period (up to and including the early 12th century) a range of forms and decorative styles totally in accordance with the

assemblages from the lands around the Baltic (chapter 4). It is most likely that, at this stage, combs were distributed by itinerant comb-makers, visiting from time to time the rapidly growing centre at the source of the river Volkhov.

It may be plausible to surmise that the first class 3 combs found their way into the town also via itinerant comb-makers. There is also a possibility of a different scenario suggested by the distribution patterns analysed above (section 4.4) and discussed below (section 6.5.3). The exact location of the area where these first double-sided combs of composite construction may have been manufactured is virtually impossible to define. An analysis of the morphological features on earliest examples draws attention to the area of the Southern Baltic, the Jutland peninsula and Skåne in particular, where parallels to straight-sided combs of squat proportions with plano-convex side-plates, distinguished as the earliest specimens in the Novgorod assemblage, are encountered fairly commonly amongst early medieval class 3 combs (Blomqvist 1943; Andersen 1967; Persson 1976 and Ulbricht 1984).

During the 12th century, increasing numbers of double-sided composite combs were lost or disposed of in the town. The fact that less than half of the objects in the assemblage (ca. 47%) were found in a sound, usable state, implies that, in comparison with the vast majority of class 2a combs (ca. 80%), far fewer double-sided composite combs met the fate of loss. Furthermore, the peculiarities of their shape, with bulging side-plates at the middle of the comb height, made misplacement hardly conceivable. More than half of the combs in the collection were broken into pieces and discarded. Composite construction, being a great advantage with regard to economising the usage of the raw materials, was mechanically less stable and rendered class 3 combs somewhat inferior to their one-piece counterparts. In this respect, it is worth noting that a total of eleven combs in the assemblage reveal signs of repair, ten of which having been in connection with repair or re-assembly of combs with damaged elements.

Specimens D5 (Fig. 6.15), D97, D222 (Fig. 6.8) and D449 were identified as 'probably repaired' on the evidence of a peculiar mixture of raw materials in the assembly. Comb D222 is a complete casual find, uncovered in 1957 from a construction site in Bolshevnikov (aka Lubianitsa) Street on the Trade side of the

town. It is a five-billeted comb with one fairly narrow billet in the centre made of bone, the remaining billets and both side-plates being made of antler. The coarse teeth of the bone billet are shaped somewhat differently compared to the remaining, presumably original billets, and four pairs of vertically set rivets securing this billet are slightly thicker than the remaining rivets. Combs D5, D97 and D449 have bone billets (mixed with one antler billet in the case of specimen D5) and side-plates in antler and bone and are, most likely, repaired specimens judging by the fact, that in most combs, exhibiting the usage of a bone and antler mixture, billets are invariably bone and side-plates antler.

Another two combs appear to have been repaired on the evidence of differently shaped side-plates (D316 and D441). Convex-sided comb D26 (Fig. 6.31) was obviously reused as a single-billeted object after the other billet (or billets), presumably damaged, had been removed and the side-plates shortened and reshaped from one side. Judging by the rounded-off end of the side-plate on specimen D171 (Fig. 6.15), slightly protruding beyond one edge of the comb, one of the central billets of the originally four-billeted comb was removed, the side-plates having been shortened and reshaped at one end, resulting in a radical change of the comb proportions. A similar method of repair, with the removal of one end-plate and shortening and reshaping of the side-plates from this end, can be seen on comb D156 (Fig. 6.31), whereas on specimen D155 (Fig. 6.31) broken side-plates appear to have been replaced with the new one of much lower height.

Only one double-sided composite comb (D325 (Fig. 6.31)) was repaired and subsequently reused as a single-sided composite comb, quite similar to the way simple combs in skeletal materials and wood (with broken teeth on one side) were often repaired (sections 4.5.2 and 5.5).

6.5.2 Production

There are no examples of unfinished double-sided composite combs or objects which can be classified as rejects in the deposits of Novgorod. However, a skeuomorphic character of the majority of specimens from the latter 12th – earlier 13th centuries, deeply indebted in aesthetic conception as well as in execution to simple combs in

skeletal materials proven to be manufactured in Novgorod during this period (section 4.5.2), allows us to assume that they also were manufactured in the town, possibly by the same craftsmen who were making class 2a combs. The fact that parallels to these combs are known mainly in the settlements belonging to the Novgorod State and, occasionally, in the neighbouring Russian Principalities and foreign states, constitutes another pointer towards the production activities in the Novgorod lands at least, most likely in the metropolis itself, which naturally offered the wider and most diverse consumer market.

It is most useful, therefore, to pay special attention to the areas of the highest concentrations of class 3 combs coinciding in time with the highest concentration of 'bone'-working waste.

As shown in Table 48 (section 4.5.2) presenting the occurrence of waste elements¹ in antler, ivory and bone in the collections of artifacts from Novgorod, the most explicit evidence for 'bone'-working derives from the Nerevsky, Troitsky, Mikhailo-Arkhangelsky, Duboshin and Fedorovsky sites. These sites, conveniently representing all five ends of Novgorod, have produced the highest concentrations of 'bone' manufacturing waste per unit of excavated area as well as the highest densities of double-sided composite combs (see Table 83, section 6.4). Let us start with those town districts which first came into being as independent administrative and political units.

The Nerevsky End

Dated waste elements in antler, ivory and bone from the Nerevsky site, compiled in Tables 49a and 49b, were quantified by contexts and the Four Periods in the history of simple combs in skeletal materials, the Second and Third Periods being relevant to respectively the First and the Second Periods in the history of double-sided composite combs.

¹ Waste elements do not include shavings, which should have been preserved in Novgorod soil, but due to the methods of excavation accepted in the Novgorod expedition, have never been identified and retained.

During the First Period (1100-1239), high concentrations of both antler waste (which as we recollect, at this stage, was mainly utilised in the manufacture of class 3 combs) and double-sided composite combs occur only on properties Б and Д (Table 49a (Second Period), Table 87, Fig. 6.28). Both properties at this stage reveal 'Northern' connections, most explicitly demonstrated by the presence of worked pieces of walrus ivory and the high density of objects made out of walrus ivory and marine mammal bones (Smirnova 2001, 14, Tab. 3a), both containing in their class 3 comb collections imports deriving from 12th century deposits.

It was argued above (section 4.5.2) that craftsmen who lived on *boyar* property Д were making simple combs in antler and walrus ivory and it might be surmised that some double-sided composite combs were manufactured as well, probably on a lesser scale. The presence on this property of one of the most impressive single-billeted skeuomorphs (D312 (Fig. 6.3)) is very indicative of the attempts to translate common native forms into fashionable composite constructions. More evidence for the craft activities in connection with making class 3 combs can be obtained from property Б, mainly from morphological features of the combs themselves, which on this property outnumber class 2a combs.

It is quite obvious that the comb-makers who lived and worked on this property were not only aware of the latest fashions in the west (imports¹ occurred throughout the whole First Period, e.g. D382 and D383 (Fig. 6.6), D387 (Fig. 6.17)), but also of the most popular native forms. The products included classical skeuomorphic concave-sided trapezoid combs in 'Novgorod style' and hybrid one-off specimens, reproducing 'western' decorative elements on a typical Novgorod form (D214 (Fig. 6.24)). It can be said that new comb styles radiated from this property, perhaps dictating new trends for the whole town. Thus, almost identical angular-sided D203 and D204 (both Fig. 6.27) both deriving from the early 13th century contexts, which were identified above as local interpretations of western decorative styles (see sections 6.2.3a and 6.2.3b), were the earliest examples of types typical for the Second Period.

¹ D215, D229, D382, D383, D387

During the Second Period (1240-1400), higher than average concentrations of bone and antler waste occurred on all properties (Д, Е, И and К) at the cross-roads of Kuzmodemianskaia and Velikaia Streets, with the highest indices being for properties И and Е (Table 49b (Third Period)). It is hardly coincidental that all four properties reveal high densities of class 3 combs, the highest indices of concentration occurring exactly on properties И and Е (Table 87, Fig. 6.28). At least three of these properties (with the exception of property Д) also contain imports in their collections, demonstrating a certain interest in contemporary fashions in the west. It may be assumed, therefore that class 3 combs (along with class 2a combs in the case of property И (see section 4.5.2)) were manufactured on the town estates belonging to one of the most powerful (at this stage) *boyar* clans, the Mishiniches.

The Liudin End

Dated waste elements in antler, ivory and bone from the Troitsky site are compiled in Tables 50a and 50b, where the Second and Third Periods (class 2a combs) are relevant to respectively the First and the Second Periods in the history of double-sided composite combs.

During the First Period, intensive antler-working is proven to have taken place in the late 12th-early 13th centuries on properties А and Б, located to the east of Proboinaia streets (Smirnova 1997). Property Б, showing also some signs of 'bone-working' activity (Table 50a, Second Period), has been excavated only marginally. It seems conceivable to interpret the revealed high densities of double-sided composite combs on these three properties as an indirect evidence for comb production on the spot (Table 88, Fig. 6.29). As far as property А is concerned, it is also conceivable, judging from the high percentage of 'faulty' combs, that simple combs were manufactured there, although no direct evidence has been found for this (section 4.5.2).

Imports have not been found on more extensively excavated properties А and Б, and the great majority of finished products from both localities are classical skeuomorphs with concave(1) or straight sides and trapezoid cross-sectional side-plates (Fig. 6.4, 6.14 and 6.15). It can be stated that, compared with property Б of the Nerevsky End,

these comb-makers were less innovative and more allied to native traditions, which is not surprising if one bears in mind the close 'Southern' and ecclesiastical connections of the inhabitants of property A.

There is not enough evidence to support manufacturing of class 3 combs on property M which, at this stage, also reveals high densities of finished products and a slightly higher than average concentration of bone waste. However, it is worth recollecting that rare examples of mixed raw materials (bone and antler) in double-sided composite combs were uncovered on properties A and M.

During the Second Period, higher than average densities of worked bone elements (which were at least as common as antler) as well as double-sided composite combs occur on properties Г, И and П (Table 50b, Third Period, Table 88, Fig. 6.29), but as evidence it is sparse.

The Slavensky End

The occurrence of high concentrations of both simple combs and waste elements can be seen on the Duboshin site, one of the small excavations in the Slavensky End (Tables 38 and 85). Despite the fact that there is no specific comb-working debris, the concentrations of waste elements (Smirnova 2002) and class 3 combs occurring in later 13th-14th century deposits allows the suggestion of double-sided composite comb-making during the Second Period.

The Zagorodsky End

Two locations of antler-working activities have been traced in the late 12th – early 14th century deposits of the Mikhailo-Arkhangelsky site in the Zagorodsky End (Smirnova 2002). There is no direct evidence on these locations for specialisation in comb-making, but dense concentrations of double-sided composite combs (Table 86), outnumbering their counterparts of simple construction during both Periods, suggest that these may (especially during the First Period) have been produced on the spot.

'Northern' connections (Smirnova 2001, 10-11), the presence of imports (D449) and objects classified as skeuomorphs (single-billeted comb D435 (Fig. 6.3)) and local interpretations of foreign decorative styles. D454 (Fig. 4.26), allow parallels to be drawn with property Б in the Nerevsky End.

The Plotnitsky End

Properties excavated within the Fedorovsky site in the part of town which, from ca. 1168 was referred to as the Plotnitsky End, can be considered as related (in social and economic terms) to the properties in the Zagorodsky End discussed above, and property Б in the Nerevsky End. The plentiful presence of exotic Northern materials such as walrus ivory and whale bone, the obvious wealth and occurrence of socially distinctive objects such as wooden cylinder locks, all suggest involvement of the inhabitants of this area in tax-collecting in the Northern lands. However, the occurrence of imported double-sided composite combs as early as in an early 12th century context, also suggests their involvement in overseas trading operations (most likely fur trading).

The evidence for 'bone'-working activities utilising antler and walrus ivory during the 12th – early 13th centuries is somewhat patchy due to the later disturbances in the sequence of earlier deposits (Fig. 51, Second Period). It seems reasonable to assume that, in this case, there is an obvious division between the 'production area' of property ВГД, where double-sided combs may have been manufactured along with simple combs in skeletal materials, and the 'consumption areas' of properties Б and Е (Table 89, Fig. 6.30).

6.5.3 Distribution

The meticulous analysis of morphological traits of double-sided composite combs in the Novgorod collection undertaken alongside the comparative analysis of the assemblages from Northern Europe, made it possible to separate combs of local manufacture from combs produced outside the Novgorod (and other Russian) lands. The latter were referred to as 'imports', but a closer examination of the distribution

patterns of both foreign and local products allows more accurate implications of the term, which differed radically throughout the period from the 12th to the 14th century.

In the early-mid 12th century all kinds of class 3 combs were not only extremely rare, but also occurred on no more than four out of a few dozen properties excavated in the town, namely on properties Б, Д and Е on the Nerevsky site and property Е on the Fedorovsky site. The artifactual evidence from the Nerevsky property Е, from the earliest deposits and throughout the 12th century at least, has long been recognised as a proof of the involvement of the property owners in long distance and overseas trading activities (Zasurtsev 1963, 115-120). There is enough evidence to assume that inhabitants of properties Б, and Д in the Nerevsky End, as well as property Е in what later was referred to as the Plotnitsky End, were in fur-trading business, furs probably being their shares from the state revenue collecting activities (Smirnova 2001). The paucity of earliest class 3 combs even on these properties suggests that they were hardly amongst goods brought into Novgorod as merchandise. It is more reasonable to see in these earliest class 3 combs of foreign manufacture items spotted as different and unusual, purchased and brought back home by individuals as souvenirs, which were also used later as models in attempts at copying. It will probably be never possible to know, whether these individuals traveled as far as the Southern Baltic, were the parallels of the earliest class 3 combs lead, or just to Gotland, where there was a Rus trading hall, as well as a busy market with merchants from all over the Scandinavia and Southern Baltic.

The distribution of double-sided composite combs became far wider in the late 12th and especially in the early 13th century, which coincides with the conclusion of a trade treaty between the Novgorod authorities and Gotland (*Gotskiy bereg* in Old Russian) and German towns. The treaty dated to 1191-1192 is the earliest extant trade treaty, which specified the rules and longstanding norms for dealing with offences committed by or against western merchants in Novgorod, or by or against Novgorodians overseas (Rybina 1986, 26-31; Melnikova 1997, 15). Combs of foreign manufacture from the late 12th - early 13th century deposits appear to have been brought into Novgorod as merchandise and seem to be 'imports' in a true meaning of this word. Their morphological peculiarities allow us to suggest that they were made in the Western part of the Baltic world embracing Danish and Norwegian

realms, and, indirectly, to confirm the opinion that, at this stage, the shipping and organisation of the growing volume of trade exchanges were dominated by Scandinavians operating out of the north German towns (Franklin and Shepard 1996, 331).

As far as the distribution patterns of the far more numerous local products of the First Period are concerned, certain trends should not be avoided in discussion concerning at least three localities of the town. The highest densities of class 3 combs along with some evidence for the comb-making activities occur in three different parts of the town, exactly on the same properties which in the earlier times had taken a lead in the utilisation of simple combs, namely property B in the Nerevsky End, property A in the Liudin End and property E in the Plotnitsky¹ End. These properties radiated, each in its own way, some new cultural impulses and set up new fashions (in combs at least) being, therefore, somewhat further ahead of the remaining areas. Both Nerevsky property B, so to say, one of the oldest populated areas of Novgorod with its Scandinavian roots, and Liudin property A, with its Byzantine roots, show the symptoms of 'going native'. We can only surmise that the property owners belonged to the most influential social stratum of Novgorod society.

Distribution patterns of the Second Period demonstrate, on the one hand, further cultural integration, and on the other hand a certain shift in the political power and cultural influence towards a different *boyar* party, namely the Miroshkiniches clan, who occupied the southern group of properties excavated on the Nerevsky site.

Combs of foreign manufacture were still widely distributed, but they became fewer and indicative of totally different areas of origin, embracing Sweden and Eastern Baltic (lands of Chud' (now Estonia) and Livonia (now Latvia)), precisely the countries, the Novgorod Republic was confronted with in the latter part of the 13th century. During the first few decades of the 13th century the German Knights of the Catholic Order of Livonian Swordbearers (who later (1237) were joined by the Teutonic Order) had been gradually pushing eastwards, to the lands north of the Western Dvina river (see map in Fig. 4.66). The Swedes were pushing from the north and the Lithuanians were threatening from the west. The fact that the foreign

¹ with certain reservations to this name at this chronological stage

class 3 combs of the Second period find parallels in the lands Novgorod had military, rather than trading encounters with, and, vice versa, Novgorod types of combs are occasionally found in the towns threatened (Revel' (now Tallinn)), attacked (Rakvere, 1268 (Wesenburg, Russian Rakovar)), or even captured by the Novgorodians (Tartu, 1262 (Russian Yur'ev)) makes the supposition of the merchandise character of these combs questionable.

Chapter 7

CONCLUSIONS:

COMB-MAKING ACTIVITIES IN NOVGOROD.

HISTORICAL MODELS OF THE INDUSTRY DEVELOPMENT IN CONNECTION WITH SOCIAL AND CULTURAL DEVELOPMENT WITHIN THE TOWN

7.1 The Repertoire of Comb Classes

The Novgorod assemblage of nearly 3000 combs¹ forms a unique collection of well dated typological varieties, associated with a certain concentration of urban population in Medieval Europe. The superiority of this collection is determined by the close to perfect preservation of organic materials sealed in a relatively undisturbed chronological sequence, as well as by the large-scale, long-term excavations undertaken in various parts of the medieval town (Table 90).

There are a few key questions concerning the comb repertoire in Novgorod represented in the waterlogged deposits throughout a prolonged stretch of time from the mid 10th to the mid 15th century. What kinds of combs were used in Novgorod during this time? How does the Novgorod material compare with contemporary evidence elsewhere in all-Russian and Northern European contexts? To answer these questions, the Troitsky assemblage has been chosen as demonstrative material for a number of reasons. Firstly, it is a large area of thorough excavations in the part of the town (the Liudin End) belonging to the oldest populated areas and presenting the whole chronological sequence of waterlogged cultural deposits. Secondly, the site, which has been investigated from the early 1970s, has revealed certain improvements in the methodology of excavation and the retrieval policy compared to the other 'giant' site in the Nerevsky End (1950s-early 1960s). Thirdly, the Troitsky

¹ Including 315 boxwood combs from the excavations undertaken in the 1950s-1960s omitted in this research.

site has also revealed a high concentration of comb finds, as well as the full range of comb classes known in Novgorod (Table 90).

Table 90 The occurrence of combs of all classes in the Novgorod sites

Town side	End	Site	Composite combs		Simple combs		All combs	Site size (sq.m)	Index of concentration*
			single-sided class 1	double-sided class 3	in wood class 2b	in skeletal materials class 2a			
St. Sophia's	Nerevsky	Dmitrievsky	0	0	0	1	1	360	0.3
		Kozmodemyansky	0	2	0	6	8	140	5.7
		Liudogoshchensky	0	5	0	5	10	160	6.3
		Nerevsky	134	215	299	454	1102	8840	12.5
		Tikhvinsky	0	11	1	22	34	364	9.3
	Liud.	Troitsky	220	192	206	502	1120	6336	17.7
	Zag.	Mikhailo-Arkhangelsky	1	21	0	15	37	656	5.6
	Kremlin		1	0	0	0	1	100	1.0
Trade	Slavensky	Buyany	1	1	1	8	11	160	6.9
		Duboshin	0	11	1	21	33	160	20.6
		Gotsky	0	0	1	0	1	552	0.2
		Il'insky	0	33	23	91	147	1430	10.3
		Kirovsky	0	0	49	8	57	320	17.8
		Mikhailovsky	1	5	12	15	33	440	7.5
		Nutny	0	3	25	10	38	674	5.6
		Rogatitsky	0	1	4	1	6	140	4.3
		Torgovy	0	2	8	3	13	160	8.1
	Plot.	Fedorovsky	1	36	10	130	177	2534	7.0
	<i>Casual finds</i>	4	13	0	37	54	-	-	
	Total	363	551	640	1329	2883	23,526	12.3	

* Indices equal or higher than that for the whole assemblage (bottom line) are given in Bold.

Of all contemporary urban centres in Northern Europe, only Schleswig and Trondheim offer materials which are similar to Novgorod in terms of the range of combs and the chronology, boxwood combs (class 2b) being the only class of combs unknown in Schleswig and Trondheim. However, the chronological sequences vary on different sites making direct comparison impossible. Tables 91 and 92 present the assemblages of combs from the two biggest sites in Schleswig, the Plessenstraße site (ca. 1500sq.m¹) with deposits dated to the 11th-12th centuries, and the 'Schild' (536sq.m) with deposits of the 11th-14th centuries (Ulbricht 1984, 41, Tab. 5). From the Novgorod Troitsky assemblage and the Trondheim 'Folkebiblioteks' assemblage

¹ The overall area of the Plessenstraße site was larger (ca. 2045sq.m), but its western part was occupied by the Dominican cloister constructed in 1239 (Ulbricht 1984, 11-12). The given site size is the approximate area from which the material derives (I.Ulbricht, personal communication).

(Flodin 1989, 119-125, Fig. 43, see also the revised dating of the site phases in McLees 1990, 15, Fig. 4), combs deriving from the chronological periods not represented at either Schleswig sites have been excluded. Tables 91 and 92 also include indices of concentration for each class of combs and the overall collection, showing numbers of combs uncovered from a unit of 100sq.m of excavated area. The Schleswig indices demonstrate densities of all classes of combs (apart from class 2b combs unknown in Schleswig) that are considerably higher than for Novgorod and Trondheim.

Table 91 The range of combs from the 11th-12th century deposits on the Troitsky site in Novgorod, the 'Folkebibliotekets' site in Trondheim and the 'Plessenstraße' site in Schleswig

Construction	Comb class	11th -12th centuries					
		Novgorod (Troitsky I-XII) 6336sq.m		Trondheim 'Folkebibliotekets' ca. 3200sq.m		Schleswig 'Plessenstraße' 1500sq.m	
		Number of combs	Index of concentration	Number of combs	Index of concentration	Number of combs	Index of concentration
composite	class 1*	91	1.4	179	5.6	281	18.7
	class 3	18	0.3	5	0.2	69	4.6
simple	class 2a	322	5.1	6	0.2	145	9.7
	class 2b	48	0.8	0	-	0	-
	long-toothed combs	1	0.02	1	0.03	137	9.1
Composite combs of uncertain class		0	-	3	0.1	0	-
All combs		479	7.6	194	6.1	495	33.0

* Including comb cases at all three sites

Long toothed combs, the function of which is far from certain, form a substantial portion in the Schleswig assemblages, whereas in Novgorod and Trondheim they were found in insignificant numbers. Comparing the repertoire of classes common in all three towns (Fig. 7.1), one can see a noticeable predominance of simple combs in the Novgorod collection and of composite combs in the Schleswig and Trondheim assemblages. Single-sided composite combs, accounting for a higher percentage of

combs in the earlier Novgorod sub-assembly (Fig. 7.1 (2a)), reveal a considerably lower density in comparison with their counterparts in Trondheim and Schleswig (Table 91).

Table 92 The range of combs from the 11th-14th century deposits on the Troitsky site in Novgorod, the 'Folkebibliotekets' site in Trondheim and the 'Schild' site in Schleswig

Construction	Comb class	11th -14th centuries					
		Novgorod (Troitsky I-XII) 6336sq.m		Trondheim 'Folkebibliotekets' ca. 3200sq.m		Schleswig 'Schild' 536sq.m	
		Number of combs	Index of concentration	Number of combs	Index of concentration	Number of combs	Index of concentration
composite	class 1*	91	1.4	316	9.9	72	13.4
	class 3	184	2.9	79	2.5	83	15.5
simple	class 2a	474	7.5	6	0.2	82	15.3
	class 2b	189	3.0	0	-	0	-
	long-toothed combs	3	0.05	2	0.1	110	20.5
Composite combs of uncertain class		0	-	26	0.8	0	-
All combs		941	14.9	429	13.4	347	64.7

* Including comb cases at all three sites

The comb repertoire evidently varied throughout the centuries in the medieval towns, but the patterns of chronological changes in the comb repertoire in Schleswig can be seen only vaguely due to a lack of detailed chronology precluding the search for comb dates. Up to now, the Trondheim assemblage has been the largest published collection of reasonably well dated medieval combs, highlighting the urgent necessity of detailed research on combs from Novgorod.

Summing up the results of the analysis of chronological distribution of the four main classes of combs from Novgorod (chapters 3-6), the overall assemblage of dated combs from the most recent excavation site (1973-2000) in the town is presented in chronological retrospective in Figure 7.2. Figure 7.2 shares the data Table in Figure

7.3, which presents the same material with an emphasis on the chronological fluctuations in the comb repertoire. It can be seen that, up to the mid 11th century, single-sided composite combs formed the overwhelming majority of combs utilised in Novgorod. A sharp decline in numbers of class 1 combs preserved in the mid and late 11th century deposits was compensated by an increase of simple combs in skeletal materials which, up to the early 13th century, became the most common class of combs used by the town dwellers. Double-sided composite combs, introduced in Novgorod at the turn of the 12th century, began by the end of this century to form a substantial group in the comb repertoire which, in the subsequent century and in the early 14th century, accounted for at least a third of all comb classes in use, their popularity peaking in the mid 13th century. During the 13th century one can see a steady decline in the use of simple combs in skeletal materials on the background of the rise of boxwood combs which, in the 14th and in the the first third of the 15th century, became the most common class of combs in Novgorod.

Single-sided composite combs (class 1)

Chronologically, the earliest class of combs utilised in Novgorod, class 1 combs, became rare finds already in the late 11th century and those three specimens which reappeared in the town after at least six decades and which were uncovered from the late 12th century deposits, undoubtedly belonged to unique objects in the comb repertoire, being totally alien to common types of predominantly class 2a combs.

The analysis of stylistical peculiarities of single-sided composite combs and their chronological distribution in the cultural deposits of Novgorod allows a nexus embracing Novgorod with various parts of the Northern lands of the Viking hegemony to be drawn. During the period from the mid 10th to the early 11th century, the repertoire of single sided composite combs was in accordance with the sites in Central Sweden and Gotland. This was proven by the analysis of forms of combs and their elements, decorative styles (vertically arranged ornamental schemes), riveting systems (through the ends of billets) and raw materials (elk antler). Non-cased combs (large 'A' combs and small 'B' combs with deep plano-convex side-plates) dominated in the earliest decades (mid 10th century period), whereas from the late

10th century cased combs (to be kept in cases with two pairs of contiguous side-plates) indicative of ownership by men, began to supersede non-cased types.

A different tradition of comb-making also appeared in the late 10th century, but it became predominant in the 11th century. Non-cased long combs (often featuring 'wings' on the end-plates) formed a minority amongst new types of small combs. Both non cased and most common cased combs of new types had mainly shallow plano-convex side-plates, the latter group being kept in cases with a single pair of these side-plates. The new comb types commonly exhibited decorations combined with marginal lines along the upper and lower edges of the side-plates, riveting through the junction between the billets and the use of red deer antler. All these traits were in accordance with Southern Baltic tradition rooted in Frisian norms of comb-making. Southern Baltic links can be also traced throughout the stylistic analysis of the early simple combs in skeletal materials.

The distributional patterns of class 1 combs in Novgorod, the chronological restriction of these to the 10th – mid 11th century, and the alliance of the morphological features of these combs with the Balto-Scandinavian traditions of comb-making allowed the conclusion that these objects came into town as personal belongings of the newcomers of Scandinavian descent. During the late 10th - mid 11th century (i.e. at the times of Princes Vladimir Sviatoslavich and Iaroslav Vladimirovich (the Wise)), the increase of the cased combs, which for this period are believed to be a truly men's type (Ambrosianini 1981, 74)¹, appears to be indicative of the presence of the Varangian men-at-arms, who constituted the largest groups of the mercenaries in the *druzhinas* of both Princes of Novgorod (Birnbaum 1978; Franklin and Shepard 1996; Melnikova 1978). Late 10th –11th century class 1 combs can be considered as indicators of a certain social group of the early medieval population of Novgorod, namely members of the Prince's *druzhina*.

Prince Iaroslav Vladimirovich (d. 1054) was the last of the Russian Princes who widely used Scandinavian mercenaries and, being born to a Swedish mother, promoted political and trade contacts with Scandinavian and Southern Baltic

¹ At the later stage (late 11th- 12th century), as was demonstrated by L. Thunmark-Nylén (1995, 182), Scandinavian women could have had cased combs.

kingdoms. The Novgorod period in Iaroslav's life is considered to have lasted till 1026, but it is generally believed that even later (up until his brother Mstislav Vladimirovich death in 1036) he spent a fair amount of time in Novgorod, playing a host to many noble Scandinavians and technically till his last days Iaroslav remained the Prince of Kiev and Novgorod.

It is hardly surprising, therefore, that single-sided composite combs from the deposits of post Iaroslav's time became so rare and are practically unknown in the last decades of the 11th century.

Simple combs in skeletal materials (class 2a)

Simple combs in skeletal materials form the largest group of combs in the Novgorod collection.

Earliest class 2a combs in Novgorod are stylistically identical to the types, which appeared almost simultaneously in a number of Northern European lands around the Baltic area in the early 11th century. It was argued above (chapter 4) that double-sided combs of simple construction presented a tradition of making one-piece combs in boxwood and ivory, which originated during the Late Roman period in the Christian communities of the Mediterranean world. These combs were known among the Germanic and Slavic peoples in Central Europe during the Dark Ages and early Middle Ages, in their exquisite version of liturgical combs (Theune-Großkopf and Röber 1994, 101-107). Early simple combs manufactured in raw materials conventional for Northern Europe (mainly antler and to a certain extent bone, as well as exquisite walrus ivory), but according to a Mediterranean (i.e. Christian) tradition, are, therefore, indicative of a social veneer of Christian observance.

The oldest types of simple combs in Novgorod like elsewhere in Northern Europe featured the prevailing L-decorations, with a certain percentage of L.RDE and L.RDB patterns. Since as yet no microscopic identification of antler simple combs has been undertaken, the argument that mainly elk antler combs and some numbers of red deer and reindeer antler combs were present in the earliest (11th – early 12th century) group, was based on indirect evidence (section 4.2.3). By the early 12th

century class 2a combs appear to have superseded almost absolutely all other classes of combs and ceased to be perceived as manifestations of Christian observance. It was not before the mid 12th century when the new, native designs appeared in Novgorod, some of which developed L-decoration enriched with some new elements or L.RDB ornaments, but some of truly original RDE patterns, with further elaboration into RDF and RDC decorations. These were predominantly elk antler¹ and walrus ivory combs.

During the mid-late 13th and 14th centuries Novgorod simple combs in elk antler, featuring almost no or very modest decoration, steadily decline in numbers. To a certain extent, this decline may have been a response to the reintroduction in the early 13th century and a rapid growth of popularity thereafter of boxwood simple combs. The latest period of the occurrence of class 2a combs is marked in Novgorod, as in other European towns of this time, by the appearance from the late 14th century of elephant ivory combs with slender rectangular cross-section.

Simple combs in wood (class 2b)

There is enough archaeological evidence supporting the links between the emergence of the first boxwood combs in Novgorod in the later 10th century and the conversion of the elite of the Rus to Christianity in its Greek variety. Stylistical peculiarities of these combs pertaining to the Eastern Mediterranean (Byzantine) tradition, chronological and spatial distribution of the early wave of boxwood combs on the properties of Novgorod, allow the conclusion that these were most likely liturgical combs utilised by the priests, who were then mainly Greek. By the beginning of the 12th century, boxwood combs became very rare and during this century are known in very low numbers.

Class 2b combs, which reappear in the early 13th century and, a hundred years later, became the most common comb class utilised in Novgorod, were completely different objects, stylistically similar to their counterparts all over Europe, where they were spread most likely by Hanseatic merchants. It is highly meaningful that

¹ This statement is based on the evidence of the comb sizes, reflecting larger amount of compact material available only in elk antlers.

class 2b combs of the later wave are most densely distributed on the Trade side of the town in the nearest proximity to the market.

Double-sided composite combs (class 3)

The first examples of double-sided composite combs of foreign manufacture appeared in Novgorod around the turn of the 12th century, the morphological features of these combs suggesting their Southern Baltic origin. By the end of this century local designs became recognisable by trapezoid cross-sectional side-plates and a number of traits, including the line of the comb sides, decoration, predominantly trapezoid outline and squat proportions, as well as the manner of cutting and shaping teeth, which highlighted the skeuomorphic character of class 3 combs with their stylistic peculiarities borrowed from the most common contemporary designs of class 2a combs. During the 13th century, the influence of class 2a combs somewhat weakens and new designs of mainly rectangular long combs with, most often, angular, straight and convex sides and traditional trapezoid and, also fairly common, plano-convex cross-sectional side-plates, were made which survived well into the 14th century.

Examples of class 3 combs of foreign manufacture account for less than 10% of all double-sided composite combs in the Novgorod assemblage. Whereas the provenance of foreign combs deriving from the 12th – early 13th century appears to be in the Western parts of the Balto-Scandinavian world (the Danish and Norwegian kingdoms), the younger so-called imported combs indicate a different connection, linking Novgorod with areas in the Eastern Baltic and Central Sweden.

7.2 Manufacture of Combs and Raw Materials

It has been demonstrated that the range of combs within each class is quite broad and diverse (Chapters 3-6). Although the quality of individual items in terms of craftsmanship is noticeably variable, from reasonably simple designs and careless execution to highly sophisticated products with regard to forms and decorations, it can be stated that, with a few exceptions, combs can be classed as products of competent craftsmen.

The raw materials utilised in the manufacture of combs were skeletal materials (antler, bone, walrus and elephant ivory) and wood (predominantly boxwood). Whereas some of these materials (elk antler, skeletal bone from the live stock, some species of wood) constituted available local resources, others, such as red deer and reindeer antler, boxwood and ivory were not available locally. As far as boxwood and ivory are concerned, the question should be put as to whether there was trade of these highly prized commodities, available only in areas distanced hundreds of miles away from the town. It was argued above (chapter 5) that the theory of a well organised trade of Caucasian boxwood along the Volga river route existing already as early as in the 10th century, had no grounds to support it and boxwood combs were undoubtedly brought into the town as finished (or prefabricated) products. The same is applicable to the 14th-15th century elephant ivory combs. On the other hand, the local manufacture of simple and composite double-sided combs in walrus ivory in the 12th and 13th centuries has been proven (sections 4.5 and 6.5), implying long-distance transportation of the highly valuable raw material. The question as to whether the combs in antler and bone were made locally or brought into town as objects manufactured elsewhere should be answered separately for different comb classes and different periods.

As far as the early period is concerned (up to the early 12th century), most combs appear to have been manufactured outside the town. The term 'imports', bearing a meaning of organised movements of commodities, should be avoided. Most class 1 and class 2b combs (and possibly, some of the class 2a combs) appear to have arrived into town as items belonging to individuals, newcomers of different descent and social status, whereas the oldest class 3 combs, most probably, were brought in as souvenirs or presents purchased or acquired by individuals. Only a small minority of early combs were made locally. The evidence for the local production of some of the single-sided combs as early as in the mid 10th century is limited to only one property Γ in the Liudin End of the town (section 3.5). It clearly demonstrates the itinerant mode of production, which can be judged from the small amount of elk antler comb-making debris and its spatial distribution in close proximity to one of the oldest dwellings in Novgorod with a life span of a maximum of 20 years. Similar examples of comb-making activities as a seasonal event rather than a more

prolonged operation have been traced elsewhere in Northern Europe on settlements of the 9th-11th centuries.

It is highly interesting that the other episode of chronologically and spatially limited comb-making activities in early Novgorod occurred approximately a hundred years later on the same property Γ in the Liudin End, revealing wide connections of the property owner, whose involvement in long-distance trading operations is suggested by plentiful artifactual evidence. A comb-maker who appears to have stayed on the property for a short while obviously specialised in simple combs of class 2a (in antler), some of which remained unfinished (section 4.5). It was also speculatively suggested above on the evidence of stylistically odd wooden combs (class 2b) deriving from the same chronological stratum on property Γ , that the comb-maker might have utilised wood¹ as well as antler of various species (section 5.5).

Local manufacture of simple combs in elk antler and walrus ivory can be traced from around the mid 12th century, which marks the beginning of a sedentary production of combs in the urban context. A decrease in numbers of class 2a combs uncovered in mid 12th century contexts, which seemed puzzling at the outset, appears to be a result of temporary regress of production during this period of transition, a few decades during which one might expect a modification of conventions, improvisations and probes for alternatives, resulting in the emergence of distinctive local designs different from ubiquitous forms and basic linear and ring-and-dot decorations.

By the late 12th century, the distinctive Novgorod types, exploiting the challenging alien idea of combs of composite construction married to local designs of one-piece double-sided combs had become common, competing with class 3 combs of foreign manufacture. The late 12th – 13th centuries can be called the hey day of the production of class 2a and class 3 combs in Novgorod. The comb-making activities were concentrated on a number of town properties belonging to the elite of Novgorod society. It seems plausible to suggest the dependent status of comb-makers, who were most likely capable of manufacturing a variety of other products.

¹ It is highly regrettable that the wooden combs have not been identified and it remains unclear whether the comb-maker had some boxwood material or prefabricated boxwood combs (comb-blanks) in stock, which could be indicative of southern connections, or experimented in different species of wood including those available locally.

The higher densities of 'faulty' combs, with certain irregularities in decorations and outline, on the properties providing evidence for comb-making may be indicative of apprentices' work.

It is virtually impossible to judge whether the property owner obtained the whole output of the production and was also responsible for marketing and sales operations. It is even difficult to say whether the combs were only for consumption within households on the urban properties and the dependent lands in the rural area and never reached the market. However, the later 12th and early 13th century are marked with the widest range of combs, the most diverse collection in design and quality of local and foreign products, probably indicative of the expanding and diversified urban population, which had formed by then a captive consumer market and was receptive to new trends.

Combs of all periods were highly marketable objects, even in their most simple forms requiring professional hands, resulting presumably in fairly high prices. That the simplicity of some humble designs was more apparent than real, can be seen in a few 13th –14th century crude items in antler and wood of clearly impromptu execution, which were rejected before completion. There are clear indications of the availability of combs of foreign manufacture (class 2b and class 3) at the Novgorod market, at least to those with more ability to pay, from the late 12th century onwards.

The most eminent comb imports, in the true meaning of this word, were boxwood combs of the second wave (13th-15th centuries) which appear simultaneously on the urban markets of Northern Europe. These were widely distributed across Europe by Hanseatic merchants. It seems plausible that a fair number of combs were traded in prefabricated forms to some Novgorod merchants involved in overseas trading operations, who subsequently could alter the designs according to consumers' requests. The Kirovsky property A, belonging most likely to one of those merchants and situated close to the town market and to both Hanseatic quarters of the town, revealed an enormous concentration of late 13th –14th century boxwood combs. The most remarkable example of a comb altered by a special request is the so-called Zavid's comb (Fig. 5.19).

7.3 Use of Combs in the Urban Context: Chronological Evolution of Combs on the Background of the Social and Economic Development of the Urban Community of Novgorod

The meticulous study of combs found in Novgorod was aimed from the outset to try and see who were the people combing their hair and beards, to see whether these numerous objects scattered throughout the town and throughout the ages can shed any light on the social and political structure of Novgorod. As a summary of the results of the detailed typological analysis and the implications behind patterns of chronological and spatial distribution of the finds, historical models of the demographic, social and cultural evolution of the urban community of Novgorod can be outlined as follows.

7.3.1 Early Novgorod: 10th – early 12th century

The conventional positions as to the precise status of early Novgorod, its social and political structure and the combination of ethnic groups, outlined throughout the academic debate over the last few decades are:

- 1) The early town of Novgorod emerged as a result of the gradual growing together of the three original settlements (Ends, boroughs), the Slavensky End (Slavno) on the right bank of the river Volkhov, the Liudin End (Southern) and the Nerevsky End (Northern) on the left bank of the river, between which the *Detinets* (a citadel) occupying the north-west part of the modern Kremlin, was located (Yanin and Aleshkovsky 1971, Kolchin and Yanin 1982, 110-118; Yanin 1992, 85-87; Yanin 2001a, 91-92; Yanin 2002a).
- 2) The ethnic makeup of the Volkhov town was a mixture of Slavic, Baltic, Scandinavian and Finno-Ugric elements, with the Slavs accounting for the majority of the population of Novgorod, the chieftains of Slavic tribes forming the core of Novgorod aristocracy, the *boyars* (Yanin and Aleshkovsky 1971, Sedova 1981, 180-181; Sedov 1999, 207).
- 3) The Scandinavian component, although present constantly in the 10th–11th centuries was insignificant, being at its largest in the first half of the 11th century, when the transfer of the Prince's residence from Ruric Gorodishche to Novgorod by Prince Iaroslav Vladimirovich (aka Iaroslav the Wise) turns Novgorod into the Princely town (Sedova 1981, 181; Sedov 1999, Nosov 1990, 208, Pokrovskaja 1999, 53). Objects of Scandinavian origin (mainly metal objects) in

Novgorod are considered to be indications of occasional individual contacts of the town dwellers with the Western Baltic lands (Jansson 1999, 18).

- 4) The Princely period in Novgorod is believed to begin in the early 11th century, when the Prince and his *druzhina* (personal retinue, men-at-arms) settled on the no man's lands by the Slavensky Hill on the Trade side of the town. The Prince's court was set up there and the properties of members of the *druzhina* were laid out. Prior to that time, the power of the prince in the town was nominal, which ensured the leading position of local aristocrats who possessed the right to collect state revenue. During the 11th – early 12th century, these special privileges of the Novgorod boyars enabled them to struggle successfully to reduce the power of princes nominated from Kiev to little more than that of a hired defence contractor (Nosov 1999; Sedov 1999; Yanin 1992, Yanin 2002b).

The typological and distributional analysis of the corpus of combs from the earliest deposits of Novgorod, as well as other artifactual evidence, has led to conclusions which are contradictory to almost all conventional beliefs.

Amidst speculations concerning the very first decades of Novgorod, four major developments stand out. Firstly that the groups of Varangians (Scandinavians), men and women alike, were amongst the first people who settled down in the mid 10th century on the left bank of the river Volkhov. Secondly, that early dwellers left few signs of activities other than straight forward arable farming, fishing and hunting, as well as trading honoured by Princely credit. Thirdly, that the last quarter of the 10th century was marked by an increasing presence of military milieu, evidenced by the growing numbers of cased class 1 combs, indicative of the expanding *druzhina* element. Stylistic peculiarities of the 10th century combs draw the nexus embracing Novgorod, Ruric Gorodishche, Ladoga, Gotland and Central Sweden. Fourthly, the presence of clergy and, therefore, a certain veneer of Christian observance in late 10th century Novgorod is evidenced by the presence of Byzantine style boxwood combs, most likely liturgical.

The rapid growth of the town and a noticeable influx of newcomers from the Southern Baltic from the turn of the 11th century evidenced by the dramatic change of decorative styles, raw materials and manufacturing traditions of class 1 combs of predominantly cased variants. The growth of the Christian population of Novgorod is witnessed by the appearance and constant increase of small double-sided simple combs in skeletal materials. All these changes coincide with the historical transfer

into town of the Princely residence, which most certainly was not a spontaneous event, but a well prepared operation with logistical support from those prince's liegemen who resided already in Novgorod.

There is no evidence for the presence of the Varangians in the period when they supposedly accompanied their sovereign and settled down by the Slavensky Hill, in and around the area known later as Iaroslav's court. No objects of indisputable Scandinavian identity have been found there, nor is there archaeological evidence for the location of elite property (Prince's court) in the early 11th century deposits on the Trade side. Of all excavated properties of the town, one property adjoining the crossroads of Proboinaia and Chernitsina Streets from the south-west fulfills the requirements to claim a truly special status. It features a big area, rather unusual structures and an absolutely unique collection of finds from early – mid 11th century deposits. These include a unique Psalter wax book, a number of ornaments in gold and other precious metals, worked elephant ivory, eight silver denarii and a selection of objects with prince's marks including unprecedented concentration of cylinder wooden locks tying up sacks containing the state revenue. The property is also marked by high numbers of weapons (spears, arrows) and horse fittings (bits, spurs) (Yanin et al 1998, 1999, 2000, 2001).

An outstanding collection of over a hundred birch bark documents from the late 11th –early 13th centuries (ten rare late 11th century documents forming a third of all known in the town from 11th century deposits) has produced the evidence for a special public status of this area, where at that time a joint court of the Prince and *Posadnic* (the elected head of Novgorod) was located (Yanin et al 2000; Yanin 2002a). The textual analysis of the birch-bark documents from the property has revealed the highest concentration of collective appeals, as well as an incomparable number of references to the Prince, *druzhina* and the Varangians.

With the evidence from the analysis of the spatial distribution of the early –mid 11th century single-sided composite combs, the hypothesis that Iaroslav's residence was transferred from Ryric Gorodishche to the Liudin End of the town receives additional support. The Varangian members of the Prince's *druzhina* most likely occupied the neighbouring properties to the west of Proboinaia Street, one of which

has revealed a personal lead seal of Iaroslav the Wise in the deposits of the early 11th century. There were also property owners in the Nerevsky End who were identified as *druzhina* members, possibly granted with some privileged duties delegated to them by the Prince.

In connection to the theory outlined above is the question on the origin of Novgorod *boyars*, most of whom appear to have been connected with the power of a few generations of the Rus Princes. The whole institution of *posadnics*, the elected governors of Novgorod in the later period, were originally no more than trustworthy agents appointed by the Prince and acting on behalf of the Prince during his absence. Quite a few of the owners of large properties, always referred to as *boyar* properties in the Liudin and Nerevsky Ends, have revealed a Scandinavian origin on the evidence of the artifact distributional analysis.

In connection with these conclusions, two recent genealogical researches are of special interest. Molchanov (1997) has traced the ancestry of the Novgorod and Ladoga *posadnic's* clan, the Giuriatiniches-Rogoviches, back to Norwegian Earl Rognvald Ulfsson, kinsman of Princess Ingigerd, wife of Iaroslav (the Wise) and daughter of Swedish *könung* Olaf (Skotkonung). Earl Rognvald, who was also a brother-in-law of Olaf Tryggvason of Norway, was appointed in charge of Staraiia Ladoga (Aldeigjuborg in Scandinavian sagas), which Ingigerd (Irina in Rus sources) demanded as her dowry, and settled down in the north of Rus for good. Molchanov conventionally places the clan on the Trade side of the town. However, Gippius (2001) convincingly argues the existence of at least two related branches of Rongvald's heirs, the boyar clans of Miroslaviches and Mikhalkoviches to which over a half of all known Novgorod *boyars* belonged. Furthermore, Gippius places the location of the former clan around Dobrynia Street in the Liudin End, just north of the area excavated within the Troitsky site, and the latter clan in Prusskaia Street further to the north-west on the same side of the town (Fig. 1.4).

In the light of all this new evidence, the statement of the First Novgorod Chronicle (in its younger version) that 'the people of Novgorod are of Varangian stock to this very day', seems to be far more than the generally believed literary exaggeration (Birnbbaum 1978, 20).

Another important aspect of the social structure of 11th century Novgorod is the presence of clergy with strong Byzantine connections within the 'nests' of noble quarters of the town (property A in the Liudin End and early property Γ in the Nerevsky End). Each locality of obviously related properties is also marked by the presence of families of long distance (probably overseas as well) traders (property Γ in the Liudin End and properties A and E in the Nerevsky End).

Generally speaking, on the evidence from the changes in comb repertoire during the 10th to early 12th century, the social, political and cultural development of the town on the river Volkhov can be clearly seen as a gradual transition from a trading settlement of 'kaupang' type, like most of the early towns in Northern Europe, into a princely centre with quite a developed social structure in the town population. Included in the population of Novgorod were the Prince himself and his family periodically residing in the town and the princely *druzhina*, i.e. his permanent personal retinue, loyal people recruited from the town and outside as well as men-at-arms. These together with commercial people involved in overseas trade belonged to the high-ranking members of society, who were most likely hosts of itinerant craftsmen and foreign visitors. There must have been a variety of working folk, servants, shipmasters and seamen, as well as the poor and beggars, but it is almost impossible to 'see' these through an analysis of just one category of artefacts.

In cultural aspects, the early period of Novgorod, as evidenced by the range of combs, was the 'age of primary borrowing'¹ from Scandinavia and Byzantium, a period of coexistence of actual products from both regions (class 1 and class 2b combs), and of hybrid objects born via marrying Southern images with Northern traditions of comb-making (class 2a combs).

7.3.2 'Republican' Novgorod, pre-Tartar-Mongol epoch: mid 12th – early 13th century

During the late 11th –early 12th century the first symptoms of a shift away from the 'age of primary borrowing' and more towards a synthesis of the three separate

¹ The term itself is borrowed here from Franklin and Shepard (1996, 315).

strands creating Old Russian culture (i.e. the Scandinavian, Byzantine and Slavic cultural traditions) became noticeable.

Pre-Tartar-Mongolian Novgorod during the 12th – early 13th century revealed the emergence of self-sustaining, self-imitating and synthetic culture, closely linked to the continuing growth of the town with its diverse production and consumption. This can be witnessed by the appearance of original Novgorod designs of simple combs in antler and exquisite walrus ivory and, a shade later, of local interpretations of the foreign idea of double-sided combs in composite construction. The comb-making activities were traced on a number of *boyar* properties in different parts of the town, mirroring a growing demand from the expanding and more socially diversified urban community of Novgorod.

The 'old' elite of the town, occupying long settled areas in the three original Ends of Novgorod were undoubtedly wealthy, mighty, influential and open-minded persons. New cultural impulses were still radiated from their properties (properties И, Е, and Д in the Nerevsky End; properties А, Б in the Liudin End). However, the new wealth, obviously obtained through tax-collection in the North and probably through overseas fur trade as well, also being linked with the Princes now living outside the town, appears within newly settled parts of the town, in areas which later became known as Zagorodsky (between the Liudin and Nerevsky Ends) and Plotnitsky (north of Slavensky End) Ends, also offering some innovations in the sphere of combs and comb-making.

This period is also marked by a flourishing of the Novgorod market and the appearance of the first truly imported combs, merchandises of the foreign traders. These were likely to have been a result of the trade treaty of 1191-1192 concluded between the Novgorod authorities and Gotland (*Gotskiy bereg* in Old Russian) and German towns and the foundation of a German quarter complete with a Church of St. Peter. The German merchants in Visby had taken over the Gotlandic monopoly on trading operations with Novgorod, and, thus, the Gotland quarter in Novgorod. With the foundation of the second foreign merchants' enclave in Novgorod, the Hanseatic League acquired two trading areas in the town.

7.3.3 The Novgorod State in the mid 13th – mid 14th centuries

The decline of local comb-making (class 2a and class 3) can be seen not only in a constant drop in numbers of combs, but also in the progressing simplification of decorative features on simple combs, a lower diversity of class 3 combs and the increase of imports of boxwood combs. It appears also to be a reflection of the complicated historical situation. On the one hand, Novgorod experienced the all-Russian crisis during the latter 13th century in connection with the Tartar invasion, although on a lesser scale than other Russian Principalities, since Novgorod suffered no direct damage from the Tartars. On the other hand, from the first decades of the 13th century, pressure had been building up on the western and northern frontiers of the state due to increasing aggression of the immediate neighbours. The German Knights were pushing eastwards, to the lands north of the Western Dvina river (lands of Chud' (now Estonia) and Livonia (now Latvia)), the Swedes were pushing from the north and the Lithuanians were threatening from the west.

The Baltic trade of Novgorod, primarily with Riga, Gotland and Lübeck as is evidenced by the treaties of 1259-1260, 1269, 1301, 1338 (Rybina 1986, 31-46), not only remained relatively unaffected but prospered further, evidenced by the increase of foreign combs (class 2b) partially compensating for the decline of local comb production.

On a domestic level, the patterns of comb distribution reveal a shift of political power away from the boyar clans of the Liudin End and Pruskaia Street towards a different *boyar* party residing in the Nerevsky End, which dominated on the political arena up until the end of Novgorod independence.

7.3.4 The dawn of fame: Novgorod in the late 14th – 15th centuries

The Black Death epidemic, which badly hit Novgorod, Pskov, Smolensk and other towns in the west and north-west of Russia in 1350-1351, may have contributed to the further decline of the industry. Combs of all classes became so few that it is hard to conceive what people of Novgorod combed their hair with. The most plausible scenario is that most combs of this period were made out of horn. The paucity of

combs can be due to the fact that the celebrated waterlogged cultural deposits of Novgorod, which well preserve most organic materials, relentlessly destroy keratins.

Although, due to the small numbers of combs from the latest waterlogged deposits, the informative evidence of the assemblage is lower, the stylistic features of the combs reveal further cultural integration, whereas the distribution patterns constitute pointers to the centre of political power and cultural influence being in the southern group of properties excavated on the Nerevsky site and occupied by the Mishiniches *boyar* clan.

7.4 Results and Perspectives

A retrospective look at the aims and objectives outlined at the outset of the research demonstrates at this final stage that the estimated high potential of combs as a specific find group has borne the weight of the conglomerate of proposed analyses despite the procedural problems and limitations discussed in chapter 1.

The detailed study of the morphological traits of the main comb classes in the chronological retrospective enabled us to reveal certain tendencies for predominant stylistic trends to prevail at various stages. It clearly showed that single traits can be similar in chronologically different comb groups, but the combination of certain characteristics appears to be unique and thus chronologically distinctive. The typological survey, interlaced with the chronological analysis, helped to identify within the Novgorod assemblage stylistic groups similar to those in the comb collections from elsewhere in Northern Europe as opposed to comb styles pertaining to the local tradition. The assemblage, therefore, lived up to its typological and chronological potential and demonstrated its value as superb reference material.

The comb study not only became a valuable strand of information required for a comprehensive analysis of a much wider range of data concerning the character of life in medieval Novgorod, but also highlighted some grey areas much further beyond this finds group, which require detailed research. One of these is the chronology of some excavation sites dug in the 1960s – early 1970s, the Il'insky site in particular. Comb analysis has revealed serious discrepancies in the patterns of the

chronological distribution of combs from this site, which were shown to be related to the inadequacies of the analysis of the dendrochronological sample.

The improvement of excavation methods and the revision of the retrieval policy in general appear to be essential developments, from which any artifactual analysis would benefit.

The present comb study has also highlighted an urgent necessity for thorough research on the 'Byzantine legacy' as can be revealed through the analysis of all artifactual evidence (pottery, glass, ecclesiastical ornaments and icons, coins and weights etc.). The Greek influence in the complex process of cultural development of the Northern Rus' appears to have been underestimated in past archaeological research.

Looking ahead and considering further perspectives of the comb analysis, it seems logical and important to compile a European-wide database encompassing the collections from major sites around the Baltic and Northern Seas, where Viking Age and medieval combs should be measured and described uniformly. Identifications of the objects to the type of skeletal material, as well as microscopic analysis of antler specimens aiming at more precise identifications to species, remain amongst the most important avenues of artifactual studies. This requires joint efforts by an international team of comb experts, who could bring research on the comb-making industry in medieval Europe to an unprecedented level.

List of Tables

	page
1 Major assemblages of Viking Age and medieval single-sided composite combs	28
2 Combs quantified by number of billets	31
3 Combs with copper alloy and iron rivets quantified by number of rivets	34
4 Combs with copper alloy and iron rivets quantified by average number of rivets per billet	35
5 The occurrence of decorative schemes on the side-plates of single-sided composite combs and comb cases	59
6 The occurrence of variants of decorative scheme 6 on the side-plates of single-sided composite combs and comb cases	63
7 The occurrence of the 10 th –11 th century undecorated and decorated objects quantified chronologically	66
8 Form characteristics in complete sets and matching pairs of comb and case	71
9 Forms of side-plates of non-cased and cased combs quantified by chronological period	75
10 Identification of the antler raw material to species	77
11 The occurrence of single-sided composite combs on Novgorod sites	88
12 The occurrence of single-sided composite combs in the trenches of Troitsky site	89
13 The occurrence of single-sided composite combs on the properties of the Nerevsky site	91
14 The occurrence of single-sided composite combs on the properties of the Troitsky site	92
15 The occurrence of antler debris in the 10 th –11 th century contexts on the properties of the Nerevsky End	97
16 The occurrence of antler debris in the 10 th –11 th century contexts on the properties of the Liudin End	98
17 The chronological distribution of three comb groups with different degree of side concavity	113
18 The chronological distribution of two comb groups with different degree of side concavity	114
19 Average depth and relative depth of combs in different skeletal materials	117
20 Chronological changes in average depth and relative depth of combs	118
21 The frequency of simple antler, ivory and bone combs in varying sizes	120
22 Chronological changes in the average size of simple combs in skeletal materials	121

23 Class 2a combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth	126
24 Simple combs in skeletal materials. Chronological changes in the relative height of the central zone	127
25 Frequency of combs with a medium wide central zone	128
26 The chronological distribution of combs featuring central zones assigned to various proportional modules	129
27 Simple combs in skeletal materials. Chronological distribution of combs with undecorated central zones	131
28 The occurrence of combs with irregularities in decoration of central zones	140
29 The chronological distribution of main decorative patterns	141
30 Chronological distribution of combs with side edge decoration	145
31 The occurrence of different patterns of side edge decoration on combs featuring ornamented and blank central zones	147
32 Chronological distribution of antler, ivory and bone simple combs	148
33 Chronological distribution of waste elements in skeletal materials in the 11 th -15 th century deposits	149
34 Chronological distribution of small antler combs with low depth	150
35 The occurrence of decorative patterns on small antler combs with low depths	151
36 The occurrence of elk, red deer and reindeer antler elements in antler waste materials	152
37 The occurrence of simple combs in skeletal materials on Novgorod sites	171
38 The concentration of class 2a combs within the four chronological Periods	172
39 Chronological distribution of class 2a combs from the Nerevsky site	173
40 Chronological and spatial distribution of class 2a combs on the properties of the Nerevsky End (Nerevsky site)	174
41 Chronological distribution of class 2a combs from the Troitsky site	178
42 Chronological and spatial distribution of class 2a combs on the properties of the Liudin End (Troitsky site)	179
43 Chronological distribution of class 2a combs from the Fedorovsky site	182
44 Chronological and spatial distribution of class 2a combs on the properties excavated within the Fedorovsky site	183
45 Chronological distribution of class 2a combs from the Il'insky site (based on the existing chronology by Kolchin (1978))	185
46 The frequency of main patterns on decorated combs and chronological distribution of undecorated combs on the evidence of the Il'insky assemblage	186

47 Spatial distribution of class 2a combs on the properties of the Slavensky End (Il'insky site) within the four Periods (based on the revised chronology)	188
48 Waste elements in skeletal materials in the assemblages from Novgorod sites	193
49a Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Nerevsky site	195
49b Spatial distribution of waste elements in skeletal materials from the deposits of the Third and Fourth Periods on the properties of the Nerevsky site	197
50a Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Troitsky site	199
50b Spatial distribution of waste elements in skeletal materials from the deposits of the Third and Fourth Periods on the properties of the Troitsky site	200
51 Spatial distribution of waste elements in skeletal materials from the deposits of the First and Second Periods on the properties of the Fedorovsky site	202
52 The occurrence of wooden simple combs on Novgorod sites	210
53 The occurrence of late wooden simple combs on Novgorod sites	211
54 The occurrence of class 2b combs with straight and concave sides in dated contexts	214
55 Chronological changes in average depth and relative depth of wooden combs	216
56 Class 2b combs. Sizes of dated intact specimens	217
57 Class 2b combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth	220
58 Simple combs in wood. Chronological changes in the relative height of the central zone	221
59 Simple combs in wood. The chronological distribution of combs featuring central zones assigned to various proportional modules	222
60 The frequency of main patterns on decorated combs and chronological distribution of undecorated combs on the evidence of the assemblage of class 2b combs	224
61 Class 3 combs quantified by number of billets	247
62 The occurrence of various sets of billets amongst antler-, bone- and ivory-billeted class 3 combs	248
63 The occurrence main riveting systems on the dated class 3 combs	250
64 The utilisation of antler and bone for side-plates	252

65	The occurrence of side-plates with different cross-sections in dated contexts	255
66	The occurrence of different riveting systems on combs with the main five cross-sectional types of the side-plates	256
67	Main proportional groups of class 3 combs	258
68	Chronological distribution of main proportional groups of rectangular double-sided composite combs	259
69	Chronological distribution of main proportional groups of trapezoid double-sided composite combs	260
70	Types of side line of complete trapezoid class 3 combs	261
71	Types of side line of complete rectangular class 3 combs	262
72	Chronological distribution of class 3 combs with surviving end-plates	263
73	Correlation between the types of cross-section of the side-plates and the shape of class 3 comb sides	264
74	Chronological changes in the size of class 3 combs	271
75	Chronological changes in the size and dimensions of rectangular and trapezoid class 3 combs	272
76	Class 3 combs. Chronological changes in comb teeth density and the degree of division in density between coarse and fine teeth	277
77	The frequency of class 3 combs with undecorated side-plates as revealed by the dated specimens	279
78	The frequency of plain and decorated side-plates on class 3 combs with different side lines	280
79	Chronological distribution of concave(1), straight-, angular- and convex-sided class 3 combs featuring plain side-plates	281
80	Chronological distribution of class 3 combs made of antler, bone and mixed skeletal materials	292
81	The composition of raw materials in the groups of locally made and imported class 3 combs	293
82	Chronological changes in the composition of raw materials, utilised in imported combs	294
83	The occurrence of double-sided composite combs on Novgorod sites	299
84	The concentration of class 3 combs within the two chronological Periods	300
85	The concentration of class 3 combs within the two chronological Periods on the most productive sites with established chronology	301
86	The concentration of class 3 combs allocated within the two chronological Periods on evidence from morphological analysis of the objects from the sites with uncertain chronology	302
87	Chronological and spatial distribution of class 3 combs on the properties of the Nerevsky End (Nerevsky site)	303

88 Chronological and spatial distribution of class 3 combs on the properties of the Liudin End (Troitsky site)	306
89 Spatial distribution of class 3 combs deriving from the deposits of the First Period on the properties excavated within the Fedorovsky site	308
90 The occurrence of combs of all classes in the Novgorod sites	321
91 The range of combs from the 11 th -12 th century deposits on the Troitsky site in Novgorod, the 'Folkebibliotekets' site in Trondheim and the 'Plessenstraße' site in Schleswig	322
92 The range of combs from the 11 th -14 th century deposits on the Troitsky site in Novgorod, the 'Folkebibliotekets' site in Trondheim and the 'Schild' site in Schleswig	323

LIST OF FIGURES

	page
1.1 An example of a database entry	1
1.2 Novgorod in the Northern European context	2
1.3 Excavation sites in Novgorod	3
1.4 The location of Novgorod excavation sites within the town's medieval layout	4
2.1 Samples of archaeological antler: a) elk antler; b) reindeer antler	5
2.2 Samples of modern antlers: a) elk antler; b) reindeer antler; c) red deer antler	6
2.3 Micro structure of antlers. Transverse sections of beams in reflected light (x12): a) elk antler; b) reindeer antler; c) red deer antler	7
2.4 Micro structure of antlers. Longitudinal thin sections through compacta of beams (x12): a) elk antler; b) reindeer antler; c) red deer antler	8
2.5 Primary classification of Novgorod combs	9
2.6 Measurements of combs and their parts	10
3.1 Single-sided composite combs with retained cases	11
3.2 Single-sided composite combs with retained cases (A16, 29) and matching pairs (A50-51, A191-197)	12
3.3 Single-sided composite combs and comb cases. Chronological distribution (a)	13
3.4 Single-sided composite combs and comb cases. Chronological distribution (b)	14
3.5 Single-sided composite combs designed to be kept in composite cases when not in use	15
3.6 Single-sided composite combs. Chronological distribution (c)	16
3.7 Single-sided composite combs. Chronological distribution (d)	17
3.8 Single-sided composite combs and comb cases. Construction	18
3.9 Comb A336 of unusual construction	19
3.10 One-billeted comb A152 and simple comb A145 carved to resemble a form	

of a composite comb	20
3.11 Combs with varied width of billets in assembly	21
3.12 Combs with 'ears' and square terminals	22
3.13 Attributes of the end-plates of cased combs	23
3.14 'Winged' combs	24
3.15 Chronological distribution of combs with copper alloy and iron rivets	25
3.16 Single-sided composite combs. Chronological distribution of combs featuring an average of 1 and 2 rivets per billet a) Iron-riveted; b) Copper alloy-riveted	26
3.17 Single-sided composite combs. Chronological distribution of all combs featuring an average of 1 and 2 rivets per billet	27
3.18 Single-sided composite combs. Eastern Scandinavian (early) tradition of riveting single-sided composite combs and its variations	28
3.19 Single-sided composite combs. Variations of the eastern Scandinavian tradition of riveting combs	29
3.20 Single-sided composite combs. Western Scandinavian tradition of riveting combs	30
3.21 Single-sided composite combs. Side-plates a) All combs. Size of the side-plates; b) Cased combs. Size of the side-plates	31
3.22 Single-sided composite combs. Relative depth of side-plates with plano-convex cross-section	32
3.23 Single-sided composite combs. Side-plates. Chronological distribution of proportional groups	33
3.24 Comb cases with two pairs of contiguous side-plates and a comb case with a single pair of B-shaped cross-sectional side-plates imitating pairs of contiguous side-plates (A88)	34
3.25 Comb cases with a single pair of side-plates	35
3.26 Case construction with the emphasis on the form of the end-plates	36
3.27 Lower side-plates of cases secured with additional rivet	37
3.28 Single-sided composite comb cases. Side-plates a) Size of the side-plates; b) Proportion of the side-plates	38
3.29 Single-sided composite combs and cases with plano-convex cross-section of side-plates. Relative depth of the side-plates	39

3.30 Single-sided composite comb cases with plano-convex cross-section of side-plates. Relative depth of the side-plates	40
3.31 Single-sided composite combs with interlaced linear decorations	41
3.32 Single-sided composite combs and cases with stylised interlaced decorations	42
3.33 Mid 10 th century single-sided composite combs decorated with groups of ring-and-dot motifs	43
3.34 Cases decorated with bands of multiple ring-and-dot motifs and groups of ring-and-dot elements	44
3.35 Combs and comb cases decorated with bands of multiple ring-and-dot motifs, arranged vertically and horizontally	45
3.36 Combs with metal sheeting behind the side-plates with T-shaped openings	46
3.37 The 10th century single-sided composite combs with decorated end-plates	47
3.38 Decorative schemes 0, 1 and 2	48
3.39 Decorative scheme 3	49
3.40 Decorative scheme 4	50
3.41 Decorative schemes 5, 7 and 8	51
3.42 Decorative scheme 6	52
3.43 Single-sided composite combs featuring vertically limited ornamental zones (decorative schemes 2, 3 and 4)	53
3.44 Single-sided composite combs featuring ornamentation according to decorative scheme 6	54
3.45 Single-sided composite comb cases featuring ornamentation according to decorative scheme 6	55
3.46 Combs featuring Scandinavian tradition of ornamentation (variant 6.8 of decorative scheme 6)	56
3.47 The 11 th century comb from the Novgorod Kremlin, manufactured and decorated in the Norwegian tradition	57
3.48 Undecorated combs from 10 th (A367) and late 12 th (A114 and A337) century deposits and amulets in the forms of a comb (A330) and a sheathed knife	58
3.49 Chronological distribution of combs with vertical and horizontal arrangement of decoration a) Non-cased combs b) Cased combs	59

3.50 Chronological changes in the combination of vertically arranged decorative schemes on single-sided composite combs a) Non-cased combs; b) Cased combs	60
3.51 Single-sided composite combs. Dynamics of chronological changes in the use of antler raw material a) Non-cased combs; b) Cased combs	61
3.52 10 th century single-sided non-cased and cased composite combs made out of elk (A22, A95), red deer (A118, A227) and reindeer antler (A89, A120)	62
3.53 Single-sided composite combs and cases. Antler identification of side-plates with varying relative depths (Index K.A.)	63
3.54 Single-sided composite combs and cases. Elk and red deer antler use in side-plates with varying relative depths (Index K.A.)	64
3.55 Single-sided composite combs and cases. Dynamics of chronological changes in the use of antler raw material	65
3.56 Single-sided composite combs. Average width of billets	66
3.57 Single-sided composite combs. Average width of billets of elk and red deer antler	67
3.58 Single-sided composite cases. Proportions of the main groups	68
3.59 Chronological distribution of cases with one and two pairs of side-plates	69
3.60 Proportions of non-cased and cased combs	70
3.61 Dynamics of chronological changes in proportions of non-cased combs	71
3.62 Dynamics of chronological changes in proportions of cased combs	72
3.63 Height of teeth relative to comb height in non-cased and cased combs	73
3.64 Dynamics of chronological changes in the relative height of teeth on cased combs	74
3.65 Forms of non-cased and cased single-sided composite combs	75
3.66 Long toothed and relatively short combs from mid 10 th century contexts	76
3.67 Classification of forms of the side-plates	77
3.68 Single-sided composite combs and cases. Main forms of the side-plates	78
3.69 The Rus lands (after Franklin and Shepard)	79
3.70 Combs A115 and A357 of Scandinavian origin	80

3.71 Spoons of Scandinavian origin with interlaced linear decoration	81
3.72 Distribution of 10 th century single-sided composite combs on the properties of the Nerevsky End (Nerevsky site)	82
3.73 Distribution of 11 th century single-sided composite combs on the properties of the Nerevsky End (Nerevsky site) and location of the late 12 th century comb	83
3.74 Distribution of 10 th century single-sided composite combs on the properties of the Liudin End (Troitsky site)	84
3.75 Distribution of 11 th century single-sided composite combs on the properties of the Liudin End (Troitsky site) and location of the late 12 th century combs	85
3.76 Waste elements from the Troitsky dwelling XI-29-170 (property Г) on and combs deriving from the same context	86
3.77 Bone with part of runic alphabet from the Nerevsky site	87
3.78 Hemispherical gaming pieces of walrus ivory from Troitsky site	87
3.79 Reproduction of the diagram demonstrating the relative depth of 'A' combs and 'B' combs (after Ambrosiani 1981, 71 Fig. 37)	88
4.1 11 th century simple double-sided combs in antler featuring secondary use as single-sided	89
4.2 Antler (B861, B865) and elephant ivory (B789) double-sided combs trimmed and reused as single-sided	90
4.3 Simple combs featuring suspension holes (B898 and B1040) and a comb with surviving leather case (B234)	91
4.4 Chronological distribution of simple combs in skeletal materials	92
4.5 Simple combs in skeletal materials. Degree of side slope	93
4.6 Forms of lower parts of beams of red deer and elk antler	94
4.7 Simple combs in skeletal materials. Proportions	95
4.8 Simple combs in skeletal materials. Basic forms	96
4.9 11th century simple combs in skeletal materials. Basic forms	97
4.10 12th century simple combs in skeletal materials. Basic forms	98
4.11 13th century simple combs in skeletal materials. Basic forms	99
4.12 14th – early 15 th century simple combs in skeletal materials. Basic forms	100

4.13 Simple combs with convex sides	101
4.14 Simple combs in skeletal materials. The degree of concavity of comb sides	102
4.15 Simple combs with straight sides	103
4.16 Simple combs with concave sides	104
4.17 Simple combs with sides slightly curved inwards ($0.02 \leq dsc < 0.04$)	105
4.17a Forms of simple combs with different lines of the sides	106
4.18 12 th century combs with concave sides	107
4.19 13 th – early 14 th century combs with concave sides	108
4.20 13 th century semi-lentoid cross-sectional combs	109
4.21 11 th -12 th century rhomboid cross-sectional combs	110
4.22 Combs with slender rectangular cross-section	111
4.23 Simple combs in skeletal materials. Relative depth	112
4.24 Simple combs in skeletal materials. Chronological changes in relative depth	113
4.25 Simple combs in skeletal materials. Sizes of antler combs	114
4.26 Simple combs. Size of objects in antler and ivory	115
4.27 Simple combs in skeletal materials. Chronological changes in comb sizes	116
4.28 Small size simple combs from 11 th (B324, B444, B1207, B1269), 12 th (B1080, B1108) and 13 th (B103) century contexts	117
4.29 Chronological distribution of miniature simple combs	118
4.30 Combs featuring obliquely cut teeth	119
4.31 Combs featuring scratched guidelines for cutting teeth)	120
4.32 Simple combs featuring uneven tooth base line	121
4.33 Combs featuring sawn guidelines exploited decoratively as linear ornamentation	122
4.34 12 th century combs with fine teeth higher than coarse teeth	123
4.35 13 th century combs with coarse teeth higher than fine teeth	124
4.36 Simple combs in skeletal materials. Relative height of the central zone	125

4.37 Simple combs in skeletal materials. Chronological changes in relative height of central zone	126
4.38 Late 11 th -early 13 th century combs featuring narrow central zones	127
4.39 11 th century combs featuring wide central zones	128
4.40 Unfinished 12 th century combs featuring undecorated central zones	129
4.41 Owner's marks and secondary botched decoration on the 13 th century combs	130
4.42 Combs featuring central zones with marginal linear incisions combined with other decorative motifs	131
4.43 Combs featuring marginal linear incisions combined with ring-and-dot motifs in the central zone	132
4.44 11 th – 12 th century combs featuring central zones with meander patterns	133
4.45 Mid-late 12 th century comb with inlaid metal strips	134
4.46 Simple combs featuring central zones with common RDE patterns	135
4.47 Combs featuring central zones with RDF patterns	136
4.48 Combs featuring central zones with DRC patterns	137
4.49 Rare types of decorative motifs and patterns on simple combs in skeletal materials	138
4.50 Patterns based on linear decorations incorporating other (non-RD) motifs	139
4.51 Patterns incorporating linear and RDE decorations (L.RDE patterns)	140
4.52 Patterns incorporating linear and RDB decorations (L.RDB patterns)	141
4.53 RDE patterns	142
4.54 RDF patterns	143
4.55 RDC patterns	144
4.56 Forms of simple combs featuring central zones with ornamental patterns based on linear decorations	145
4.57 Forms of simple combs featuring central zones with no decoration or ring-and-dot non-linear patterns	146
4.58 Combs featuring faces decorated differently	147
4.59 Combs with decorated sides of faces	148
	352

4.60 Types of side edge decoration	149
4.61 Elk antlers at different stages of maturity and forms of antler parts suitable for sawing comb blanks	150
4.62 12 th century simple combs in walrus ivory from the Fedorovsky site	151
4.63 11 th -13 th century simple combs in walrus ivory from the Nerevsky site	152
4.64 Rus settlements in the 11 th and 12 th century (after Franklin and Shepard 1996)	153
4.65 Long-toothed combs	154
4.66 Novgorod territory in the 13 th century (after Fennel 1983)	155
4.67 Chronological and spatial distribution of class 2a combs on the properties of the Nerevsky End (Nerevsky site)	156
4.68 Chronological and spatial distribution of class 2a combs on the properties of the Liudin End (Troitsky site)	157
4.69 Chronological and spatial distribution of class 2a combs on the properties excavated within the Fedorovsky site	158
4.70 Proposed chronological and spatial distribution of class 2a combs on the properties of the Slavensky End (Il'insky site)	159
4.71 Comb blanks from the Troitsky site (1-4) and single finds of a comb and a comb blank (5) from the Dmitrievsky site	160
4.72 Comb blanks and the unfinished comb from the Nerevsky site	161
4.73 Walrus ivory waste from the Nerevsky site	162
4.74 Walrus ivory waste from the Fedorovsky site	163
4.75 Repaired and unrepaired combs ruptured and split along the grain	164
5.1 Chronological distribution of class 2b combs from Novgorod (evidence from the excavations of the 1970s-1990s)	165
5.2 Simple combs in wood from the 11 th -12 th century deposits on the Troitsky, Nutny and Duboshin sites	166
5.3 Chronological distribution of single-sided composite combs (class 1) and simple combs in skeletal materials (class 2a) and wood (class 2b) on the evidence from the Troitsky site, trenches I-XII (1973-2000)	167
5.4 Early class 2b combs from the Troitsky site (1)	168
5.5 Early class 2b combs from the Troitsky site (2)	169

5.6. Kirovsky property A at the 14 th century layers (construction horizons 6 and 8)	170
5.7 Simple combs in wood. Basic forms of early and late specimens	171
5.8 Simple combs in wood. Relative depth	172
5.9 Class 2b comb sizes	173
5.10 Two types of guidelines: gently scratched (C266) and deepened grooves exploited decoratively (C290, C292)	174
5.11 Simple combs in wood. Relative height of the central zone	175
5.12 13 th -14 th century combs featuring secondary decorations	176
5.13 Late wooden combs featuring guidelines for cutting teeth	177
5.14 Common types of late 13 th –14 th century undecorated combs with straight, concave and convex sides	178
5.15 13 th century combs with straight, concave and ornate sides	179
5.16 13 th –early 14 th century combs with blank central zones and concave, convex or ornate sides	180
5.17 13 th -14 th century combs featuring rare types of carved decoration	181
5.18 15 th century combs with painted decorations	182
5.19 Two faces of a late 13 th century comb with the inscription reading ‘comb belonging to Zavid’	183
5.20 Wooden combs from early-mid 13 th century deposits	184
5.21 14 th century combs featuring linear decorations	185
5.22 Late wooden combs featuring rare patterns or techniques of ring-and-dot decoration	186
5.23 Late wooden combs featuring common patterns of ring-and-dot decorations	187
5.24 Common patterns on late combs featuring ring-and-dot decoration	188
5.25 13 th century combs featuring decoration of the sides of faces	189
5.26 Undecorated combs from 11 th century deposits on the Troitsky site	190
5.27 Comb rejects from 13 th -14 th century deposits	191
5.28 Damaged wooden combs repaired for reuse (single-sided and double-sided examples)	192

6.1 Chronological distribution of double-sided composite combs	193
6.2 Chronological changes in proportions of class 2 and class 3 combs on the evidence from the Troitsky site, trenches I-XII (1973-2000)	194
6.3 Double-sided composite combs featuring only one billet	195
6.4 Combs featuring a single row of rivets set at a low frequency	196
6.5 Combs featuring two rows of offset rivets	197
6.6 Combs featuring pairs of rivets set vertically or obliquely	198
6.7 Combs featuring a single row of numerous	199
6.8 Combs featuring two rows of numerous rivets	200
6.9 Combs featuring two pairs of side-plates	201
6.10 Variants of sinuous cross-sectional side-plates on the evidence from Lund (after Blomqvist 1943) and Novgorod	202
6.11 Combs featuring flat rectangular cross-sectional side-plates	203
6.12 Proportions of rectangular and trapezoid class 3 combs	204
6.13 Double-sided composite combs. Basic forms	205
6.14 Rectangular outlined combs of squat and square proportions	206
6.15 Late 12 th – early 13 th century trapezoid combs of squat, square and vertically elongated proportions	207
6.16 Lavish curves featured on some concave (1) sided class 3 combs	208
6.17 Early 13 th century class 3 comb and comb case with ornate end-plates	209
6.18 Double-sided composite combs. Sizes of a) complete specimens in the main forms, b) complete specimens in the main proportional groups	210
6.19 Sizes of class 2a combs and class 3 specimens of trapezoid outline and squat proportions	211
6.20 Chronological changes in sizes of double-sided composite combs	212
6.21 Chronological changes in sizes of rectangular and trapezoid class 3 combs as well as contemporary class 2a combs a) class 3 combs of rectangular outline, b) class 3 combs of trapezoid outline, c) class 2a combs	213
6.22 Class 3 combs featuring billets in walrus ivory in combination with antler or bone side-plates	214
	355

6.23 Common types of class 3 combs from the First Period	215
6.24 Decorated class 3 combs from the First Period	216
6.25 Undecorated combs from the Second Period	217
6.26 Combs with linear decorations from the Second Period	218
6.27 Combs with RDB decorations from the Second Period	219
6.28 Chronological and spatial distribution of class 3 combs on the properties of the Nerevsky End (Nerevsky site)	220
6.29 Chronological and spatial distribution of class 3 combs on the properties of the Liudin End (Troitsky site)	221
6.30 Spatial distribution of class 3 combs deriving from the deposits of the First Period on the properties excavated within the Fedorovsky site	222
6.31 Repaired class 3 combs	223
7.1 Repertoires of mutually common classes of combs in the medieval towns of Novgorod and Schleswig	224
7.2 Chronological distribution of combs on the evidence from the Troitsky site, trenches I-XII (1973-2000)	225
7.3 Chronological changes in the comb repertoire in Novgorod on the evidence from the Troitsky site, trenches I-XII (1973-2000)	226

GLOSSARY

boyars – local landlords, aristocracy

Detinets – fortress, Kremlin

druzhina – prince's forces consisting of his permanent personal retinue (*malaia* (the small) *druzhina*, loyal people recruited from his town and outside auxiliaries

Gotskiy bereg – Old Russian name of Gotland, meaning the Gothic coast

Okol'nyi gorod – town's rampart

posadnik – initially, prince's agent, later an elected chief executive (in Novgorod, Pskov)

poshlye kuptsy – duty paying merchants

Ruskaia Pravda –the first written code of civil law credited to Prince Iaroslav Vladimirovich (aka Iaroslav the Wise)

tamga – symbol indicating that the holder acts with the authority of the Prince

tysiatsky – local commander and police chief

veche – town assembly

zhitni liudi – independent citizens of Novgorod

List of References

- Aleksandrovsky, A.L., Gaidukov, P.G. and Krenke, N.A. 1999 (Rus.) Александровский, А.Л., Гайдуков, П.Г., Кренке, Н.А. Исследования древнейшего культурного слоя и погребенной почвы на Троицком XI раскопе в Новгороде. In: Новгород и Новгородская земля. История и археология, Вып. 13, Новгород, 1999, С. 358-366. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Vyp. 13, Novgorod, pp. 358-366.)
- Ambrosiani, K. 1981 Viking Age Combs, Comb Making and Comb Makers in the Light of Finds from Birka and Ribe. *Stockholm Studies in Archaeology* 2, Stockholm.
- Ambrosiani, K. 1984 Kämme. In: Arwidsson, G. (editor) Birka II:1, Stockholm, pp. 161-76.
- Andersen, A. 1968 Mittelalterliche Kämme aus Ribe. *Res Medievals Ragnar Blomqvist kal. Mai. Oblata (MCMLXVIII)*, Karlshamn: *Archaeologica Lundensia* 3, pp. 25-42.
- Andersen, H.H. and Madsen, H.J. 1985 Byudgravning ved Århus Katedralskole. *Kuml. Årbog for Jysk Arkaeologisk Selskab*, Aarhus Universitetsforlag, Århus.
- Arbman, H. 1939 En medeltida by vid Albäksborg i Maglarps socken. *Skånes Hembygds Förbunds Årsbok, 1939*. Lund, pp. 21-38.
- Arbman, H. 1940 *Birka I. Die Gräber. Text und Tafeln*, Stockholm.
- Arbman, H. 1945 Hornsnidare som konstnärer. In: Situne Dei. Sigtuna Fornhems Årsbok 1944, Lund, pp. 7-20.
- Artamonov, M.I. 1952 (Rus.) Артамонов, М.И. Белая Вежа SA, XVI 1952, С. 58-63 (*SA*, XVI, 1952, pp. 58-63).
- Artamonov, M.I. 1958 (Rus.) Артамонов, М.И. Саркел – Белая Вежа. In: МИА №62, М.-Л. (MIA, 62, Moscow-Leningrad.)
- Astashova, N.I. 1993 (Rus.) Асташова, Н.И. Костяные изделия средневекового Смоленска In: Недошивина, Н.Г. (ред.) Средневековые древности Восточной Европы. Труды Государственного Исторического музея, Вып. 82. М., 1993, С. 69-78. (Nedoshivina N.G. (editor) *Srednevekovye drevnosti Vostochnoi Evropy. Trudy Gosudarstvennogo Istoricheskogo muzeia*, Vyp. 82. Moscow, pp. 69-78.)
- Astashova, N.I., Diatropov, P.D., Zhuravlev, D.V., Kostiukhina, L.M., Melnikova, A.S., Murasheva, V.V., Pankova, M.M., Pushkina, T.A. and Sizova, T.I. 1996 (Rus.) Асташова, Н.И., Диатропов, П.Д., Журавлев, Д.В., Костюхина, Л.М., Мельникова, А.С., Мурашева, В.В., Панкова, М.М., Пушкина, Т.А., Сизова, Е.И. *Путь из варяг в греки и из грек.... Каталог выставки. Калинин и Ко: Москва. (Put' iz variag v greki I iz grek... Catalog vystavki, Moscow.)*

Baldwin Brown, G. 1915 *The Arts in Early England*, Vol. 4, London.

Beletsky, S.V. 1998 (Rus.) Белецкий, С.В. Наследование лично-родовых знаков князьями-Рюриковичами в X-XI вв. In: *Общество, экономика, культура и искусство славян, Труды VI Международного Конгресса славянской археологии*, Том 4, М., С.195-205. (*Obshchestvo, ekonomika, kul'tura i iskusstvo slavian. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii*, Том 4. Moscow, pp. 195-205.)

Biddle, M. 1990 Combs of horn and bone In: Biddle, M. *Object and economy in Medieval Winchester*, vol. ii, Oxford, pp. 678-690.

Birk Hansen, P. 1978 *Middelalderlige kamme i Danmark*, Specialeafhandling, Århus.

Birnbaum, H. 1978 Yaroslav's Varangian connection. *Scandoclavica* 14, pp. 5-25.

Blifeld, 1977 (Ukr.) Бліфельд, Д.І. *Давньоруськи пам'ятки Шестовиці*, Київ (Kiev).

Blomqvist, R. 1943 Kammar från Lunds medeltid, *Kulturen*, 1942, Lund, pp. 133-162.

Brisbane, M, Gaimster, D. and Orton C. 1999 (Rus.) Брисбейн, М., Геймстер, Д., Ортон, К. Новгородская керамика. Некоторые предварительные результаты исследования. In: *Новгород и Новгородская земля. История и археология*, Вып. 13, Новгород, С. 71-82. (*Novgorod i Novgorodskaya zemlia. Istorii i Arkheologiya*, Вып. 13, Novgorod, pp. 71-82.)

Broberg, B. and Hasselmo, M. 1981 Keramik, kammar och skor från 7 medeltida städer. Fyndstudie, *Medeltidstaden* 30, Göteborg.

Carlsson, R. 1991 Kammar In: Carlsson, R., Elfendahl, M. and Perming, A. Bryggaren – ett kvarter et centrum. *En medeltidsarkeologisk undersökning i Uppsala 1990. Riksantikvarieämbetet. Rapport UV 1991:1*, Uppsala, pp. 114-118.

Caune, A. 1983 *Arheologiskie petijumi Riga laika no 1969. Ligz 1980. Gadam. AE*, XIV, Riga, pp. 86-124.

Chernykh, N.B. 1989 (Rus.) Черных, Н.Б. Хронология и стратиграфия Староладожского Земляного городища по данным дендрохронологического анализа. In: *Естественно-научные методы в археологии*. М., С. 201-13. (*Estestvenno-nauchnye metody v arkheologii*, Moscow, pp. 201-213.)

Chmielowska, A. 1971 Grzebienie Starozytne I sredniowieczne z ziem polskich, *Acta Archaeologica Lodziensia*, No. 20, Łódź.

Christophersen, A. 1980a Håndeverket i Forandring. Studier I Horn- og Beinhåndverkets Utvikling i Lund ca. 1000-1350. *Acta Archaeologica Lundensia* 4, ser. 13. Lund.

Christophersen, A. 1980b Raw Material, Resources and Production Capacity in Early Medieval Comb Manufacture in Lund. *Papers of the Archaeological Institute University of Lund 1979-1980*, New Series, Vol. 3, Lund.

Cnotliwy, E. 1970 Pracownie grzebiennicze na Srebrnym Wzgórzu w Wolinie. *Materialy zachodniopomorskie*, Tom XVI, Szczecin, pp. 209-287.

Cnotliwy, E. 1973 *Rzemiosło Rogownicze na Pomorzu Wczesnośredniowiecznym*. Wrocław, Ossolineum.

Cnotliwy, E., Leciejewicz, L. and Losinsky, W. 1983 Szczecin we wczesnym średniowieczu. Wzgórze zamkowe. *Polskie Badania Archeologiczne*, 23. Wrocław-Warszawa-Kraków-Gdańsk-Lódź.

Danielsson, K. (Ambrosiani) 1973 Bearbetat ben och benhorn. In: Ambrosiani, B. and Arrhenius, B. (editors) Birka. *Svarta jordens hamnområde. Arkeologisk undersökning 1970-71*. Stockholm, Rikantikvarieämbetet Rapport C1.

Darkevich, V.P. and Borisevich, G.V. 1995 (Rus.) Даркевич, В.П., Борисевич, Г.В. *Древняя столица Рязанской земли*. Круг: М., 1995 (*Drevniaia stolitsa Riazanskoj zemli*. Moscow, Krug.)

Davidan, O.I. 1962 (Rus.) Давидан, О.И. Гребни Старой Ладogi. *Археологический сборник Государственного Эрмитажа (АСГЭ)*, Вып. 4 Л., 1962. С. 95-108. (*Arkheologicheskii sbornik Gosudarstvennogo Ermitazha (ASGE)*, Вып. 4. Leningrad, pp. 95-108.)

Davidan, O.I. 1968 (Rus.) Давидан, О.И. К вопросу о происхождении и датировке ранних гребенок Старой Ладogi. *Археологический сборник Государственного Эрмитажа (АСГЭ)*, Вып. 10, Л., С. 54-63. (*Arkheologicheskii sbornik Gosudarstvennogo Ermitazha (ASGE)*, Вып. 10. Leningrad, pp. 54-63.)

Davidan, O.I. 1974 (Rus.) Давидан, О.И. *Староладожские изделия из кости и рога как исторический источник*. Диссертация на соискание ученой степени кандидата исторических наук. Л. (Doctorate thesis. Unpublished manuscript. Leningrad.)

Davidan, O.I. 1977 (Rus.) Давидан, О.И. К вопросу об организации костерезного ремесла в Древней Ладoge. *Археологический сборник Государственного Эрмитажа (АСГЭ)*, Вып. 18 Л., С. 101-109. (*Arkheologicheskii sbornik Gosudarstvennogo Ermitazha (ASGE)*, Вып. 10. Leningrad, pp. 101-109.)

Davidan, O.I. 1982 Om hantverkets utveckling i Staraia Ladoga. *Fornvännen* 77 (1982), pp. 170-179.

Davidan, O.I. 1999 (Rus.) Давидан, О.И. Новые находки гребней в Старой Ладoge. *РА*, 1, С. 167-174. (*РА*, 1, 1999, pp. 167-174.)

Davidson, G.R. 1952 *Corinth*. Results of excavations conducted by The American School of Classical Studies at Athens. Vol. XII. The Minor Objects. Princeton, New Jersey.

- De Lespinasse, R. 1892 *Les Métiers et Corporations de la Ville de Paris*. Paris.
- Deschler-Erb, S. 1998. Römische Beinartefacte aus Augusta Raurica. Rohmaterial, Technologie, Typologie und Chronologie. *Forschungen in Augst*, Band 27/1. Augst.
- Dovzhenok, V.I., Goncharov, V.K. and Iura, R.O. 1966 (Ukr.) Довженок, В.И., Гончаров, В.К., Юра, Р.О. *Давньоруське місто Воїнь*. Киев. (*Davn'orus'ke misto Boin'*. Kiev).
- Dunlevy, M. 1988 A Classification of Early Irish Combs. *Proceedings of the Royal Irish Academy* 88, C 11. Dublin, Royal Irish Academy, pp. 341-422.
- Dubov, I.V. 1982 (Rus.) Дубов, И.В. *Северо-Восточная Русь в эпоху раннего средневековья*. Л., Наука. (*Severo-Vostochnaia Rus' v epokhu rannego srednevekov'ia*. Leningrad, Nauka.)
- Dubrovin, G.E. and Tarabardina, O.A. 1993 (Rus.) Дубровин, Г.Е., Тарабардина, О.А. Работы на Федоровском раскопе в 1992 году. *In: Новгород и Новгородская земля. История и археология*, Вып. 7, Новгород, С. 14-18. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 7, Novgorod, pp. 14-18.)
- Dubrovin, G.E. and Tarabardina, O.A. 1998 (Rus.) Дубровин, Г.Е., Тарабардина, О.А. Работы на Федоровском VI раскопе в 1997 году. *In: Новгород и Новгородская земля. История и археология*, Вып. 12, Новгород, С. 10-14. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 12, Novgorod, pp. 10-14.)
- Dubrovin, G.E., Tarabardina, O.A. and Tikhonov, P.I. 2000 (Rus.) Дубровин, Г.Е., Тарабардина, О.А., Тихонов, П.И. Хронология Федоровского раскопа *In: Новгород и Новгородская земля. История и археология*, Вып. 14, Новгород, С. 183-194. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 14, Novgorod, pp. 183-194.)
- Edberg, R. (ed.) 1996 Some Russian, Byzantine and Oriental objects from the 1996 Archaeological Excavations in Sigtuna, Sweden. Released on October 15, 1996 as a web page at www.telemuseum.se/museer/Sigtuna/sigt.orient.
- Eding, D.N. 1928 (Rus.) Эдинг, Д.Н. *Сарское городище*. Ростов. (*Sarskoe gorodishche*. Rostov.)
- Egan, G. and Pritchard, P. 1991 Dress accessories c.1150 – c.1450. *Medieval Finds from Excavations in London: 3*. London, HMSO.
- Eniosova, N.V. 1994 (Rus.) Ениосова, Н.В. Ажурные наконечники ножен мечей в X-XI вв. на территории Восточной Европы *In: История и эволюция древних вещей: Сборник статей*. М., 1994. С. 100-121. (*Istoriia i evoliutsiia drevnikh veshchei: Sbornik statei*. Moscow, MGU, pp. 100-21.)
- Falck, W. 1971 Ryska kyrkan I kv. Munken. *Gotlandskt arkiv* 43, pp. 85-93.

Faradzheva, N.N. 1997 (Rus.) Фараджева, Н.Н. Становление и развитие строительной культуры древнего Новгорода *In: Славянский средневековый город. Труды VI Международного конгресса славянской археологии*. Том 2. М., С. 401-411. (*Slavianskii srednevekovyi gorod. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii*, Том 2. Moscow, pp. 401-411.)

Faradzheva N.N. 1999 (Rus.) Фараджева Н.Н. Древнейшие постройки Троицкого XI раскопа *In: Новгород и Новгородская земля. История и археология*. Вып. 13, Новгород, 1998, С. 89-99. (*Novgorod i Novgorodskaya zemlia. Istorii i Arkheologii*. Vyp. 12, Novgorod, 89-99).

Fekhner, M.V. 1963a (Rus.) Фехнер, М.В. Изделия косторезного производства *In: Ярославское Поволжье X-XI вв.* М. С. 39-42. (Smirnov, A.P. (editor) *Iaroslavskoe Povolzh'e X-XI vv.*, Moscow, pp. 39-42.)

Fekhner M.V. 1963b (Rus.) Фехнер М.В. Предметы языческого культа. *In: Смирнов А.П. (ред.) Ярославское Поволжье X-XI вв.* М. С. 86-89. (Smirnov, A.P. (editor) *Iaroslavskoe Povolzh'e X-XI vv.*, Moscow, pp. 86-89.)

Fekhner, M.V. and Nedoshivina, N.G. 1987 (Rus.) Фехнер, М.В., Недошивина, Н.Г. Этнокультурная характеристика Тимеревского могильника по материалам погребального инвентаря. *СА, 2, С. 70-88 (SA 2, 70-88.)*

Fennell, J. 1983 *The Crisis of Medieval Russia 1200-1304*. London-New York, Longman.

Flodin, L. 1989 *Kammakeri i Trondheim ca 1000-1600*. Meddelelser, 14. Trondheim.

Franklin, S. and Shepard, J. 1996 *The Emergence of Rus 750-1200*. London-New York, Longman.

Freestone, I. and Middleton, A. 2000 Lasers provide new ways of investigating BM objects. *British Museum Magazine*, Number 37, pp. 11-13.

Friar John of Pian de Carpine 1957 (Rus) Плато Карпини. *История моголов*. М. (*Historia Mongalorum* (Russian translation), Moscow.)

Gaidukov P.G., 1997 (Rus.) Гайдуков, П.Г. Топография, стратиграфия и хронология Дубошина раскопа в Новгороде *In: Славянский средневековый город. Труды VI Международного конгресса славянской археологии*, Том 2. М., С. 59-67. (*Slavianskii srednevekovyi gorod. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii*, Том 2. Moscow, pp. 59-67.)

Gaidukov, P.G., Fedorov-Davydov, G.A. and Yanin, V.L 2000 (Rus.) Гайдуков, П.Г., Федоров-Давыдов, Г.А., Янин, В.Л. Новый клад куфических монет X в. из Новгорода *In: Восьмая Всероссийская нумизматическая конференция: Москва, 17-21 апреля 2000 г.: Тезисы докладов и сообщений*. М., 2000, С. 55-56. (*Vos'maia Vserossiiskaia numizmaticheskaia konferentsiia v g. Moskve: 17-21 apreliia 2000 g.: Tezisy dokladov i soobshchenii*. Moscow, pp. 55-56.)

- Gaidukov, P.G. and Yanin, V.L. 1995 (Rus.) Гайдуков, П.Г., Янин, В.Л. Новгородский клад западноевропейских монет кон. X – первой пол. XI в. *In: Третья Всероссийская нумизматическая конференция в г. Владимире: 17-21 апреля 1995 г.: Тезисы докладов.* М., С. 26-27. (*Tret'ia Vserossiiskaia numizmaticheskaia konferentsiia v g. Vladimire: 17-21 aprelia 1995 g.: Tezisy dokladov.* Moscow, pp. 26-27.)
- Galloway, P. 1990 Combs of bone, antler and ivory. *In: Biddle M. Object and economy in Medieval Winchester*, vol. ii. Oxford, pp. 665-678.
- Galloway, P. and Newcomer, M. 1981 The craft of comb-making: an experimental enquiry. *Univ. London Inst. Archaeol. Bull.* 18, pp. 73-90.
- Gihl, G. 1927 Arkeologiska undersökningar i Sigtuna 1927. *Upplands Fornminnesförenings Tidskrift*, XLI. Uppsala, pp. 1-13.
- Gippius, A.A. 1999 (Rus.) Гиппиус, А.А. К идентификации персонажей берестяных грамот середины XII в. усадьбы Е Троицкого раскопа *In: Новгород и Новгородская земля. История и археология*, Вып. 13, Новгород, С. 366-379. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 13, Novgorod, pp. 366-379.)
- Gippius, A.A. 2001 (Rus.) Гиппиус, А.А. «Соуть людие новгородьцы от рода варяжьска...» (Опыт генеалогической реконструкции). Неопубликованная рукопись. (*Unpublished manuscript*).
- Goehrke, C. 1992 Frühzeit des Ostslaventums. *Erträge der Forschung* 277. Darmstadt.
- Gralow, K.-D. 1988 Eine münzdatierte frühdeutsche Anlage aus Kolbow, Kreis Ludwigslust. *Bodendenkmalpflege, 35. Jahrbuch 1987*, pp. 185-194.
- Grieg, S. 1933 *Middelalderske Byfund fra Bergen og Oslo*. Oslo, Norske Videnskaps-Akademi.
- Golubeva, L.A. 1973 (Rus.) Голубева, Л.А. *Весь и славяне на Белом озере*. М., Наука. (*Ves' I slaviane na Belom ozere*. Moscow, Nauka.)
- Gurevich, F.D. 1981 (Rus.) Гуревич, Ф.Д. *Древний Новогрудок*. Л., Наука. (*Dnevni Novogradok*. Leningrad, Nauka.)
- Hather, J. 1999 (Rus) Хатер, Д. Использование дерева средневековым Новгороде - предварительные результаты *In: Новгород и Новгородская земля. История и археология*, Вып. 13, Новгород, С. 46-57. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 13, Novgorod, pp. 46-57.)
- Hensel, W. 1958 *Poznan w zaraniu dziejów*. Wrocław, Zakład Narodowy im. Ossolinskich.
- Hensel, W. 1960 *Polska przed tysiącem lat*. Wrocław-Warszawa, Zakład Narodowy im. Ossolinskich.

- Hensel, W. and Broniewska, A. 1961 *Starodawna Kruszwica*. Wrocław, Zakład Narodowy im. Ossolinskich.
- Hilczerówna, Z. 1961 *Rogownictwo Gdańskie w X-XIV wieku*. Gdańsk, Gdańskie Towarzystwo Naukowe.
- Homeyer, C.G. 1970 *Die Haus und Hofmarken*. Berlin
- Hughes, H.D. 1925 *A History of Durham Cathedral Library*. Durham County Advertiser.
- Hurley, M. 1997a Artefacts of Skeletal Material. In: Cleary, R.M., Hurley, M.F. and Shee Twohig, E. (editors) *Skiddy's Castle and Christ Church Cork excavations 1974-77 by D.C. Twohig (Cork)*, pp. 239-73.
- Hurley, M. 1997b Artefacts of Skeletal Material. In: Hurley, M.F., Scully, O.M.B. and McCutcheon, S.W.J. *Late Viking Age and Medieval Waterford. Excavations 1986-1992*. Waterford, Waterford Corporation, pp. 650-705.
- Hurley, M.F. and Scully, O.M.B. 1997 Wooden artefacts. In: Hurley, M.F., Scully, O.M.B. and McCutcheon, S.W.J. *Late Viking Age and Medieval Waterford. Excavations 1986-1992*. Waterford, Waterford Corporation, pp. 533-585.
- Hyenstrand, E. 1991 *Svarta Jordan på Björkö. Om des utforskare, stratigrafi och kammar*. Uppsala.
- Юв, О.В. 1997 (Rus.) Юв, О.В. Припятско-Неманский путь в IX-XI вв. в свете новых археологических данных. In: *Проблемы славянской археологии. Труды VI Международного конгресса славянской археологии*, Том 1. М., 1997. С. 268-274. (*Problemy slavianskoi arkheologii. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii*, Tom 1. Moscow, pp. 268-274.)
- Jankuhn, H. 1943 *Die Ausgrabungen in Haithabu (1937-1939). Vorläufigen Grabungsbericht*. Berlin-Dahlem, Ahnenerbe-Stiftung Verlag.
- Jansson, I. 1999 (Rus.) Янссон, И. Скандинавские находки IX-X вв. с Рюрикова городища In: Гиппиус, А.А., Носов, Н.Н., Хорошев, А.С. (ред.) *Великий Новгород в истории средневековой Европы. К 70-летию В.Л.Янина*. М., Русские словари, С. 18-38. (Gippius, A.A., Hosov, E.N. and Khoroshev, A.S. (editors.) *Velikii Novgorod v istorii srednevekovoi Evropy. K 70-letiiu V.L.Ianina*. Moscow, Russkie slovari, pp. 18-38.)
- Karger, M.K. 1958 (Rus.) Каргер, М.К. *Древний Киев*. М.-Л., Наука. (*Drevnii Kiev*. Moscow-Leningrad, Nauka.)
- Kharlashov, B.N. 1994 (Rus.) Харлашов, Б.Н. Некоторые итоги раскопок на Завеличье. In: *Археологическое изучение Пскова*, Вып. 2. Псков, 1994, С. 44-67 (*Arkheologicheskoe izuchenie Pskova*, Вып. 2. Pskov, pp. 44-67.)

- Khoroshev, A.S. 1982 (Rus.) Хорошев, А.С. Новые материалы по археологии Неревского конца. *In: Новгородский сборник. 50 лет раскопок Новгорода.* М., Наука, С. 239-268. (Novgorodskii sbornik. 50 let raskopok Novgoroda. Moscow, Nauka, pp. 239-268.)
- Kildiushevsky, V.I. 1983 (Rus.) Кильдюшевский, В.И. Раскопки на улице Гоголя в 1977 г. *In: Седов, В.В. (ред.) Археологическое изучение Пскова.* М., Наука, С. 105-118. (Sedov, V.V. (editor) *Arkheologicheskoe izuchenie Pskova.* Moscow, Nauka, pp. 105-118.)
- Kochkurkina, S.I. 1973 (Rus.) Кочкуркина, С.И. Юго-Восточное Приладожье в X-XIII вв. Л., Наука. (*Iugo-Vostochnoe Priladozh'e v X-XIII vv.* Leningrad, Nauka.)
- Kochkurkina, S.I. 1989 (Rus.) Кочкуркина, С.И. Памятники Юго-Восточного Приладожья и Прионежья в X-XIII вв. Петрозаводск, Карелия. (*Pamiatniki Iugo-Vostochnogo Priladozh'ia v X-XIII vv.* Petrozavodsk, Kareliia.)
- Kochkurkina, S.I. and Linevsky, A.M. 1985 (Rus.) Кочкуркина, С.И., Линеvский, А.М. Курганы летописной веси X – начала XI века. Петрозаводск, Карелия. (*Kurgany letopisnoi vesi X – nachala XI beka.* Petrozavodsk, Kareliia.)
- Kolchin, V.A. 1958 (Rus.) Колчин, Б.А. Хронология новгородских древностей. *СА, 2, С. 92-111.* (SA, 2, pp. 92-111.)
- Kolchin, V.A. 1963 (Rus.) Колчин Б.А. Дендрохронология Новгорода. *In: Новые методы в археологии. Труды Новгородской археологической экспедиции, Том 3, МИА №117, М., Наука, С. 5-103.* (*Novye metody v arkheologii. Trudy Novgorodskoi arkheologicheskoi ekspeditsii.* Tom 3, MIA, No. 117, Moscow, Nauka, pp. 5-103.)
- Kolchin, V.A. 1968 (Rus.) Колчин, Б.А. Новгородские древности. Деревянные изделия. Археология СССР. САИ (Свод археологических источников), Выпуск Е1-55. Наука, М., 1968 (*Novgorodskie drevnosti. Dereviannye izdeliia, SAI E1-55,* Moscow, Nauka.)
- Kolchin, V.A. 1971 (Rus.) Колчин, Б.А. Новгородские древности. Резное дерево. Археология СССР. САИ (Свод археологических источников), Выпуск Е1-55. М., Наука, 1971 (*Novgorodskie drevnosti. Reznoe derevo. SAI E1-55,* Moscow, Nauka.)
- Kolchin, V.A. 1982 (Rus.) Колчин Б.А. Хронология новгородских древностей *In: Новгородский сборник. 50 лет раскопок Новгорода.* М., Наука, С. 156-177. (*Novgorodskii sbornik. 50 let raskopok Novgoroda.* Moscow, Nauka, pp. 156-177.)
- Kolchin, V.A. 1989 *Wooden artefacts from medieval Novgorod, BAR S495i and ii,* Oxford.
- Kolchin, V.A. and Chernykh, N.V. 1978 (Rus.) Колчин, Б.А., Черных, Н.В. Ильинский раскоп (стратиграфия и хронология). *In: Колчин, Б.А., Янин, В.Л. (ред.) Археологическое изучение Новгорода.* М., Наука, С. 57-116. (Kolchin,

- B.A., and Yanin, V.L. (editors) *Arkheologicheskoe izuchenie Novgoroda*. Moscow, Nauka, pp. 57-116.)
- Kolchin, V.A. and Rybina, E.A. (Rus) 1982 Колчин Б.А., Рыбина Е.А. Раскоп на улице Кирова. *In: Новгородский сборник. 50 лет раскопок Новгорода*. М., Наука, С. 178-238. (*Novgorodskii sbornik. 50 let raskopok Novgoroda*. Moscow, Nauka, pp. 178-238.)
- Kolchin, V.A. and Yanin, V.L. 1982 (Rus.) Колчин, Б.А., Янин, В.Л. Археологии Новгорода 50 лет. *In: Новгородский сборник. 50 лет раскопок Новгорода*. М., Наука, С. 3-137. (*Novgorodskii sbornik. 50 let raskopok Novgoroda*. Moscow, Nauka, pp. 3-137.)
- Kondrat'eva, O.A. 1981 (Rus.) Кондратьева, О.А. Зооморфные гребни IX-X вв. *KСИА*, 166, С. 103-109 (*KSIА*, 166, pp. 103-109.)
- Kondrat'eva, O.A. 1986 (Rus.) Кондратьева, О.А. Средневековые гребни с горбатой спинкой. *KСИА*, 187, С. 58-61 (*KSIА*, 187, pp. 58-61.)
- Kondrat'eva, O.A. 1995 (Rus.) Кондратьева, О.А. Средневековые гребни с кружковым орнаментом из древнерусских находок. *In: Проблемы истории северо-запада Руси. Славяно-русские древности*, 3, СПб., С. 72-84. (*Problemy istorii severo-zapada Rusi. Slaviano-russkie drevnosti*, 3, St.-Petersburg, pp.72-84.)
- Kondrat'eva, O.A. 1997 (Rus.) Кондратьева, О.А. Древнерусские гребни IX-XI вв.: местное производство и общеевропейские традиции. *In: Памятники старины. Концепции. Открытия. Версии. Памяти В.Д.Белецкого 1919-1997*, Том. 1, СПб-Псков, С. 300-308. (*Pamiatniki stariny. Kontsepstsii. Otkrytia. Versii. Pamiati V.D.Beletskogo 1919-1997*, Том 1, St.-Petersburg-Pskov, pp. 300-308.)
- Koval', V.Y. 1999 (Rus.) Коваль, В.Ю. Амфоры Византийского круга в Древней Руси. *In: Новгород и Новгородская земля. История и Археология*, Вып. 13, Новгород, С. 246-260. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Выр. 13, Novgorod, pp. 246-260.)
- Koval', V.Y. 2000 (Rus.) Коваль, В.Ю. Византийская поливная керамика из раскопок в Новгороде *In: Новгород и Новгородская земля. История и Археология*, Вып. 14, Новгород, С. 127-139. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Выр. 14, Novgorod, pp. 127-139.)
- Labutina, I.K. 1983 (Rus.) Лабутина, И.К. Культурный слой Пскова *In: Седов, В.В. (ред.) Археологическое изучение Пскова*. М., Наука, С. 7-45. (Sedov, V.V. (editor) *Arkheologicheskoe izuchenie Pskova*. Moscow, Nauka, pp. 7-45.)
- Lampe, W. 1981 Frühgeschichtliche Kammfunde aus slawischen Siedlungen der Insel Usedom. *Bodendenkmalpflege in Mecklenburg. Jb 1980*, Berlin, pp. 171-201.
- Lasco, P. 1956 The comb of St Cuthbert. *In: Battiscombe C.F. (editor), The Relics of St Cuthbert*. Durham, Dean and Chapter of Durham Cathedral, pp. 57-72.

- Leont'ev, A.E. (Rus.) 1996 Леонтьев, А.Е. Археологи мери. К предыстории Северо-Восточной Руси. *Археология эпохи великого переселения народов и раннего средневековья*. Вып. 4. М., Институт Археологии РАН. (*Arkheologiiia epokhi velikogo pereseleniia narodov*, Vyp. 4. Moscow, Institut Arkheologii RAN.)
- Liapushkin, I.I. (Rus.) 1968 Ляпушкин И.И. *Славяне Восточной Европы накануне образования древнерусского государства*. МИА №152, Л., Наука. MIA, No. 152, Leningrad, Nauka).
- Long, C.D. 1975 Excavations in the Medieval city of Trondheim, Norway. *Medieval Archaeology*, 19, pp. 1-32.
- Luik, H. 1998 Muinas- ja keskaegsed luukammid Eestis. *Muinasaja Teadus* 6. Tallinn.
- Luik, H. 2001 Bone Combs from Medieval Tallinn, from the excavations in Sauna street In: Choyke, A.M. and Bartosiewicz, L. (editors.) *Crafting Bone: Skeletal Technologies through Time and Space. Proceedings of the 2nd Meeting of the (ICAZ) Worked Bone Research Group, Budapest 31 August – 5 September 1999*. BAR S937, pp. 321-330.
- Lysenko, P.F. 1974 (Rus.) Лысенко П.Ф. *Города Туровской земли*. Минск. (*Goroda Turovskoi zemli*. Minsk)
- MacGregor, A. 1985 *Bone, Antler, Ivory and Horn. The Technology of Skeletal Materials Since the Roman Period*. London & Sydney, Croom Helm; Totowa, New Jersey, Barnes & Noble Books.
- MacGregor, A. and Currey, J. 1983 Mechanical properties as conditioning factors in the bone and antler industry of the 3rd to 13th century AD. *Journal of Archaeological Science*, X, pp. 71-7.
- MacGregor, A., Mainman, A.J. and Rogers, N.S.H. 1999 Craft, Industry and Everyday Life: Bone, Antler, Ivory and Horn from Anglo-Scandinavian and Medieval York, *The Archaeology of York, The Small Finds 17/12*. Council for British Archaeology.
- Макаев, Е.А. 1962 (Rus.) Макаев, Е.А. Руническая надпись из Новгорода. *СА*, 3, С. 309-311 (*SA*, 3, pp. 309-311.)
- Макаров, Н.А. 1990 (Rus.) Макаров, Н.А. *Население русского Севера в XI-XIII вв.* М., Наука. (*Naselenie russkogo Severa v XI-Xii vv.* Moscow, Nauka.)
- Макаров, Н.А. 1997 (Rus.) Макаров, Н.А. *Колонизация северных окраин Древней Руси*. М., Скрипторий. (*Kolonizatsiia severnykh okrain Drevnei Rusi*. Moscow, Skriptorii.)
- Margeson, S. 1993 Norwich Households. Medieval and Post-Medieval Finds from Norwich Survey Excavations 1971-78. *East Anglian Archaeology Report*, No. 58. Norwich, Norwich Survey.

- Mårtensson, A.W. and Wahlöö, C. 1970 Lundafynd. En bilderbok. *Archaeologica Lundensia IV*, Karlshamn.
- McLees, C. 1990 *Games People Played. Gaming pieces, boards and dice from excavations in the medieval town of Trondheim, Norway*. Trondheim, Meddelelster Nr. 24.
- Melnikova, E.A. 1978 (Rus.) Мельникова Е.А. «Сага об Эймунде» о службе скандинавов в дружине Ярослава Мудрого *In: Восточная Европа в древности и средневековье*, М., Наука, С. 289-295. (*Vostochnaia Evropa v drevnosti i srednevekov'e*. Moscow, Nauka, pp. 289-295.)
- Melnikova, E.A. 1997 *Par var eigi kaupfriðr í milli Svens ok Jarizlefs*. A Russian-Norwegian Trade Treaty Concluded in 1024-1028. *In: Born, R., Rebas, H. and Siltberg T. (editors) Archiv und Geschichte im Ostseeraum. Festschrift für Sten Körner. Studia Septentrionalia*, Band 3. Kiel, Peter Lang, pp. 15-24.
- Melnikova, E.A. 1998 (Rus.) Мельникова Е.А. Культурная ассимиляция скандинавов на Руси по данным языка и письменности *In: Общество, экономика, культура и искусство славян. Труды VI Международного Конгресса славянской археологии*, Том 4. М., С.135-143. (*Obshchestvo, ekonomika, kul'tura i iskusstvo slavian. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii*, Tom 4. Moscow, pp. 135-143).
- Molaug, P.B. 1975 Oslo im Mittelalter. Ergebnisse der neuen archäologischen Ausgrabungen. *Zeitschrift für Archäologie des Mittelalters*, 3, pp. 216-60.
- Molchanov, A.A. 1986 (Rus.) Молчанов, А.А. Верительные знаки киевских князей и древнескандинавские *jahrtegnir* *In: Тезисы докладов X скандинавской конференции*. М. С. 184-186. (*Tezisy dokladov X skandinavskoi konferentsii*. Moscow, pp. 184-186.)
- Molchanov, A.A. 1997 (Rus.) Молчанов, А.А. Ярл Рёгнвальд Ульвссон и его потомки на Руси (О происхождении ладожско-новгородского посадничьего рода Роговичей-Гюргиничей) *In: Памятники старины: Концепции. Открытия. Версии. Памяти Василия Дмитриевича Белецкого 1919-1997*, Том II, СПб.-Псков, С. 80-84. (*Pamiatniki stariny. Kontseptsii. Otkrytiia. Versii. Pamiati Vasiliia Dmitrievicha Beletskogo 1919-1997*, Tom II. St-Petersburg-Pskov, pp. 80-84.)
- Nosov, E.N. 1990 Носов, Е.Н. *Новгородское (Рюриково) городище*. Л., Наука. (*Novgorodskoe (Riurikovo) gorodishche*. Leningrad, Nauka.)
- Nosov, E.N. 1992 Ryuric Gorodishche and the Settlements to the North of Lake Ilmen *In: Brisbane M. (editor) The Archaeology of Novgorod, Russia. The Society for Medieval Archaeology. Monograph Series: NO 13*. Lincoln, pp. 5-66.
- Nosov, E.N. 1997 (Rus.) Носов, Е.Н. У истоков Новгорода *In: Славянский средневековый город. Труды VI Международного конгресса славянской археологии*, Том 2. М., С. 272-285. (*Slavianskii srednevekovyi gorod. Trudy VI*

Mezhdunarodnogo Kongressa Slavianskoi Arkheologii, Tom 2. Moscow, pp. 272-285.)

Nosov, E.N. 1999 (Rus.) Носов, Е.Н. Современные археологические данные по варяжской проблеме на фоне традиций русской историографии. *In*: Носов Е.Н., Богуславский О.И., Дорофеева Т.С., Пескова А.А. (ред.) *Раннесредневековые древности Северной Руси и ее соседей. К семидесятилетию Анатолия Николаевича Кирпичникова*. Санкт-Петербург, ИИМК РАН, С. 151-163. (Nosov, E.N., Boguslavsky, O.I., Dorofeeva, T.S. and Peskova, A.A. (editors) *Rannesrednevekovye drevnosti Severnoi Rusi i ee sosedei. K semidesiatiletiiu Anatoliia Nikolaevicha Kirpichnikova*. Saint-Petersburg, ИИМК РАН, pp. 151-163.)

O'Connor, S. 1987. The identification of osseous and keratinaceous materials at York. *In*: Starling K., and Watkinson D. *Archaeological Bone, Antler and Ivory. UKIC Occasional Papers 5*. London, pp. 9-21.

O'Connor, S. 1999 The Preservation, Identification and Conservation of the Finds. *In*: MacGregor, A., Mainman, A.J. and Rogers, N.S.H. *Craft, Industry and Everyday Life: Bone, Antler, Ivory and Horn from Anglo-Scandinavian and Medieval York, The Archaeology of York, The Small Finds 17/12*, Council for British Archaeology, pp. 1898-1901.

Persson, J. 1976 Kammar. *In*: Mårtensson, A.V. (editor) *Uppgrävt förflutet för PK-banken i Lund. Archaeologica Lundensia VII*, Malmö, pp. 317-332.

Plotkin, K.M. 1992 (Rus.) Плоткин, К.М. Начало Пскова. *In*: *Археологи рассказывают о древнем Пскове*. Псков, С. 21-43. (*Arkheologi rasskasyvaiut o drevnem Pskove*. Pskov, pp. 21-43.)

Rokrovskaiia L.V. 1999 (Rus.) Ювелирные украшения Новгорода X-XI вв. (по материалам Неревского и Троицкого раскопов). *In*: Гиппиус, А.А., Носов, Е.Н., Хорошев, А.С. (ред.) *Великий Новгород в истории средневековой Европы. К 70-летию В.Л.Янина*. М., Русские словари, С. 51-64. (Gippius, A.A., Nosov, E.N. and Khoroshev, A.S. (editors.) *Velikii Novgorod v istorii srednevekovoi Evropy. K 70-letiiu V.L.Ianina*. Moscow, Russkie slovari, pp. 51-64.)

Poluboiarina, M.D. 1963 (Rus.) Полубояринова, М.Д. Стекланные браслеты древнего Новгорода *In*: *Новые методы в археологии. Труды Новгородской археологической экспедиции*, Том 3, МИА, 117, М. С. 164-199. (*Novye metody v arkheologii. Trudy Novgorodskoi arkheologicheskoi ekspeditsii*, Том 3, МИА, 117, Moscow, pp. 164-199).

Pushkina, T.A. 1993 (Rus.) Пушкина, Т.А. Изелия косторезного ремесла из Гнездова. *In*: Недошивина, Н.Г. (ред.) *Средневековые древности Восточной Европы. Труды Государственного Исторического музея*, Вып. 82. М., С. 57-68 (Nedoshivina, N.G. (editor) *Srednevekovye drevnosti Vostochnoi Evropy. Trudy Gosudarstvennogo Istoricheskogo muzeia*, Вып. 82, Moscow, pp. 57-68).

Ravdina, T.V. 1988 (Rus.) Равдина, Т.В. Погребения X-XI вв. с монетами на территории Древней Руси. Каталог. М., Наука. (*Pogrebeniia X-XI vv. s monetami*

- na territorii Drevnei Rusi. Moscow, Nauka.)
- Riabinin, E.A. 1986 (Rus.) Рябинин, Е.А. *Костромское Поволжье в эпоху средневековья*. Л., Наука. (*Kostromskoe Povolzh'e v epokhu rannego srednevekov'ia*. Leningrad, Nauka.)
- Riabinin, E.A. and Chernykh, N.B. 1988 (Rus.) Рябинин, Е.А., Черных, Н.Б. Стратиграфия, застройка и хронология Староладожского Земляного Городища в свете новых исследований, *СА*, 1. С. 72-100 (*SA*, 1, pp. 72-100.)
- Richter, U. 1990 Mittelalterliche Knochenkämme aus Freiberg. *AF*, 35:1, pp. 37-40.
- Riddler, I. 1991 Two Late Saxon Combs from the Longmarket Excavations. *Canterbury's Archaeology 1989/1990, The 14th Annual Report of Canterbury Archaeological Trust Ltd*. Canterbury, pp. 54-55.
- Roesdahl E. 1991 *The Vikings*, tr. S.M.Margeson and K.Williams. London
- Rusanova, I.P. 1973 (Rus.) Русанова, И.П. Славянские древности VI-IX вв. между Днепром и Западным Бугом. *САИ* (Свод археологических источников), Вып. Е1-25. М., Наука. (*SAI*, Вып. Е1-25, Moscow, Nauka.)
- Rybina, E.A. 1978a (Rus.) Рыбина, Е.А. *Археологические очерки истории новгородской торговли*. М., МГУ. (*Arkheologicheskie ocherki istorii novgorodskoi trgovli*. Moscow, MGU.)
- Rybina, E.A. 1978b (Rus.) Рыбина, Е.А. Готский раскоп Ин: Колчин, Б.А., Янин, В.Л. (ред.) *Археологическое изучение Новгорода*. М., Наука. С. 197-226. (Kolchin, B.A. and Yanin, V.L. (editors) *Arkheologicheskoe izuchenie Novgoroda*. (Moscow)).
- Rybina, E.A. 1986 (Rus.) Рыбина, Е.А. *Иноземные дворы в Новгороде. XII-XVII вв.* М., МГУ. (*Inozemnye dvory v Novgorode. XII-XVII vv.* Moscow, MGU.)
- Rybina, E.A. and Rosenfeld, R.L. 1997 (Rus.) Рыбина, Е.А., Розенфельд, Р.Л. Гребни и расчески. Ин: Макарова, Т.А. (ред.) *Древняя Русь. Быт и культура. Археология с древнейших времен до средневековья в 20 томах*. М. Наука. (Makarova, T.I. (editor) *Drevniaia Rus'. Byt i kul'tura. Arkheologiiia SSSR*, Moscow, Nauka.)
- Sarfatiij, H (ed.) 1990 *Verborgten steden Stadarcheologie in Nederland*. Amsterdam.
- Schmidt, B. 1961 *Die späte Völkerwanderungszeit in Mitteldeutschland*. Halle.
- Schoknecht, U. 1986 Kurze Fundberichte 1984. *Bezirk Neubrandenburg Bodendenkmalpflege*, 33. *Jarbuch 1985*, pp. 311-364.
- Schoknecht, U. 1992 Kurze Fundberichte 1990. *Bezirk Neubrandenburg Bodendenkmalpflege*, 39. *Jarbuch 1991*, pp. 335-384.

- Schoknecht, U. 1994 Kreis Röbel. In: Gralow, K.-D., Lampe, W., Schacht, S. and Schoknecht, U. Kurze Fundberichte 1993 für das Land Mecklenburg-Vorpommern. *Bodendenkmalpflege, 41. Jahrbuch 1993*, pp. 309-400.
- Sedov, V.V. 1982 (Rus.) Седов, В.В. *Восточные славяне VI-XIII вв. Археология СССР*. М., Наука. (*Vostochnye slaviane VI-VIII vv. Arkheologiya SSSR*, Moscow, Nauka)
- Sedov, V.V. 1999 (Rus.) Седов, В.В. Становление первых городов в Северной Руси и варяги. In: Носов Е.Н., Богуславский О.И., Дорофеева Т.С., Пескова А.А. (ред.) *Раннесредневековые древности Северной Руси и ее соседей. К семидесятилетию Анатолия Николаевича Курпичникова*. Санкт-Петербург, ИИМК РАН, С. 206-210. (Nosov, E.N., Boguslavsky, O.I., Dorofeeva, T.S. and Peskova, A.A. (editors) *Rannesrednevekovye drevnosti Severnoi Rusi i ee sosedei. K semidesiatiletiiu Anatoliia Nikolaevicha Kirpichnikova*. Saint-Petersburg, ИИМК РАН, pp. 206-210.)
- Sedova, M.V. 1979 (Rus.) Седова, М.В. Скандинавские древности из раскопок в Новгороде In: *VIII Всесоюзная конференция по изучению истории, языка и литературы скандинавских стран и Финляндии. Тезисы докладов*. Вып. 1, Петрозаводск, С. 179-181 (*VIII Vsesoiuznaia konferentsiia po izucheniiu istorii, iazyka i literatury skandinavskikh stran i Finliandii*. Petrozavodsk, pp. 179-181.)
- Sedova, M.V. 1981 (Rus.) Седова, М.В. *Ювелирные изделия древнего Новгорода (X-XV вв)*. М., Наука. (*Iuvelirnye izdeliia drevnego Novgoroda*. Moscow, Nauka.)
- Sedova M.V. 1997 (Rus.) Седова, М.В. *Суздаль в X-XV вв*. М., Наука. (*Suzdal' v X-XV vv*. Moscow, Nauka.)
- Sergeeva, M. (Ukr.) 1996 Сергеева М. Кістяні та дерев'яні вироби з колекції "Десятинна церква" у збірці НМІУ In: *Церква Богородиці Десятинна в Києві. До 1000 ліття освячення*. Київ, 101-103 (*Tserkva Bogoroditsy Desiatinna. Do 1000 littia osbiachennia*, Kiev, 101-103).
- Shovkopriias, 1954 (Rus.) Шовкопляс, А.М. Некоторые данные о косторезном ремесле в Древнем Киеве. *КСИА УССР*, Вып. 3 Киев, 1954 (*KSIA UkSSR*, 3, pp. 25-33).
- Shtykhov, G.V. 1978 (Rus.) Штыхов, Г.В. *Города Полоцкой земли*. Минск. (*Goroda Polotskoi zemli*. Minsk.)
- Sizov, V.I. 1902 (Rus.) Сизов, В.И. Курганы Смоленской губернии. Вып. 1: Гнездовский могильник близ Смоленска. *МАР*, 28. СПб. (*MAR*, 28. St.-Petersburg.)
- Smirnova, L.I. 1995 (Rus.) Смирнова, Л.И. 1995 Состав сырья косторезов Древнего Новгорода (опыт анализа отходов косторезного производства по материалам Троицкого раскопа). In: *Новгород и Новгородская земля. История и археология*, Вып. 9, Новгород, С. 115-129. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiya*, Вып. 9, Novgorod, pp. 115-129.)

- Smirnova, L. 1997 Antler, bone and ivory working in Nerevsky and Lyudin Ends of Medieval Novgorod. Evidence from waste analysis. *In: Material Culture in Medieval Europe - Papers of the 'Medieval Europe Brugge 1997' Conference - Volume 7*, pp.137-146.
- Smirnova, L.I. 1998 Смирнова, Л.И. Этапы становления косторезного ремесла в средневековом Новгороде (по материалам Федоровского раскопа в Плотницком конце). *In: Новгород и Новгородская земля. История и археология*, Вып. 12, Новгород, С. 94-109. (*Novgorod i Novgorodskaya zemlia. Istorii i Arkheologiya*, Вып. 12, Novgorod, pp. 94-109.)
- Smirnova, L.I. 1999 (Rus.) Смирнова Л.И. Сырье новгородских косторезов (рог, кость и «рыбный зуб»). *In: Гиппиус, А.А., Носов, Н.Н., Хорошев, А.С. (ред.) Великий Новгород в истории средневековой Европы. К 70-летию В.Л.Янина. М., Русские словари, С. 122-134. (Gippius, A.A., Nosov, E.N. and Khoroshev, A.S. (editors.) Velikii Novgorod v istorii srednevekovoi Evropy. K 70-letiiu V.L.Ianina. Moscow, Russkie slovari, pp. 122-134.)*
- Smirnova L.I. 2000 (Rus.) Смирнова Л.И. К вопросу об использовании пигментов и красителей для украшения изделий из костных тканей (по материалам раскопок в Новгороде) *In: Новгород и Новгородская земля. История и археология*, Вып. 14, Новгород, С. 111-126. (*Novgorod i Novgorodskaya zemlia. Istorii i Arkheologiya*, Вып. 14, Novgorod, pp. 111-126.)
- Smirnova, L. 2001 Utilization of rare bone materials in Medieval Novgorod. *In: Choyke, A.M. and Bartosiewicz, L. (editors) Crafting Bone: Skeletal Technologies through Time and Space. Proceedings of the 2nd Meeting of the (ICAZ) Worked Bone Research Group, Budapest 31 August – 5 September 1999. BAR S937, pp. 9-17.*
- Smirnova, L. 2002 The working of antler, bone and ivory in Novgorod: a study of a craft industry. *In: Brisbane, M. and Gaimster, D. (editors) Novgorod: Archaeology of the Medieval Town and its Hinterland, the proceedings of the session 'Knowing Novgorod: A case study in archaeological collaboration' at the European Association of Archaeologists annual meeting held in Bournemouth 14 - 19 September 1999. British Museum Occasional Paper 141. London. In print.*
- Söderberg, B.G. 1971 *Strövtåg i Gotlands historia*. Vysby.
- Starling, K. and Watkinson, D. 1987 Archaeological Bone, Antler and Ivory. *UKIC Occasional Papers 5*. London.
- Tempel, W.-D. 1969 Die Dreilagenkämme aus Haithabu. Studien zu den Kämme der Wikingerzeit im Nordseeküstengebiet und Scandinavien. Dissertation. Göttingen.
- The Oxford Dictionary of Byzantium*. 1991 Vv. 1-2, New-York – Oxford.
- Teune-Großkopf, B. 1994 Produkte von Kammachern und Beinschnitzern des frühen Mittelalters in Südwestdeutschland. *In: Kokabi, M., Schlenker, B. and Wahl, J. (editors) 'Knochenarbeit'. Artefakte aus tierischen Rohstoffen im Wandel der Zeit. Stuttgart, Landesdenkmalamt Baden-Württemberg, pp. 83-98.*

Teune-Großkopf B. and Röber R. 1994 Geweih, Knochen, Elfenbein in kultisch-christlichen Bereich. *In*: Kokabi, M., Schlenker, B. and Wahl, J. (editors) 'Knochenarbeit'. *Artefakte aus tierischen Rohstoffen im Wandel der Zeit*. Stuttgart, Landesdenkmalamt Baden-Württemberg, pp. 99-109.

Thun, E. 1967 Medieval Tommarp. *Acta Archaeologica Lundensia*, 8° ser., 5. Lund.

Thunmark-Nylén, L. 1991 Gotlands vikingatid och dess kammar. En preliminär presentation. *Gotlandsk Arkiv - Meddelanden Fr.*, pp. 109-127.

Thunmark-Nylén, L. 1995 Churchyard Finds from Gotland (11th –12th centuries). *In*: Jansson, I. (editor) *Archaeology East and West of the Baltic. Papers from the Second Estonian-Swedish Archaeological Symposium*. Sigtuna, May 1991. *Theses and Papers in Archaeology N.S. A 7*. Stockholm, pp. 161-193.

Ulbricht, I. 1978 Die Geweihverarbeitung in Haithabu. *Die Ausgrabungen in Haithabu 7*, Neumünster.

Ulbricht, I. 1984 Verarbeitung von Knochen, Geweih und Horn im mittelalterlichen Schleswig. *Ausgrabungen in Schleswig. Berichte und Studien 3*, Neumünster.

Ur'eva, A.F. and Chernykh, N.B. 1995 (Rus.) Урьева, А.Ф., Черных, Н.Б. Дендрошкалы Новгорода: опыт компьютерной обработки *In*: *Новгород и Новгородская земля. История и археология*, Вып. 9, Новгород, С. 106-114. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Vyp. 9, Novgorod, pp. 106-114.)

Vaughan, R. 1958 The Chronicle attributed to John of Wallingford. *Camden Miscellany 21*, pp. 1-67.

Verkhorubova, T.L. and Shorin, M.V. 1985 (Rus.) Верхорубова, Т.Л., Шорин, М.В. Костяные изделия с Городища под Новгородом. *In*: *Новое в Археологии Северо-Запада СССР*. Л., Наука, С. 51-56. (*Novoe v Arkheologii Severo-Zapada SSSR*. Leningrad, Nauka, pp. 51-56.)

Volkov, I. 1996 (Rus.) Волков, И.В. Амфоры Новгорода Великого и некоторые заметки о византийско-русской торговле вином *In*: *Новгород и Новгородская земля. История и археология*. Вып.10., Новгород, С. 90-103 (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Vyp. 10, Novgorod, pp. 90-103.)
Waterman, D.M. 1959 Late Saxon, Viking and Early Medieval Finds from York. *In*: *Archaeologia 97*, pp. 59-105.

Weber, B. 1993 Norwegian reindeer antler export to Orkney. The analysis of combs from Pictish/early Norse sites. *Universitetets Oldsaksamling. Årbok 1991/1992*. Oslo, pp. 161-174.

Weber, B. 1995 The Identification of Raw Material in Combs. *Universitetets Oldsaksamling. Årbok 1993/1994*. Oslo, pp. 197-205.

- Wiberg, C. 1977 Horn- og benmaterialet fra 'Mindets tomt'. In: Høeg, H.I. et al. *De Arkeologiske Utgravninger i Gamlebyen, Oslo 1, Feltet 'Mindets Tomt'*, Bind 1. Oslo, pp. 202-213.
- Wiberg, T. 1987 Kammer. In: Høeg H.I. et al. *De Arkeologiske Utgravninger i Gamlebyen Oslo, 'Søndre Felt'*, Bind 3. Oslo, pp. 413-22.
- Wikander, S. 1978 Araber, vikingar och varingar. *Svenska humanistika förbundet 90*. Stockholm.
- Wilde, K.A. 1953 *Die Bedeutung der Grabung Wollin 1934*. Hamburg, Beiheft zum Atlas der Urgeschichte 1.
- Winter, F. 1906 *Die Kämme aller Zeiten*. Leipzig, Degener.
- Yanin V.L. 1956 (Rus.) Янин В.Л. Вислые печати из новгородских раскопок 1951-1954 гг. In: *Труды Новгородской археологической экспедиции, Том 1, МИА, 55, М. Наука, С. 138-163. (Trudy Novgorodskoi arkheologicheskoi ekspeditsii, Tom 1, MIA, 55, Moscow, Nauka, pp. 138-163.)*
- Yanin, V.L. 1979 (Rus.) Янин, В.Л. О принадлежности южных усадеб Неревского раскопа в Новгороде, *СА 4, С. 86-94. (SA 4, pp. 86-94.)*
- Yanin, V.L. 1982 (Rus.) Янин, В.Л. Археологический комментарий к Русской Правде In: *Новгородский сборник. 50 лет раскопок Новгорода*. М., Наука, С. 138-155. (*Novgorodskii sbornik. 50 let raskopok Novgoroda*. Moscow, Nauka, pp. 138-155.)
- Yanin, V.L. 1992 The Archaeological Study of Novgorod: an Historical Perspective In: Brisbane M. (editor) *The Archaeology of Novgorod, Russia. The Society for Medieval Archaeology. Monograph Series: NO 13*. Lincoln, pp. 67-106.
- Yanin, V.L. 1995 (Rus.) Янин В.Л. Ярослав – князь русский: Впервые найдена его печать. *Знание – сила 4, С. 56-57 (Znanie – sila 4, pp. 56-57.)*
- Yanin, V.L. 1997 (Rus.) Янин, В.Л. Основные итоги археологического изучения Новгорода In: *Славянский средневековый город. Труды VI Международного конгресса славянской археологии, Том 2. М., С. 6-12. (Slavianskii srednevekovyi gorod. Trudy VI Mezhdunarodnogo Kongressa Slavianskoi Arkheologii, Tom 2. Moscow, pp. 6-12.)*
- Yanin, V.L. 2001a Janin V.L. Ein mittelalterliches Zentrum im Norden des Rus'. Die Ausgrabungen in Novgorod. In: Müller-Wille, M., Janin, V.L., Nosov, E. and Rybina, E. (editors) *Novgorod. Das mittealterliche Zentrum im Norden Rußland. Studien zur Siedlungsgeschichte und Archäologie der Ostseegebiete, Band 1*. Neumünster, Wachholtz Verlag, pp. 75-97.
- Yanin V.L. 2001b Janin V.L. 'Lobet den Herrn'. Der 'Novgoroder Psalter' des 10./11.Jhs. In: Müller-Wille, M., Janin, V.L., Nosov, E. and Rybina, E. (editors) *Novgorod. Das mittealterliche Zentrum im Norden Rußland. Studien zur*

Siedlungsgeschichte und Archäologie der Ostseegebiete, Band 1. Neumünster, Wachholtz Verlag, pp. 121-124.

Yanin V.L. 2001c Janin V.L. Fürst oder Bojaren: Wer hatte die Macht im Staat Novgorod. In: Müller-Wille, M., Janin, V.L., Nosov, E. and Rybina, E. (editors) *Novgorod. Das mittelalterliche Zentrum im Norden Rußland. Studien zur Siedlungsgeschichte und Archäologie der Ostseegebiete*, Band 1. Neumünster, Wachholtz Verlag, pp. 125-132.

Yanin, V.L. 2002a Novgorod and Medieval Archaeology. In: Brisbane, M. and Gaimster, D. (editors) *Novgorod: Archaeology of the Medieval Town and its Hinterland, the proceedings of the session 'Knowing Novgorod: A case study in archaeological collaboration' at the European Association of Archaeologists annual meeting held in Bournemouth 14 - 19 September 1999. British Museum Occasional Paper 141*. London, 11-14.

Yanin, V.L. 2002b Tribute collectors' seals. In: Hather, J. (editor) *Novgorod wood*. London, UCL. In press.

Yanin, V.L. and Aleshkovsky, M.Kh. 1971 (Rus.) Янин, В.Л., Алешковский, М.Х. Происхождение Новгорода (к постановке проблемы). *История СССР*, 2, С. 32-61 (*Istoriia SSSR*, 2, pp. 3-61.)

Yanin, V.L. and Gaidukov, P.G. 1996 (Rus.) Янин, В.Л., Гайдуков, П.Г. Новгородский клад западноевропейских и византийских монет конца X – первой половины XI в. In: *Древнейшие государства Восточной Европы: 1994. Новое в нумизматике*. М., Наука, С. 151-170. (*Drevneishie gosudarstva Vostochnoi Evropy: 1994. Novoe v numizmatike*. Moscow, Nauka, pp. 151-170.)

Yanin, V.L. and Gaidukov, P.G. 1998 Janin, V.L. und Gaidukov, P.G. Ein Schatzfund aus Novgorod mit westeuropäischen und byzantinischen Münzen. In: *Studien zur Archäologie des Ostseeraumes: Von der Eisenzeit zum Mittelalter: Festschrift fuer Michael Müller-Wille*. Neumünster, Wachholtz Verlag, pp. 345-357.

Yanin, V.L., Rybina, E.A., Khoroshev, A.S., Gaidukov, P.G. and Sorokin, A.N. 1998 (Rus.) Янин, В.Л., Рыбина, Е.А., Хорошев, А.С., Гайдуков П.Г., Сорокин, А.Н. Работы Новгородской археологической экспедиции на Троицком раскопе в 1997 г. In: *Новгород и Новгородская земля. История и археология*, Вып. 12, Новгород, С. 5-9. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 12, Novgorod, pp. 5-9.)

Yanin, V.L., Rybina, E.A., Khoroshev, A.S., Gaidukov, P.G. and Sorokin, A.N. 1999 (Rus.) Янин, В.Л., Рыбина, Е.А., Хорошев, А.С., Гайдуков П.Г., Сорокин, А.Н. Работы Новгородской археологической экспедиции на Троицком раскопе в 1998 г. In: *Новгород и Новгородская земля. История и археология*, Вып. 13, Новгород, С. 5-9. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiia*, Вып. 13, Novgorod, pp. 5-9.)

Yanin, V.L., Rybina, E.A., Khoroshev, A.S., and Sorokin, A.N. 2000 (Rus.) Янин, В.Л., Рыбина, Е.А., Хорошев, А.С., Сорокин, А.Н. Работы Новгородской

археологической экспедиции на Троицком раскопе в 1999 г. Ип: *Новгород и Новгородская земля. История и археология*, Вып. 14, Новгород, С. 5-9. (*Novgorod i Novgorodskaya zemlia. Istoriia i Arkheologiiia*, Выр. 14, Novgorod, pp. 5-9.)

Yanina, S.A. 1956 (Rus.) Янина, С.А. Неревский клад куфических монет X века. Ип: *Труды Новгородской археологической экспедиции*, Том 1, МИА, 55, М. Наука, С. 180-207. (*Trudy Novgorodskoi arkheologicheskoi ekspeditsii*, Том 1, МИА, 55, Moscow, Nauka, pp. 180-207.)

Yanina, S.A. 1963 (Rus.) Янина С.А. Второй Неревский клад куфических монет X века. Ип: *Новые методы в археологии. Труды Новгородской археологической экспедиции*, Том 3, МИА №117, М., Наука, С. 287-331. (*Novye metody v arkheologii. Trudy Novgorodskoi arkheologicheskoi ekspeditsii*. Том 3, МИА, No. 117, Moscow, Nauka, pp. 287-331.)

Zerpe, L. 1989 Rosenkransar, epifyser och annat avfall från ett medeltida kammakeri i Visby. *Gotländsk Arkiv*, 61. Visby, pp. 105-122.

Zasurtsev, P.I. 1963 (Rus.) Засурцев, П.И. Усадьбы и постройки Древнего Новгорода. Ип: *Труды Новгородской археологической экспедиции*, Том 4, МИА, 123, М. Наука. (*Trudy Novgorodskoi arkheologicheskoi ekspeditsii*. Том 4, МИА, 123. Moscow, Nauka.)

List of Abbreviations

Comb terminology

D – comb depth

~d – average depth

dsc – degree of side concavity

dss – degree of side slope

H – comb height

Hcz – height of the central zone (simple combs)

hwr – height to average width ratio

PP – Kolchin's type name for rectangular combs with slender rectangular cross-sections

rd – relative depth

~rd – average relative depth

rh – relative height of the central zone (H_{cz}/H)(simple combs)

S – comb size (area of the comb face)

~S – average size

~Sa – average size of antler combs

~Sb – average size of bone combs

~Si – average size of ivory combs

tdr – coarse/fine teeth density (per 10mm) ratio

W – comb width

~W – comb average width $((W_t+W_b)/2)$

Wb – width of the bottom edge of the comb

Wt – width of the top edge of the comb

Arrangement of rivets (class 3 combs)

Po – sets of pairs of rivets arranged obliquely

Pv – sets of pairs of rivets arranged vertically

R1(hf) – a single row of rivets placed at a high frequency

R1(lf) – a single row of rivets placed at a low frequency

R2(hf) – two rows of rivets placed at a high frequency

R2(lf-offset) – two rows of rivets placed offset at a low frequency

Decorations

- CH – cross-hatching
- CHr – cross-hatching pattern carved in relief
- CQ - chequers
- CV – chevrons
- D – dots
- F - foliate
- Fl – flutes
- FH – free-hand
- Ft – fillets
- Gr – deep longitudinal groove (grooves) in the centre of the side plates
- IL(c-RDE) – interlaced circular, incorporating ring-and-dot elements
- IL(L) – interlaced linear (horizontally oriented)
- IL(Lv) – interlaced linear (vertically oriented)
- IL(RDE-Lo) – interlaced linear, incorporating ring-and-dot elements and oblique lines
- ILr(RDE-Iv-Lo) – interlaced linear in relief, incorporating ring-and-dot elements, V-shaped incisions and oblique lines
- IUB - bands of multiple U-shaped incisions
- IVB – bands of multiple V-shaped incisions
- IVMB – bands of meander motifs formed by alternating V-shaped incisions
- L – linear incisions
- Lh – linear horizontal incisions
- LhvR – composition of horizontal and vertical lines in relief
- Lm – linear marginal incisions
- LM – meandering line of a series of short incisions inclined at angles in alternate directions
- LMr – meandering line in relief
- Lo – linear oblique incisions
- Lv – linear vertical incisions
- LW – waving incised line
- OW – open-work
- P/colour – painted decoration
- RDB – ring-and-dot bands

RDC - ring-and-dot carpet decorations

RDE – ring-and-dot elements

RDEbr - ring-and-dot elements carved in bas-relief

RDF - ring-and-dot florets

S – saltire, a single motif

SB – a band of saltire motifs

SB(Lv) - a band of saltire motifs with vertical incisions in the triangle zones along the edges

SB2 - a double band of saltire motifs

Sites

Dm – Dmitrievsky

Dub - Duboshin

Fed – Fedorovsky

Il – Il'insky

Kir - Kirovsky

Kozm – Kozmodemyansky

Liud – Liudogoshchensky

Mikh – Mikhailovsky

Mikh-Ark – Mikhailo-Arkhangelsky

Ner – Nerevsky

Nut – Nutny

Rog – Rogatitsky

RG – Rytic Gorodishche

Tikh – Tikhvinsky

Torg - Torgovy

Tr - Troitsky

Institutions

ARC – Archaeological Research centre (at Novgorod State Museum)

EAA – the European Association of Archaeologists

IIMK – Institute of the History of Material Culture (Russian Academy of Sciences)

MSU – Moscow State University (M.V.Lomonosov's)

NSM – Novgorod State Museum

NGM(SR) - Novgorod State Museum, Staraiia Russa affiliate

NSU – Novgorod State University

PGM – Pskov State Museum

RAN – Russian Academy of Sciences

RGM – Riazan State Museum

SH – State Hermitage (St.-Petersburg)

SHM – Russian State Historical Museum (Moscow)

Publications

BAR – British Archaeological Reports

KSIA – Kraikie soobshcheniia Instituta Arkheologii

KSIA UkSSR– Kratkie Soobshcheniia Instituta Arkheologii Ukr.SSR

MAR – Materialy po arkheologii Rossii

MIA – Materialy i issledovaniia po arkheologii SSSR

RA – Rossiiskaia arkheologiia (= continuation of SA)

SA – Sovetskaia arkheologiia

SAI – Svod Arkheologicheskikh Istochnikov