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

(Volume 2)

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[illegible]

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Fig. 1.1 An example of a database entry

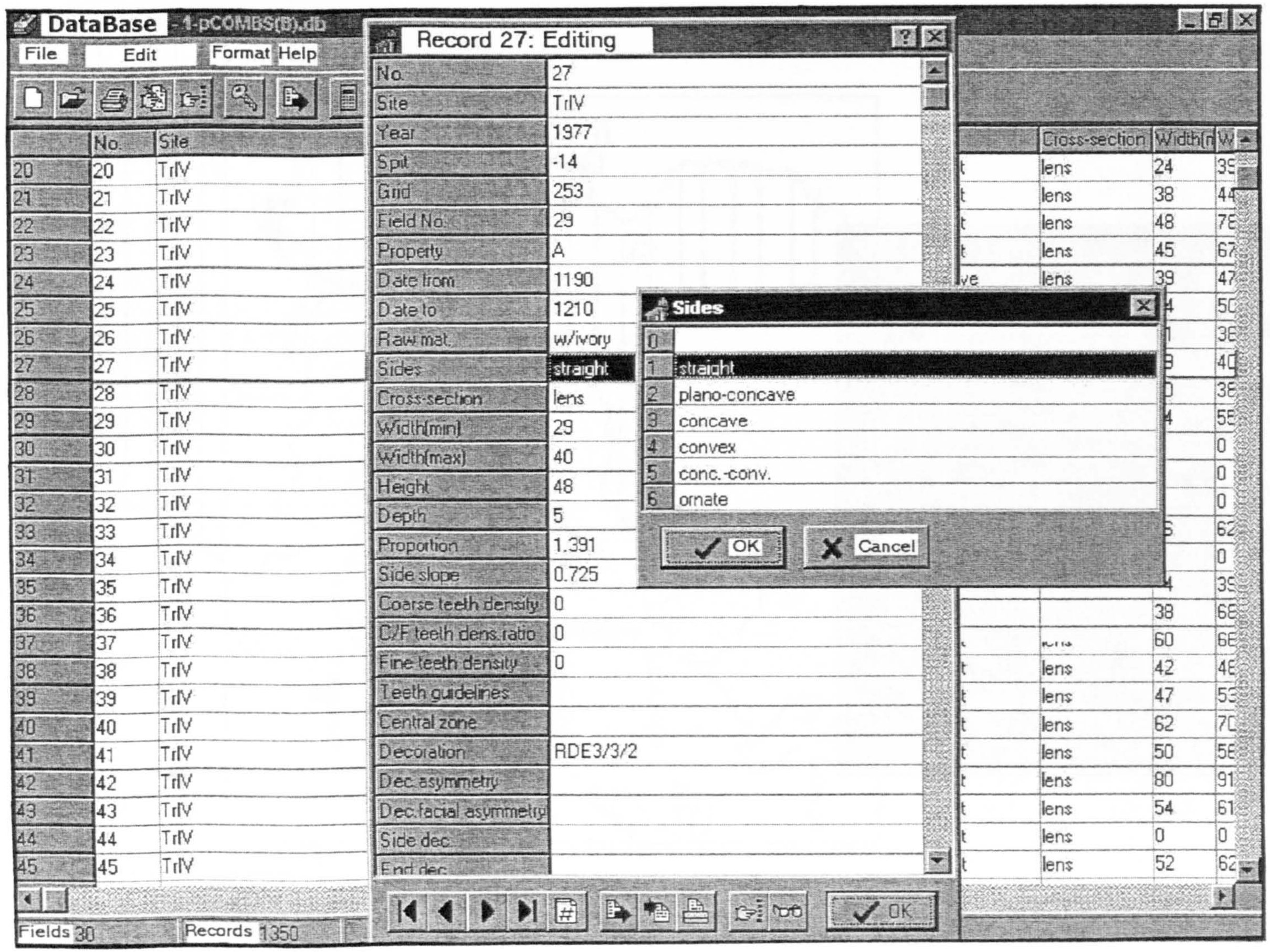


Fig. 1.2 Novgorod in the Northern European context

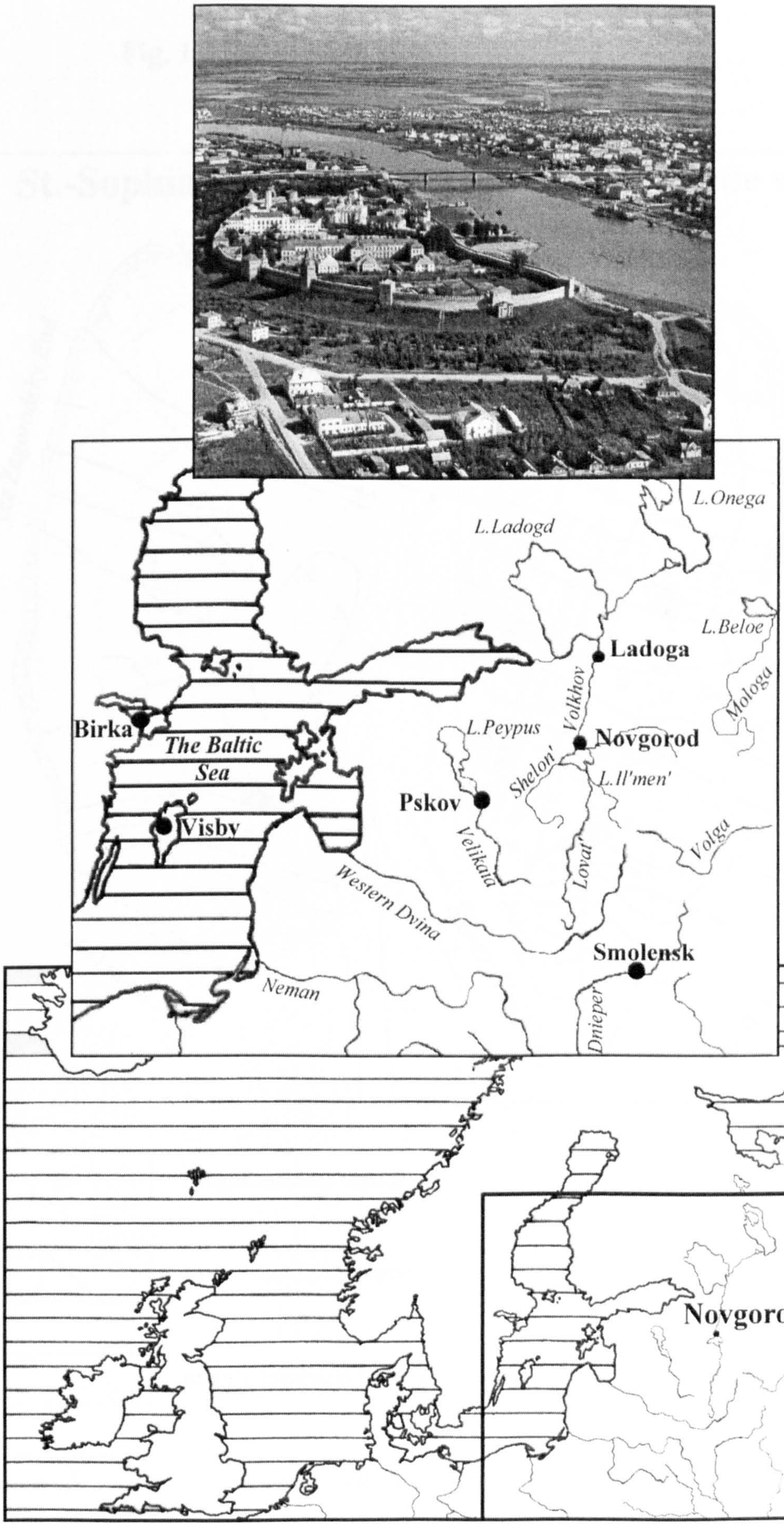


Fig. 1.3 Excavation sites in Novgorod

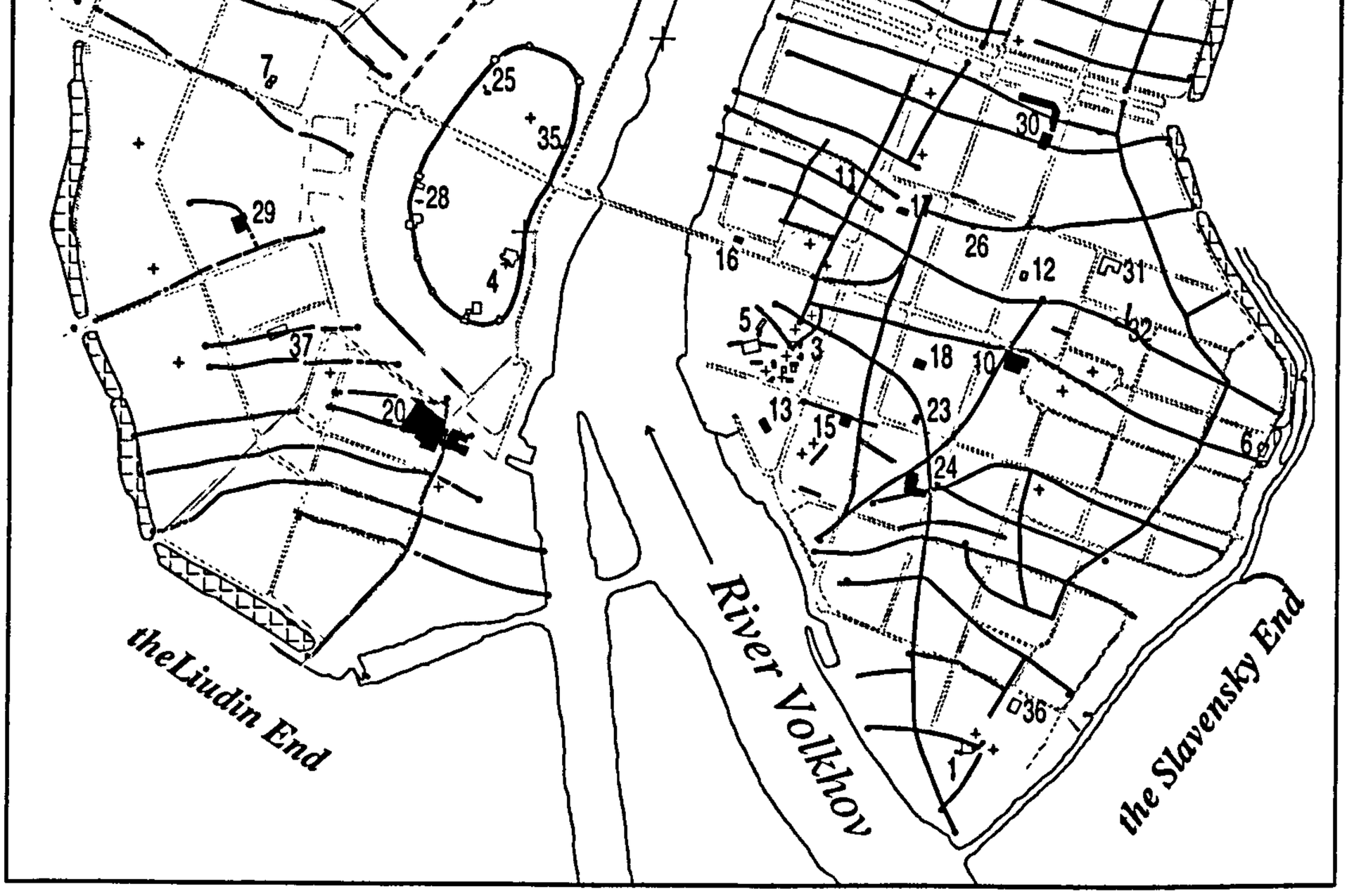
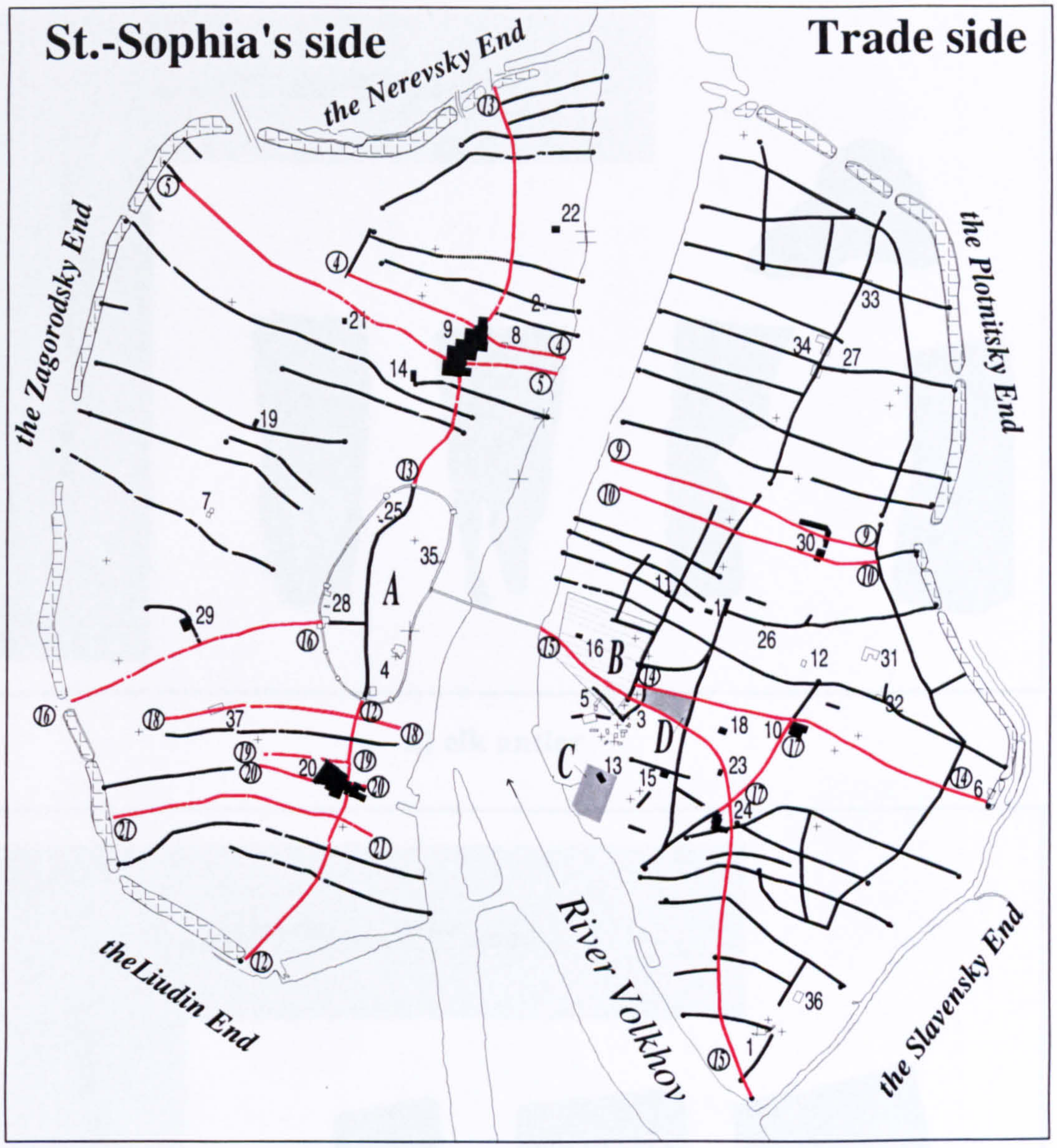


Fig. 1.4 The location of Novgorod excavation sites within the town's medieval layout



A - Kremlin
B - market
C - the Gotland Quarter (Gotsky dvor)
D - the German Quarter (Nemetsky dvor)

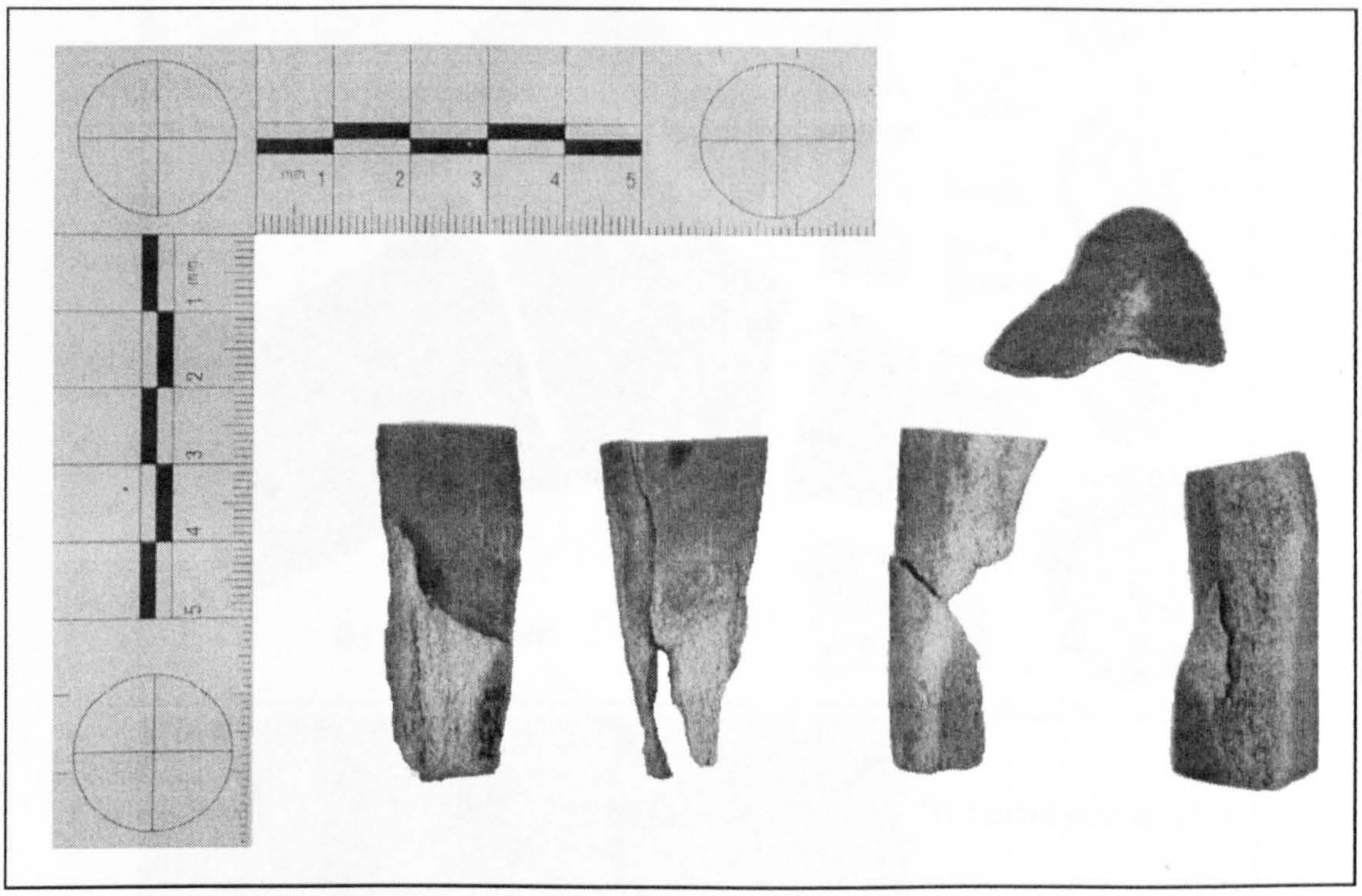
30 — excavation sites referred to in the thesis

16 — medieval streets (with their reference numbers) mentioned in the thesis

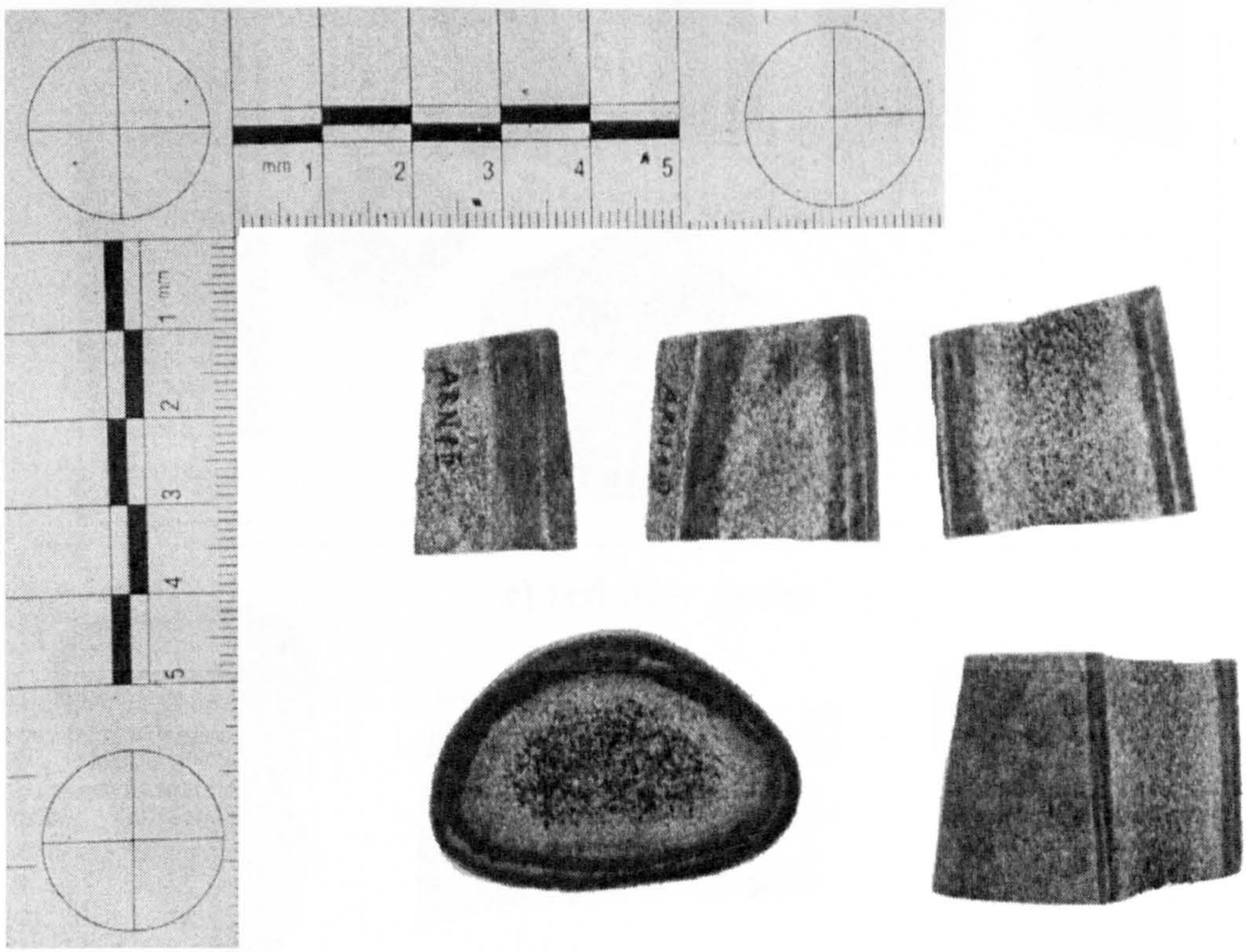
Street reference numbers:

4 - Kholopia
5 - Kuzmodemianskaia
9 - Korzheva
10 - Slavkova
12 - Proboinaia
13 - Velikaia
14 - Il'ina
15 - Slavnaia
16 - Prusskaia
17 - Duboshin
18 - Dobrynia
19 - Iarysheva
20 - Chernitsina
21 - Riadiatina

Fig. 2.1 Samples of archaeological antler

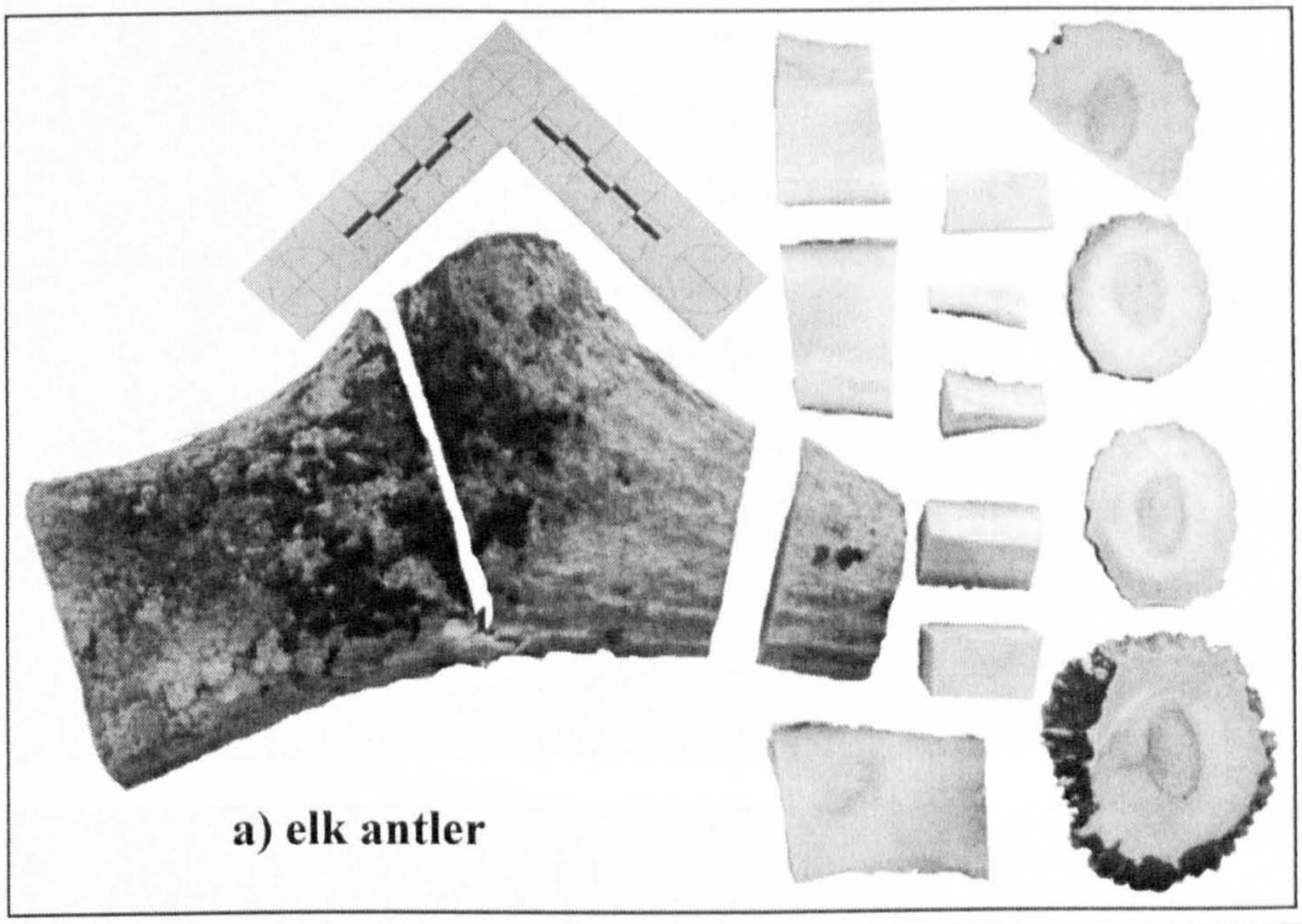


a) elk antler

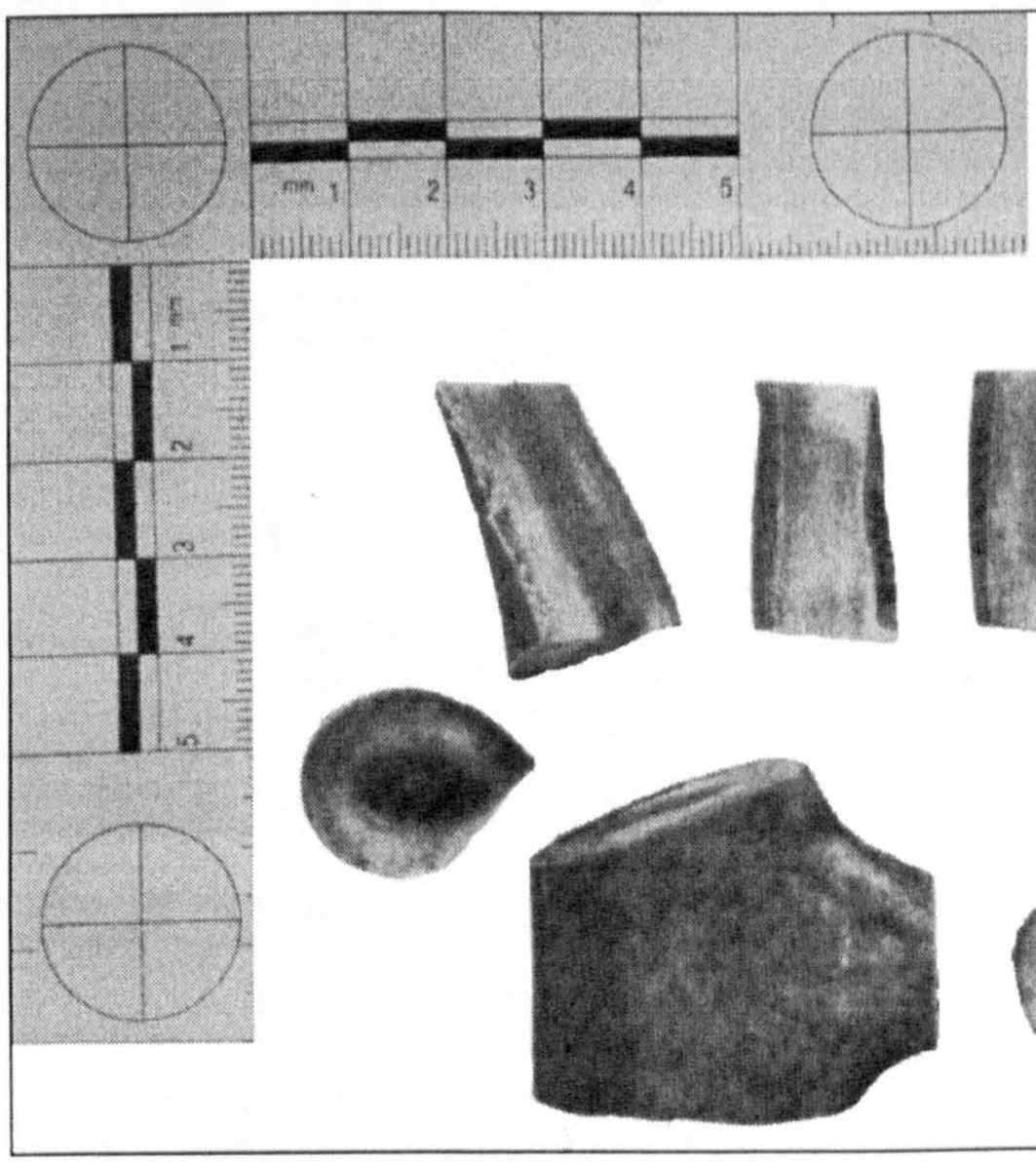


b) reindeer antler

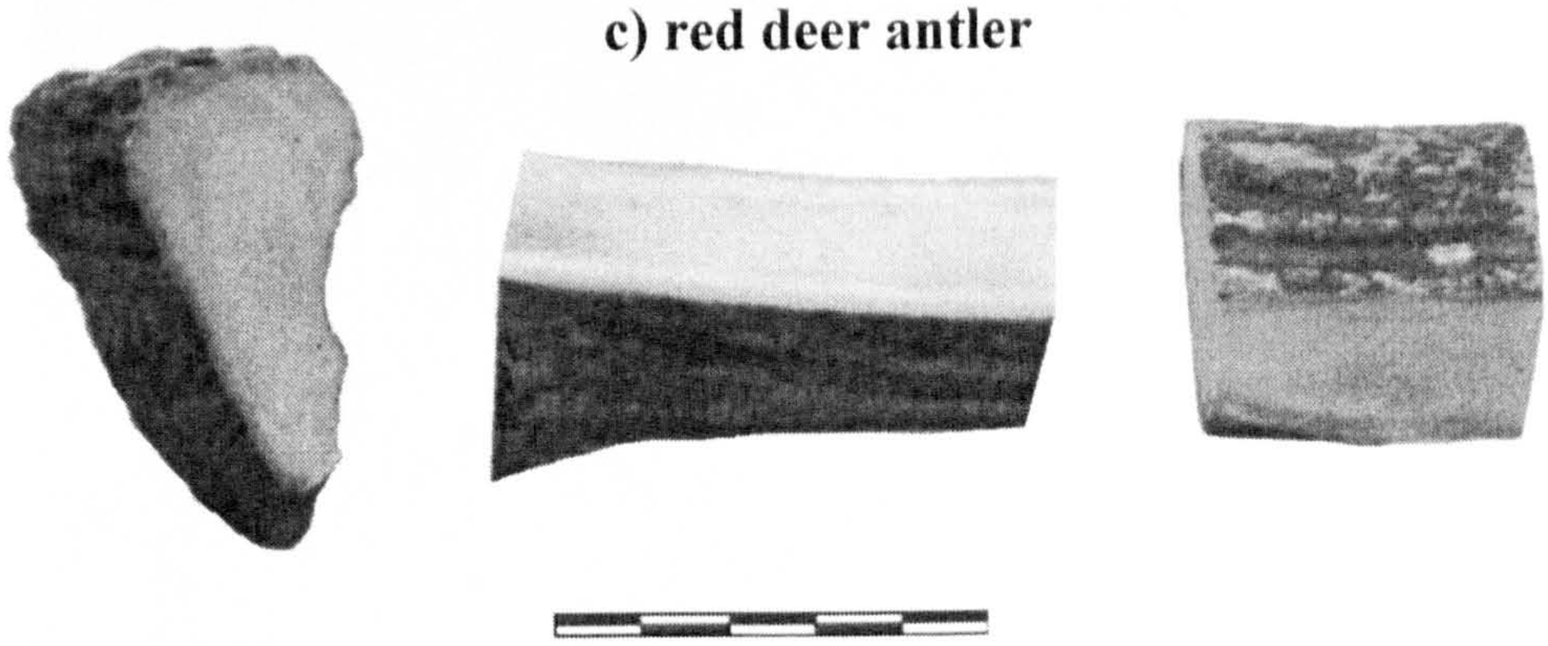
Fig. 2.2 Samples of modern antler



a) elk antler

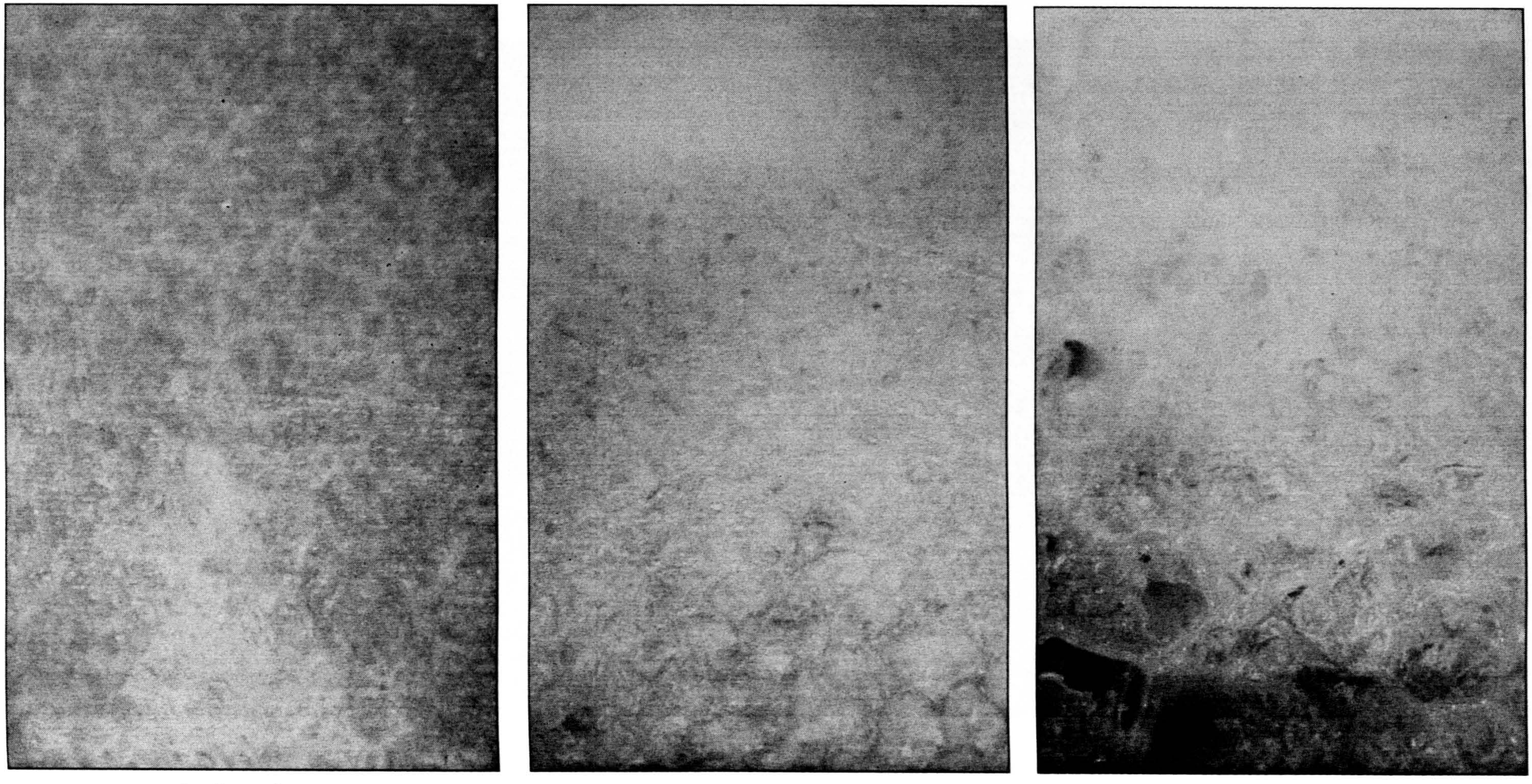


b) reindeer antler



c) red deer antler

Fig. 2.3 Micro structure of antlers. Transverse sections of beams in reflected light (x12)

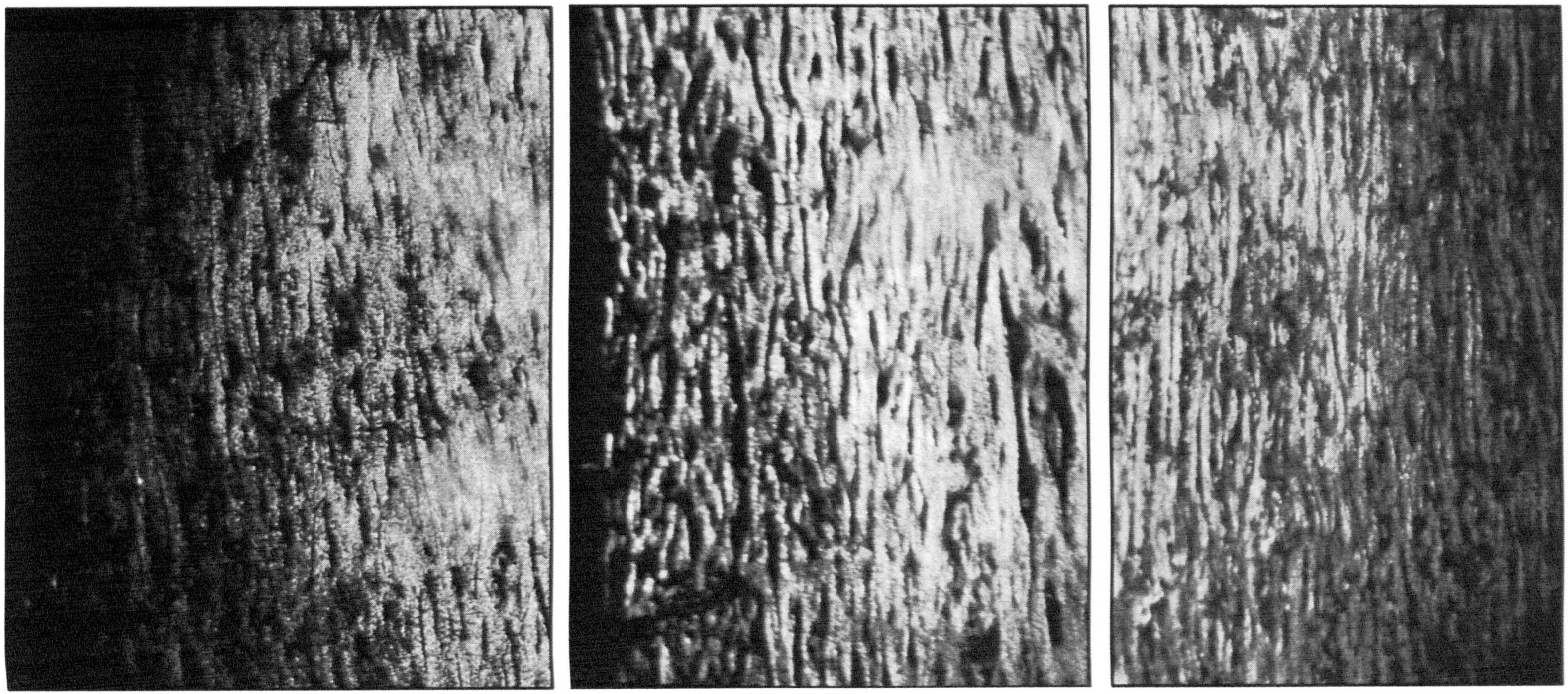


a) elk antler

b) reindeer antler

c) red deer antler

Fig. 2.4 Micro structure of antlers. Longitudinal thin section through compacta of beams (x 12)



a) elk antler

b) reindeer antler

c) red deer antler

Fig 2.5 Primary classification of combs

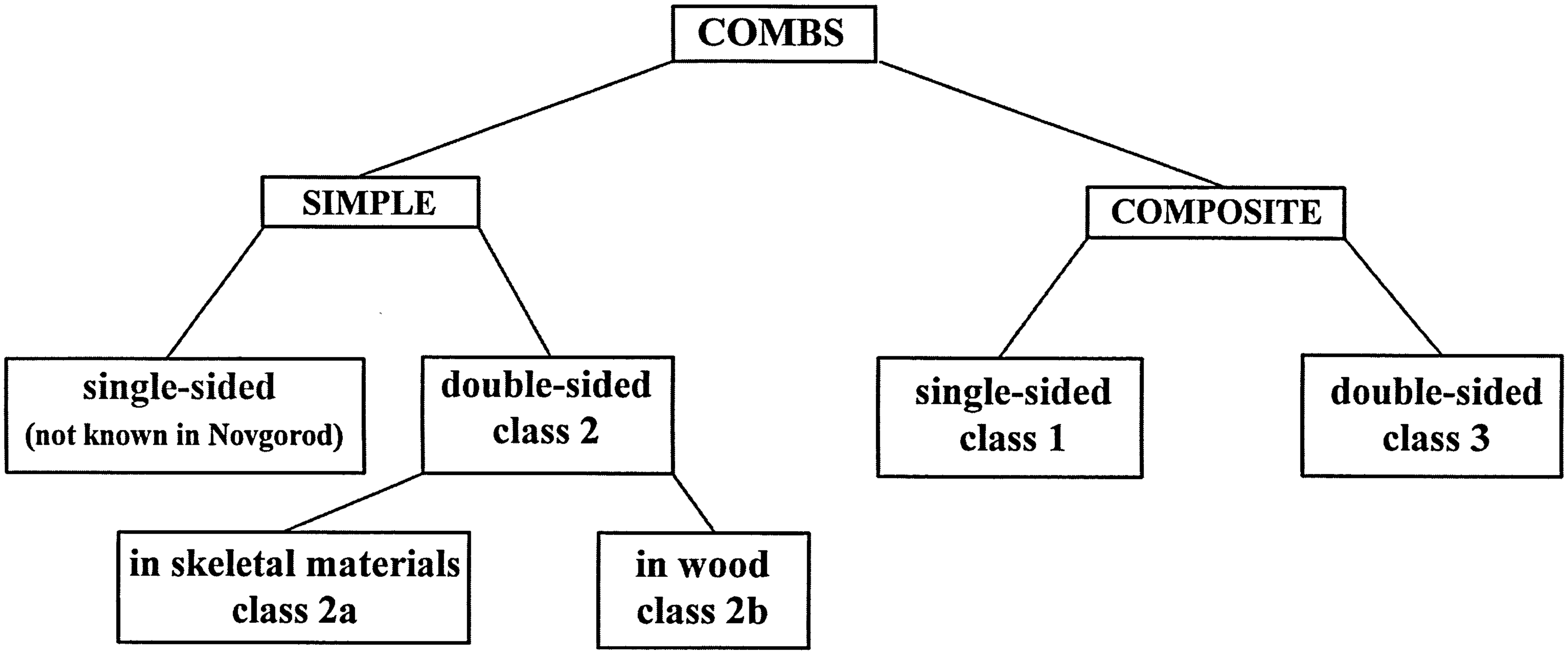


Fig. 2.6 Measurements of combs and their parts

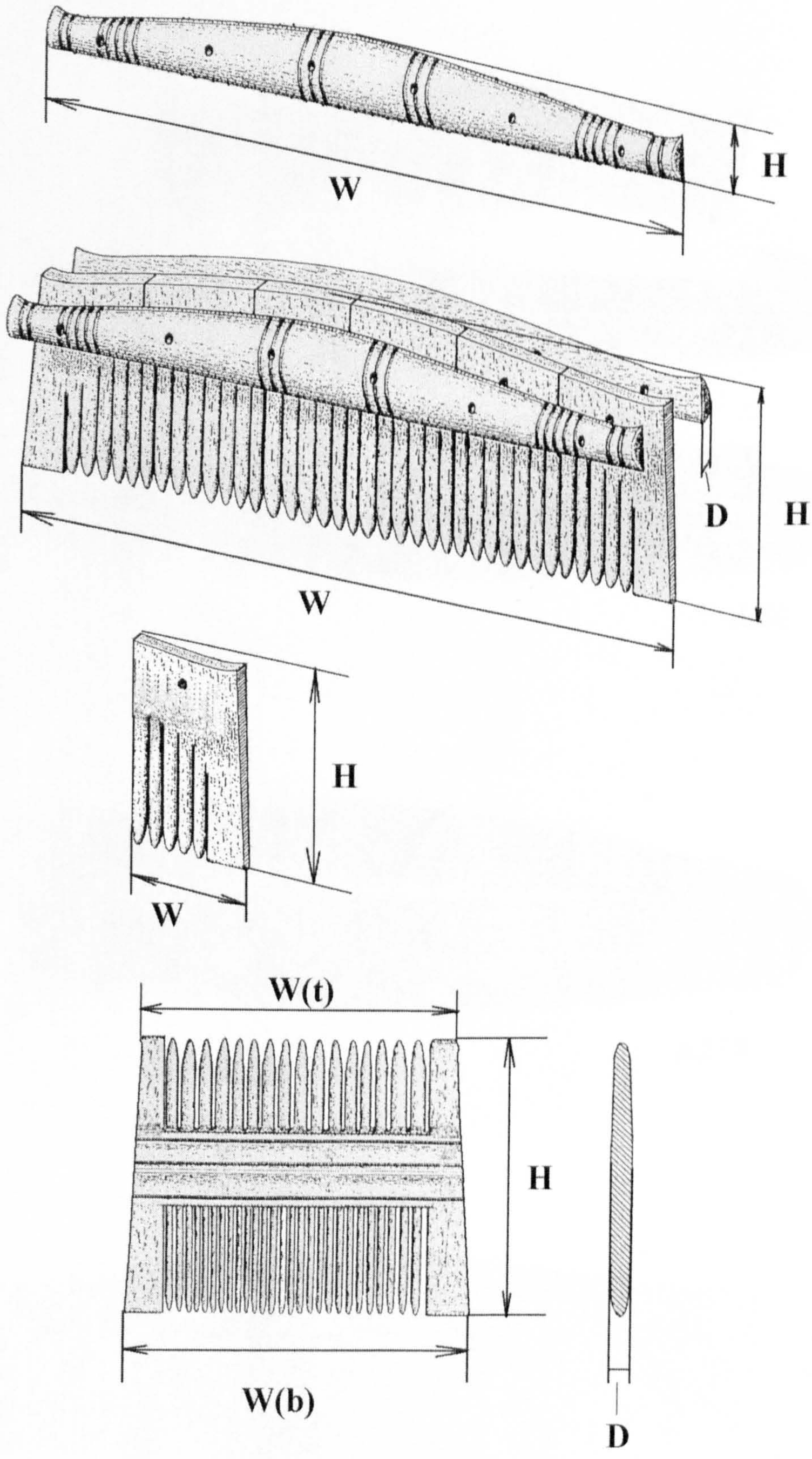
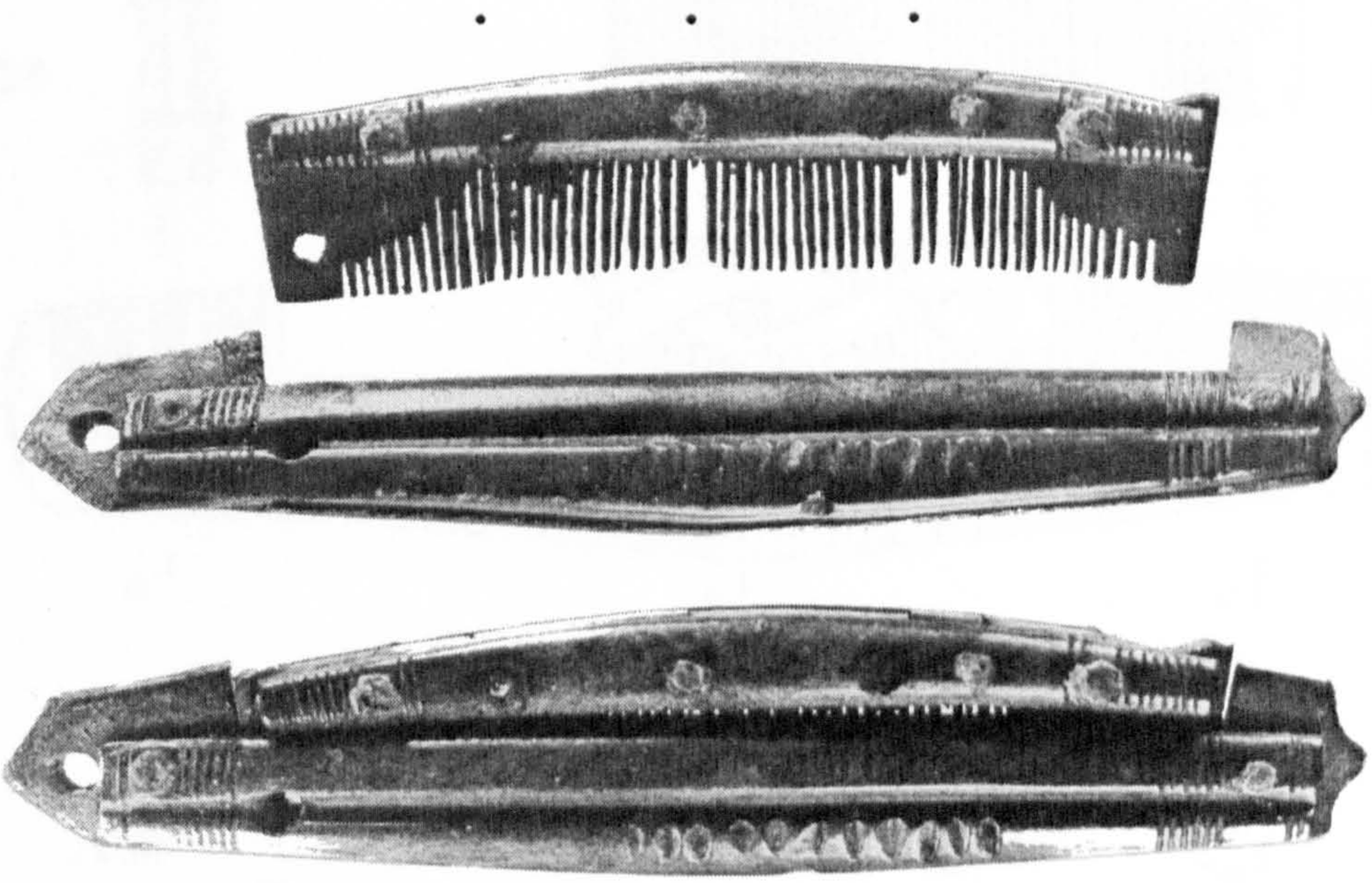
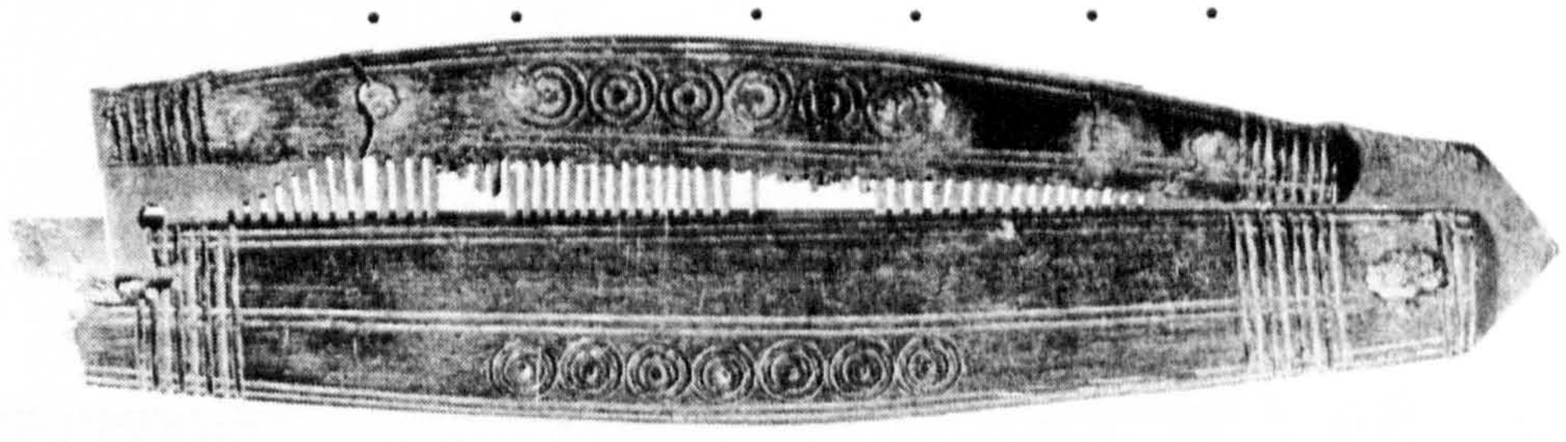


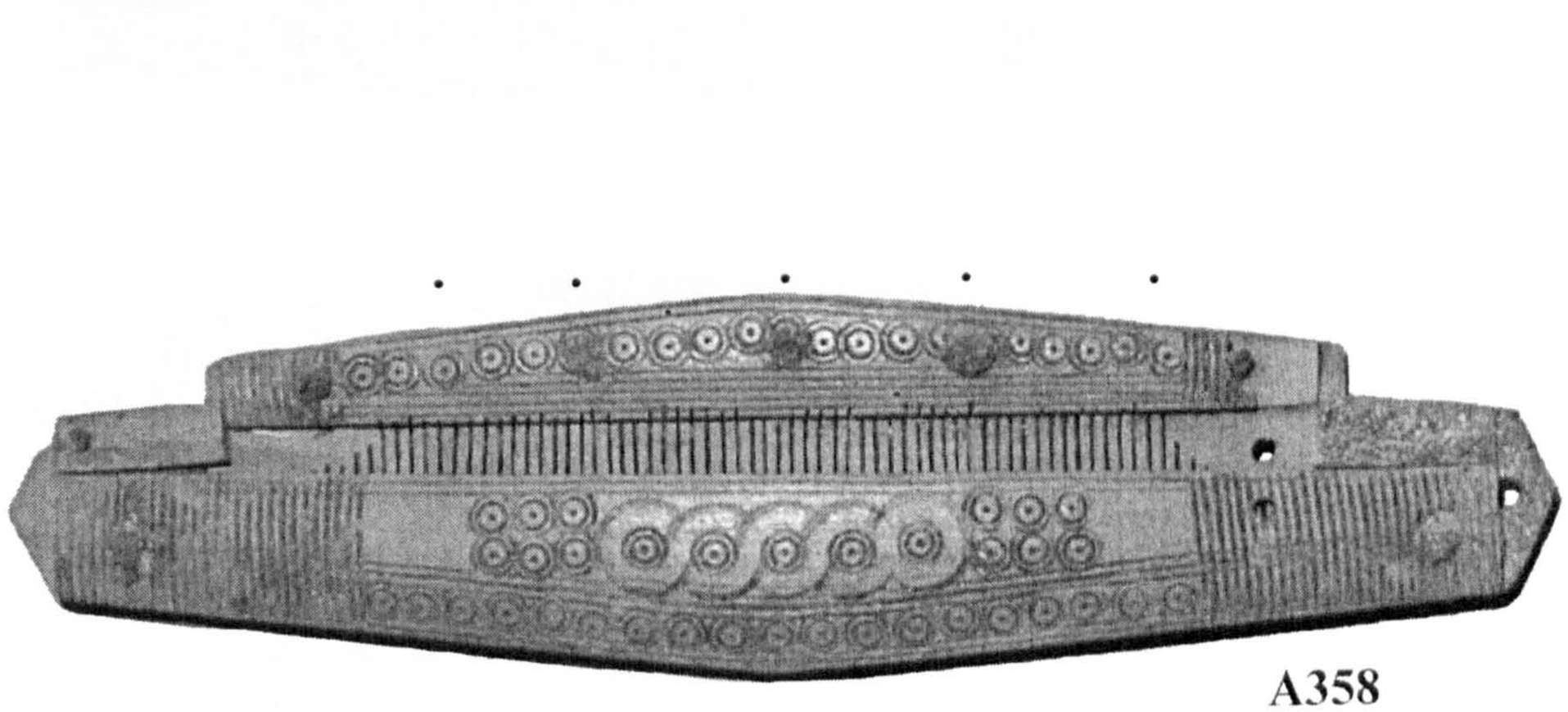
Figure 3.1 Sets of combs and cases



A54



A218



A358

Fig. 3.2 Sets of combs and cases (A16, A29) and matching pairs (A50-A51, A191-A197)

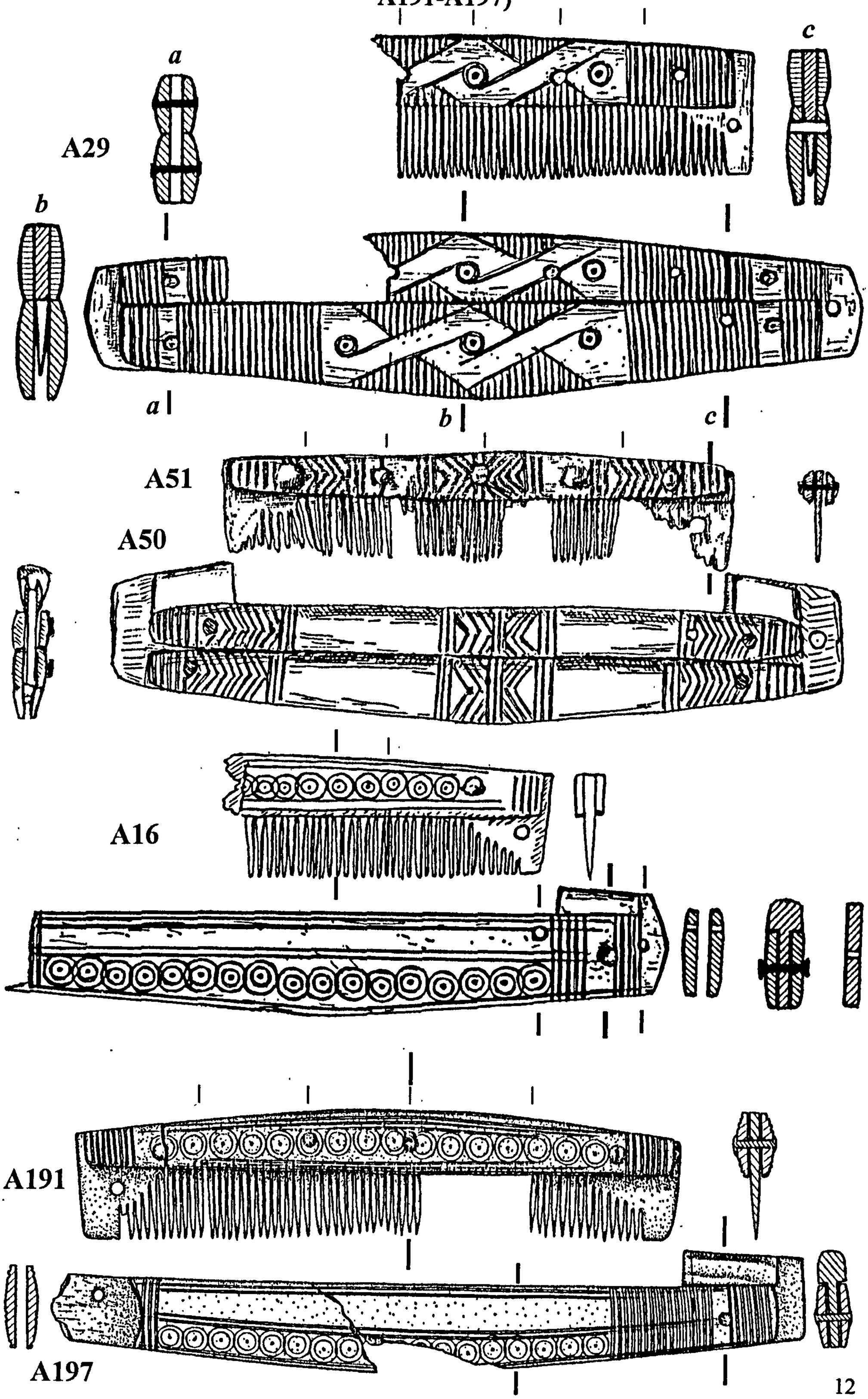
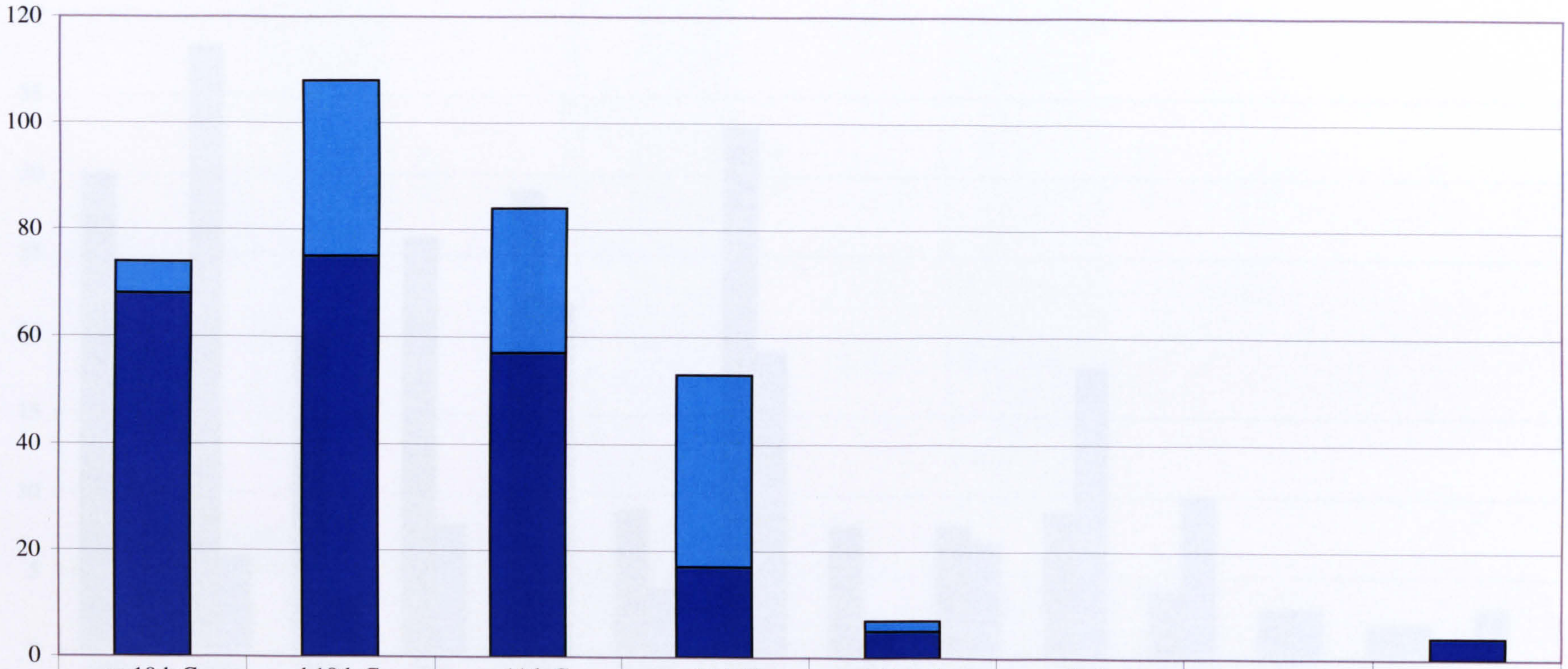


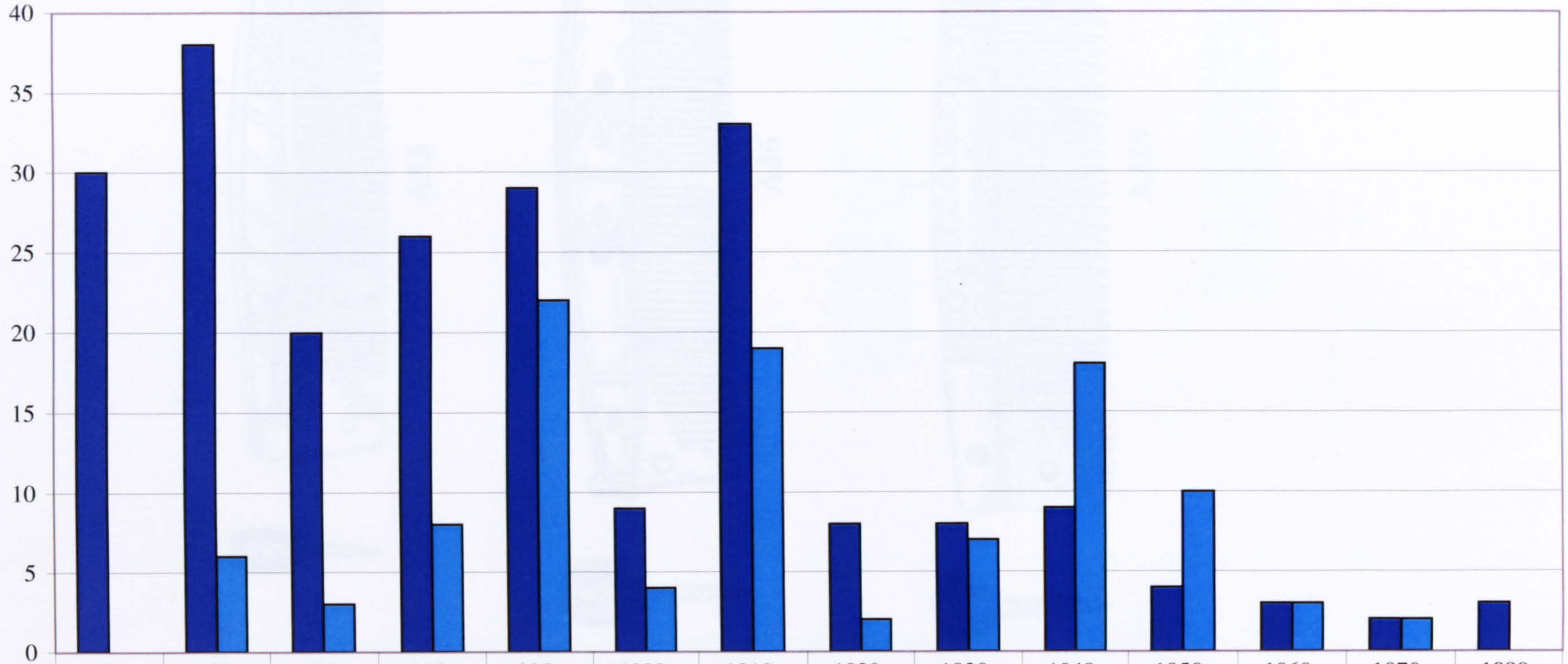
Fig. 3.3
Single-sided composite combs and comb cases. Chronological distribution (a)



	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C	e.12th C	m.12th C	l.12th C
comb cases	6	33	27	36	2	0	0	0
combs	68	75	57	17	5	0	0	4

Σ (case/comb) 330 (104/226)

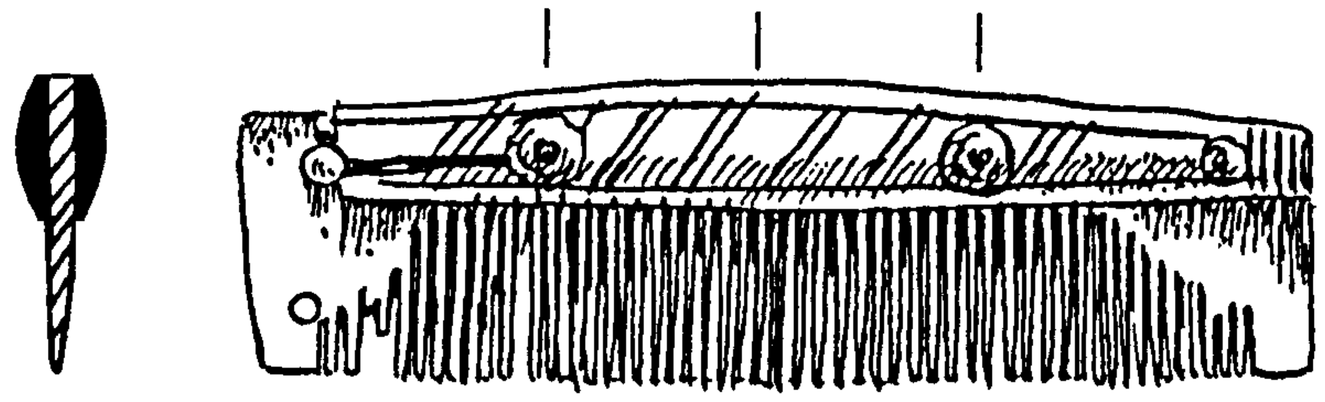
Fig. 3.4
Single-sided composite combs and comb cases. Chronological distribution (b)



	950s	960s	970s	980s	990s	1000s	1010s	1020s	1030s	1040s	1050s	1060s	1070s	1080s
combs	30	38	20	26	29	9	33	8	8	9	4	3	2	3
comb cases	0	6	3	8	22	4	19	2	7	18	10	3	2	0

Σ (comb/case) 326 (222/104)

Fig. 3.5 Single-sided composite combs designed to be kept in composite cases when not in use



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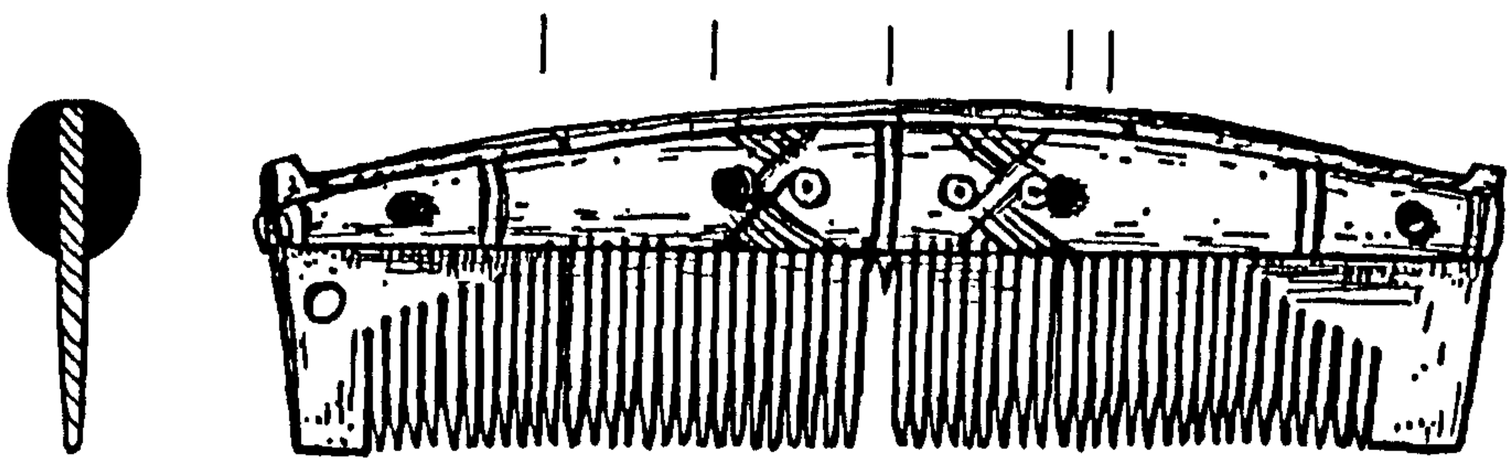

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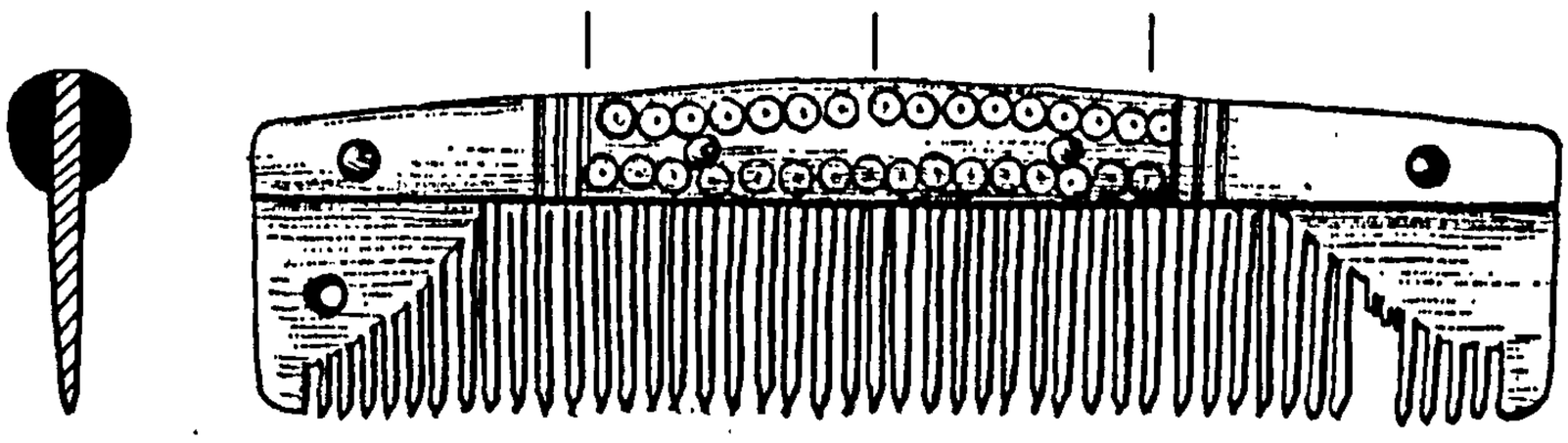
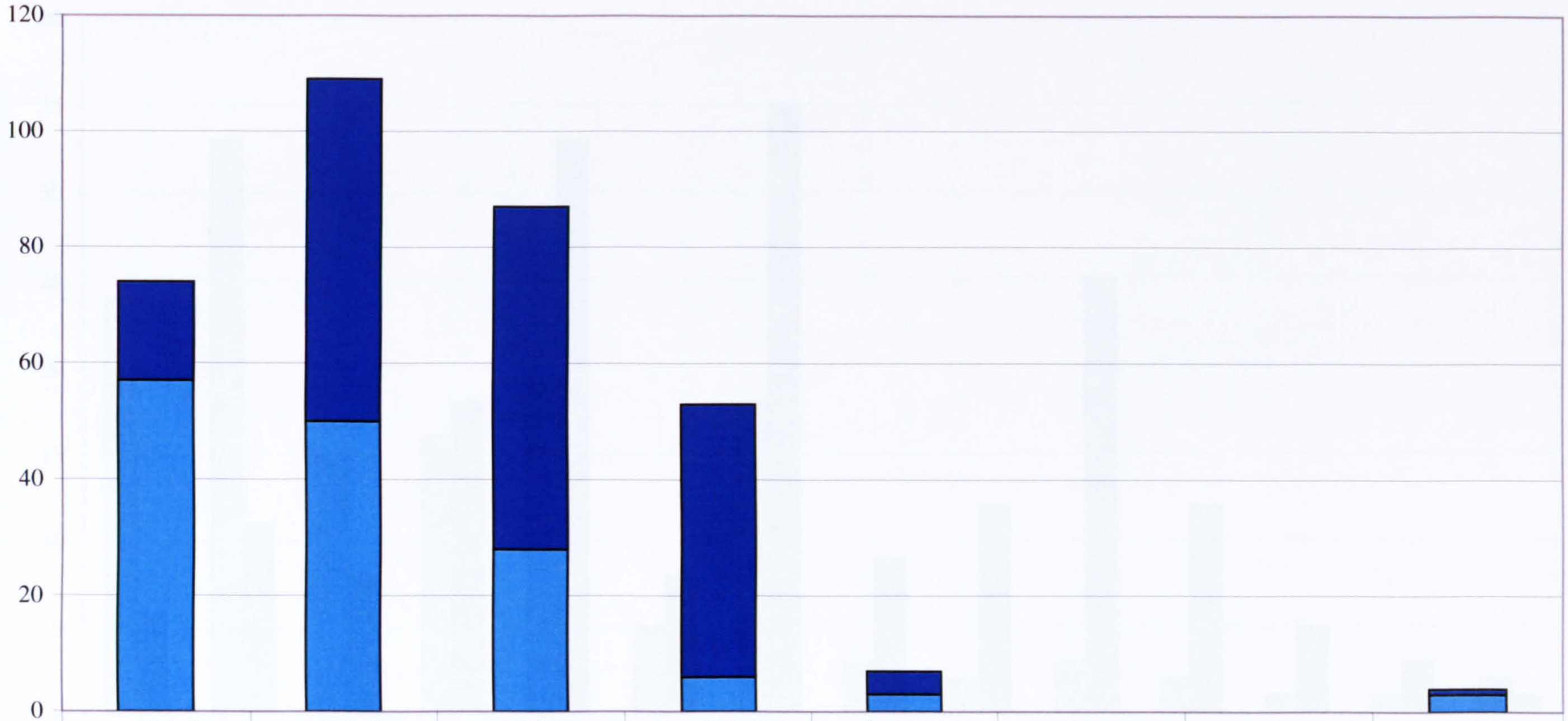


A329

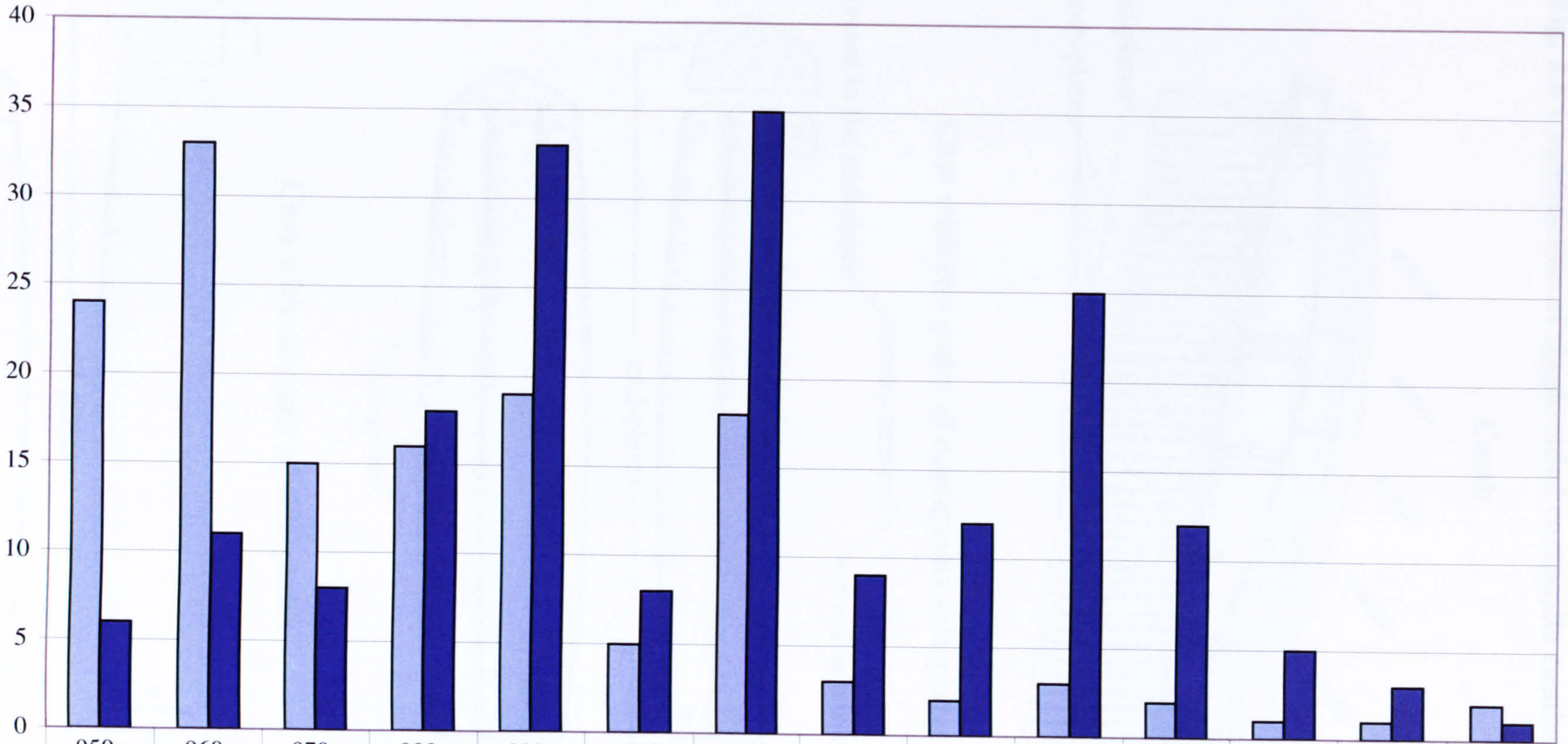
Fig. 3.6 Single-sided composite combs. Chronological distribution (c)



	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C	e.12th C	m.12th C	l.12th C
cased combs	17	59	59	47	4			1
uncased combs	57	50	28	6	3			3

Σ 334 (187/147)

Fig. 3.7 Single-sided composite combs. Chronological distribution (d)



	950s	960s	970s	980s	990s	1000s	1010s	1020s	1030s	1040s	1050s	1060s	1070s	1080s
non-cased combs	24	33	15	16	19	5	18	3	2	3	2	1	1	2
cased combs	6	11	8	18	33	8	35	9	12	25	12	5	3	1

Σ 330 (144/186)

Fig. 3.8 Construction of single-sided composite combs and cases

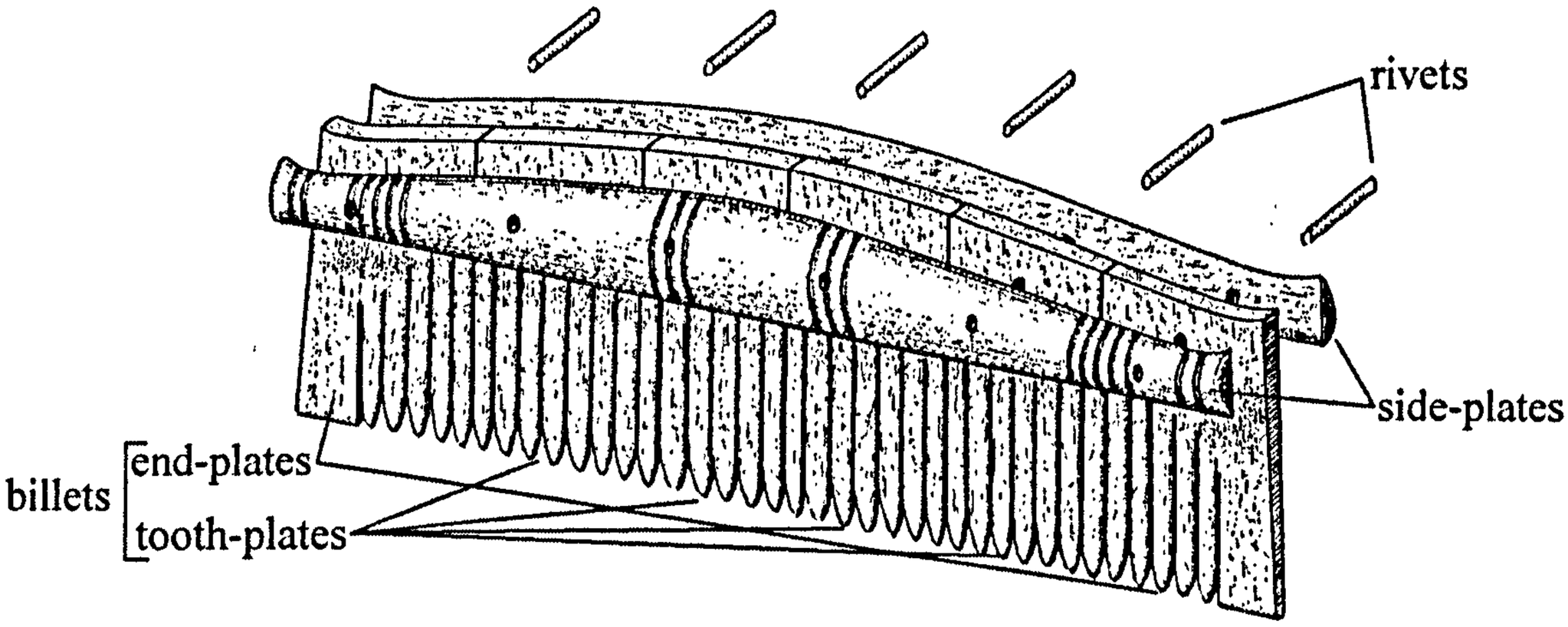


Fig. 3.9 Comb A336 of unusual construction

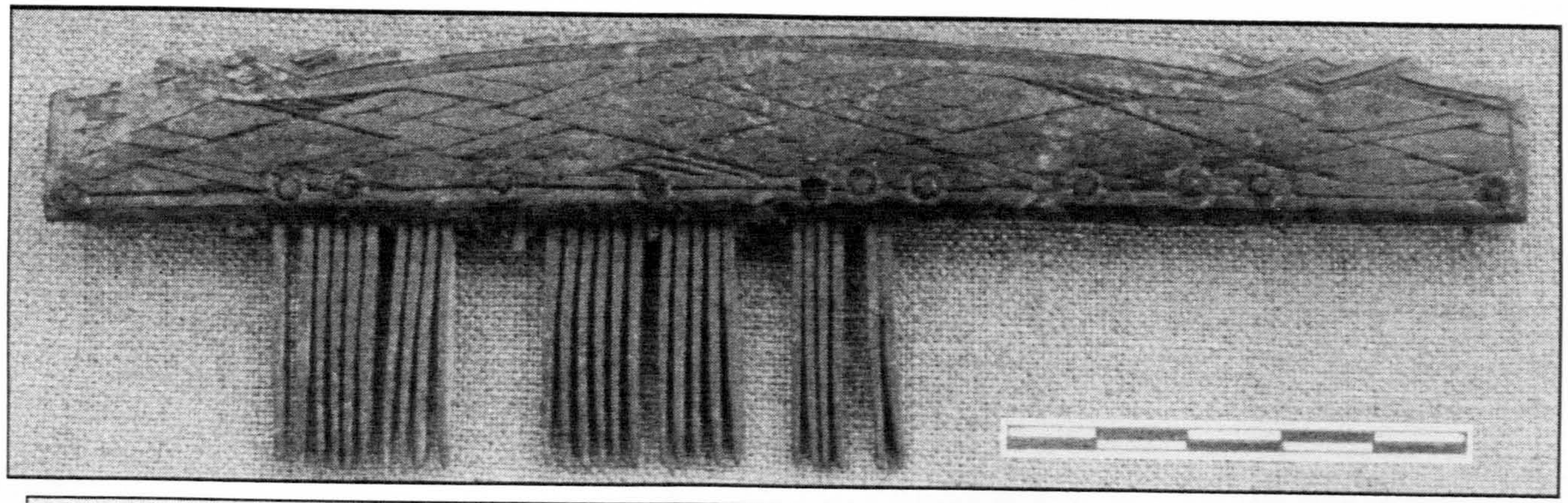
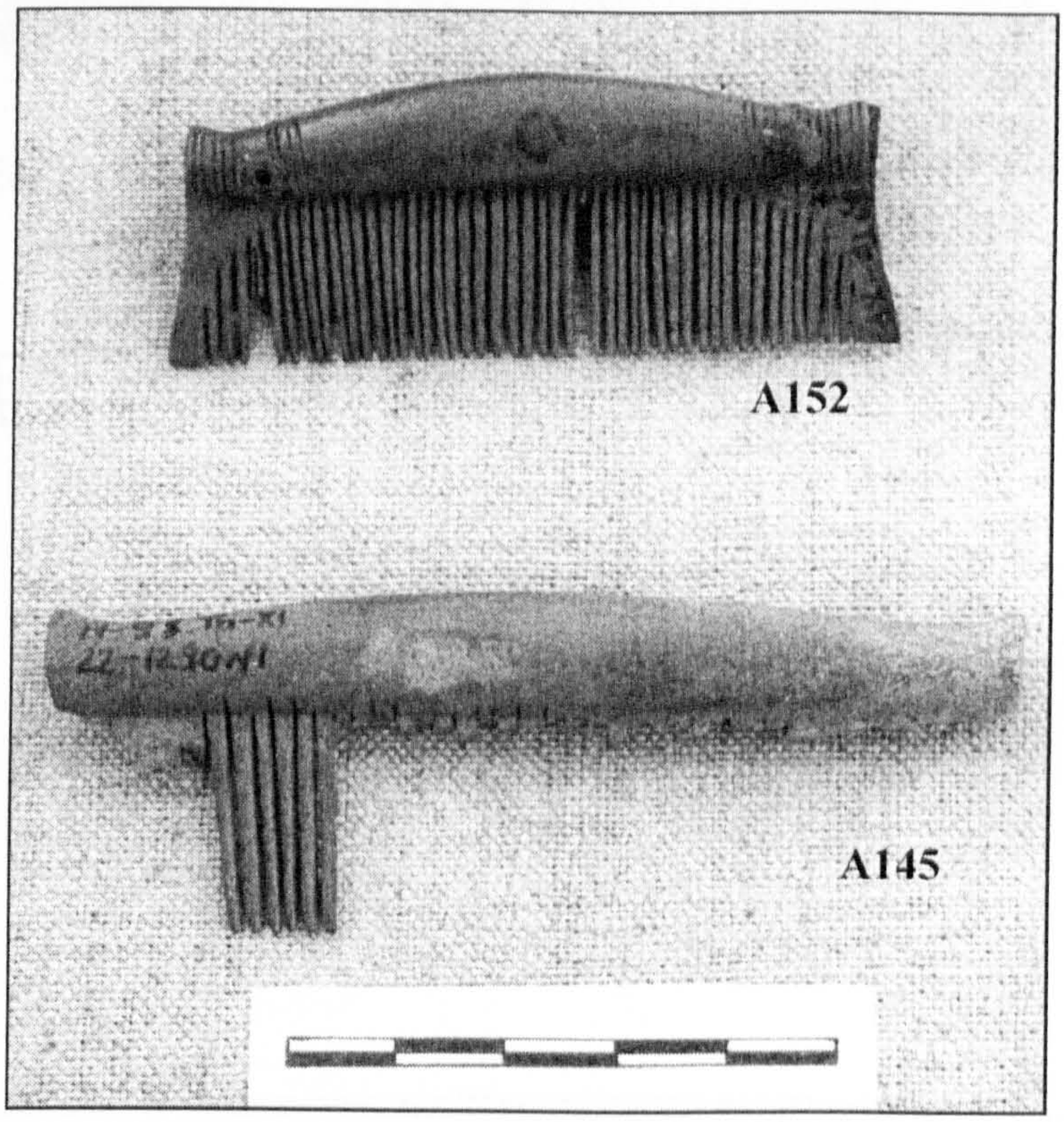


Fig. 3.10 One-billeted comb A152 and simple comb A145 carved to resemble the form of a composite comb



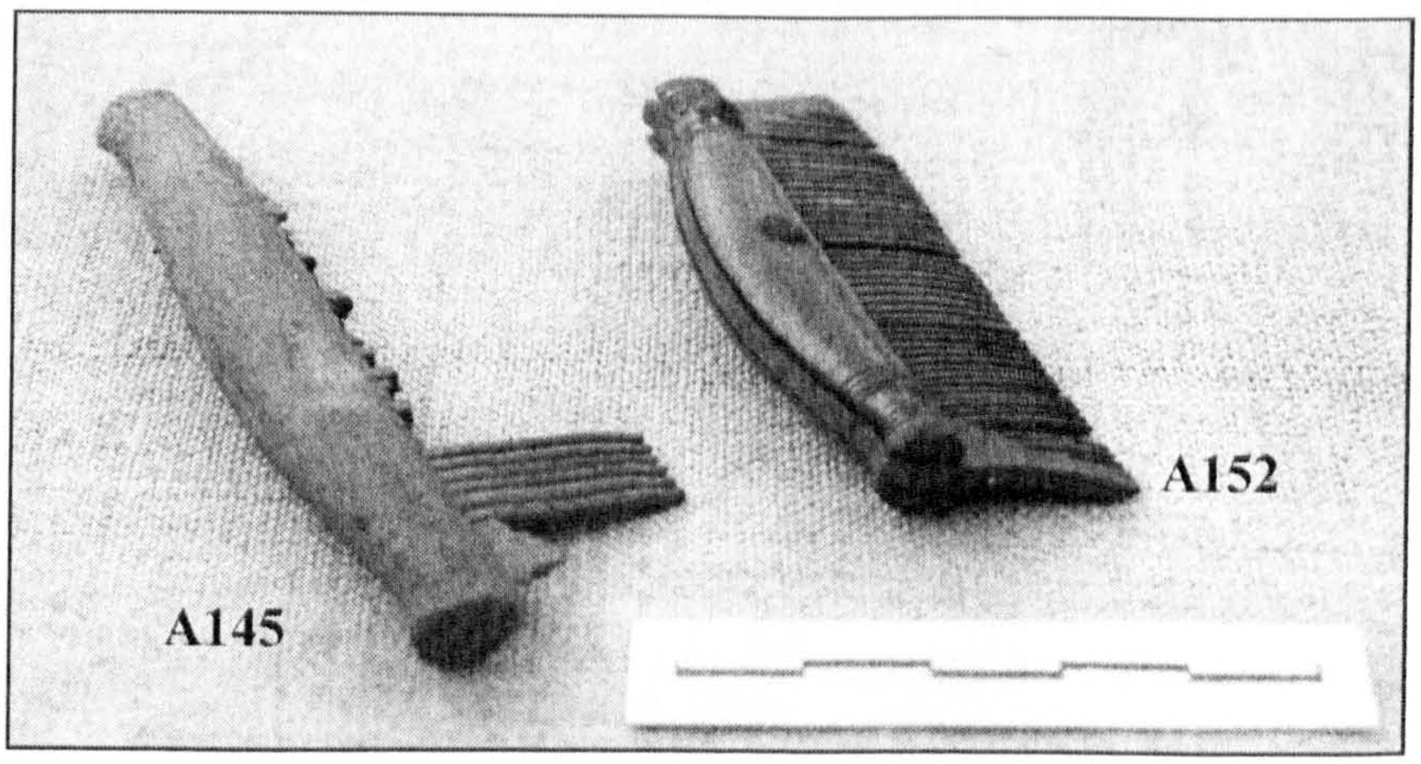
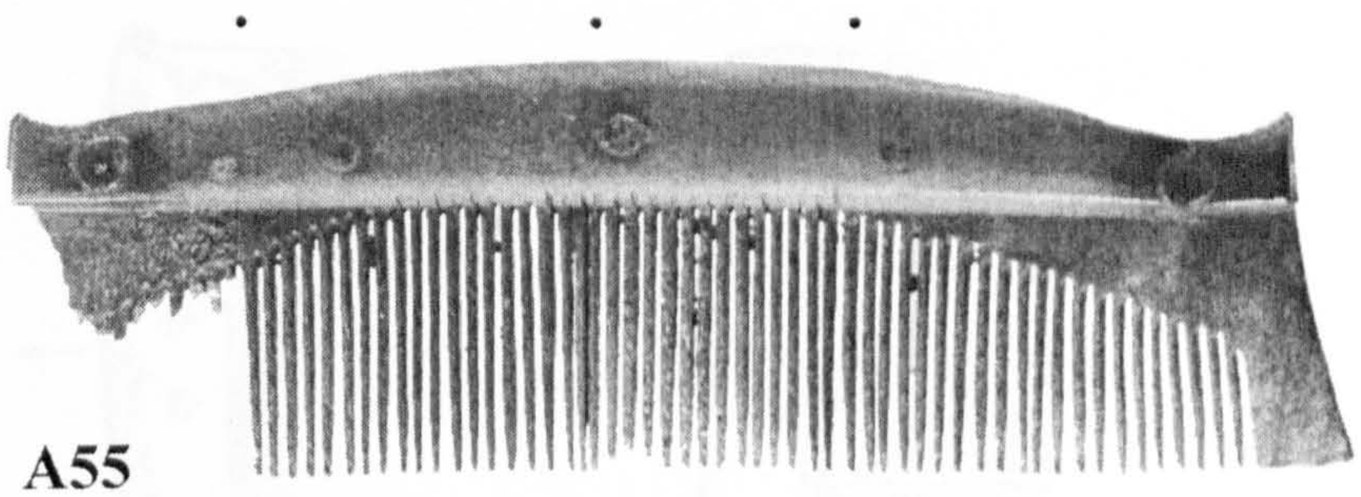


Fig. 3.11 Combs with varying width of billets in assembly



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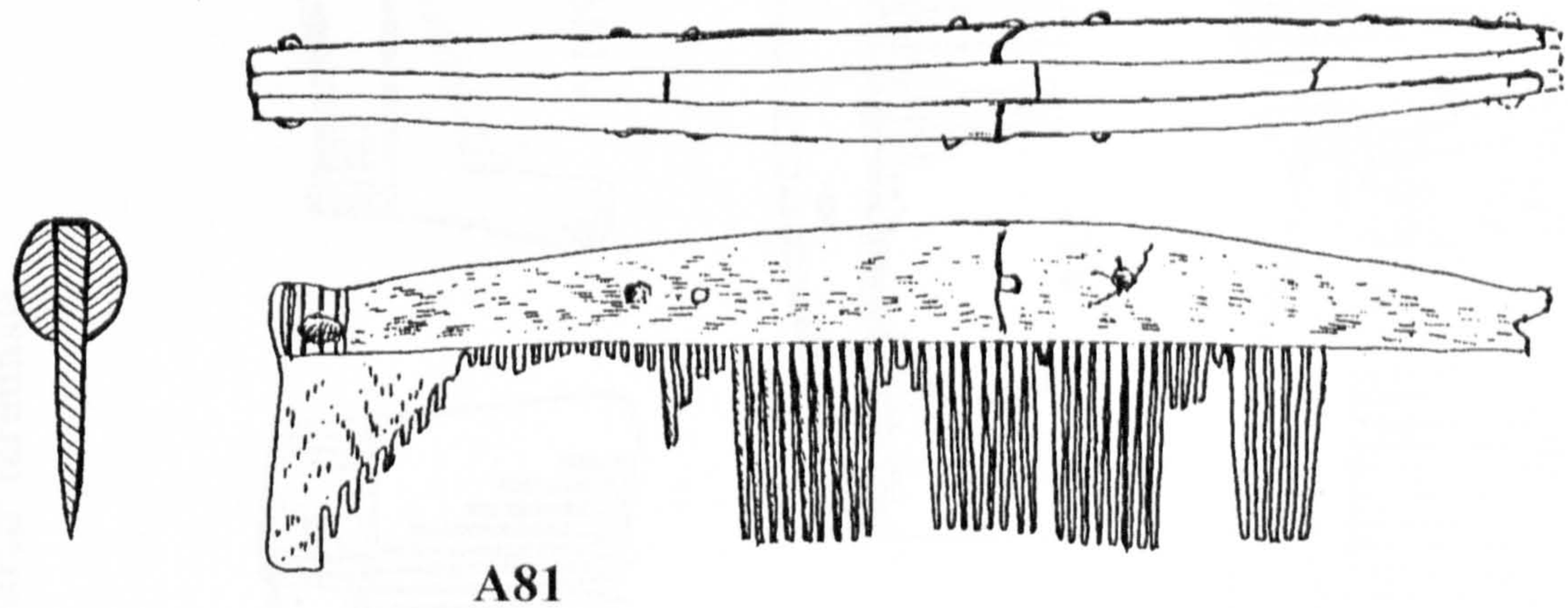

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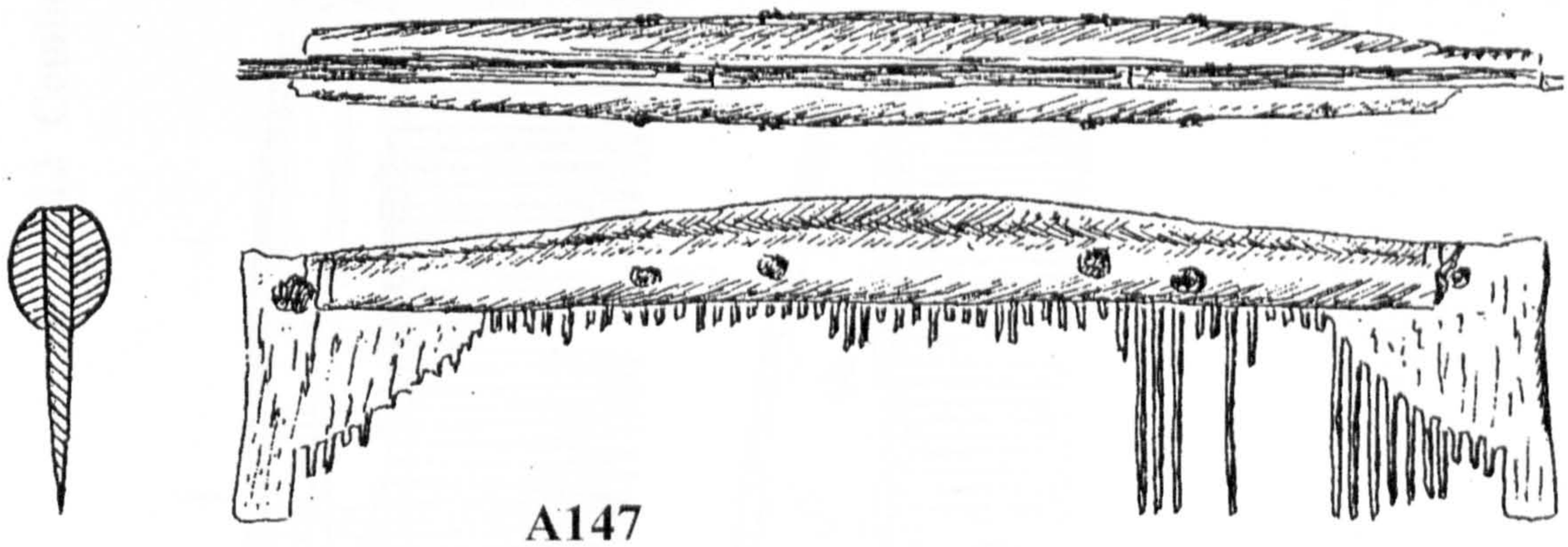

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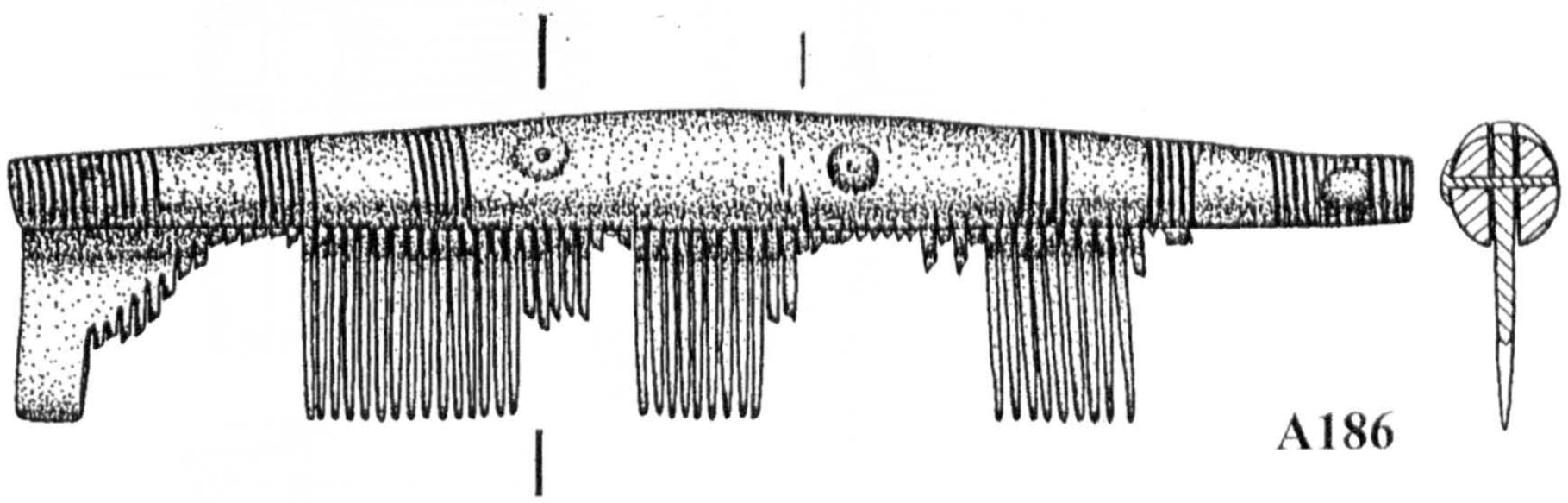
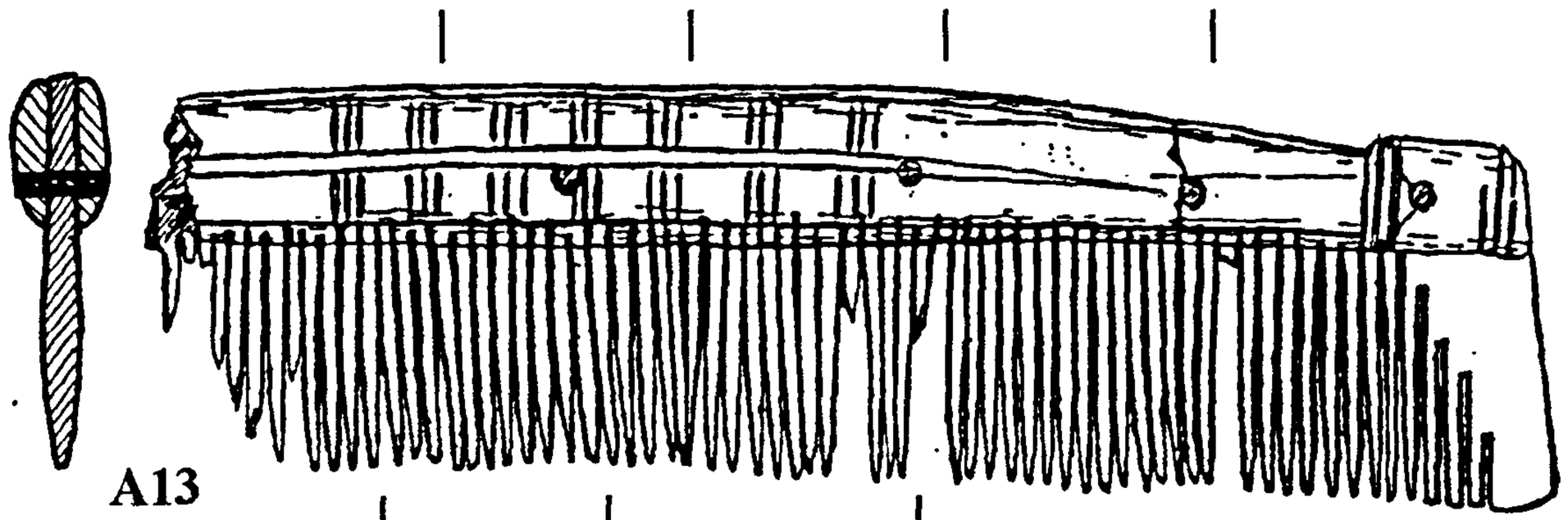
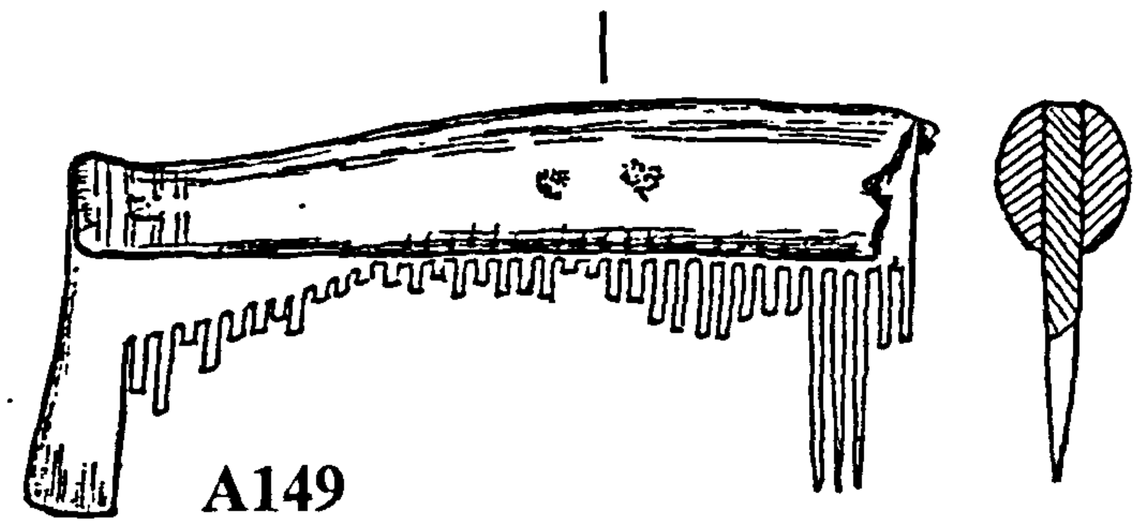
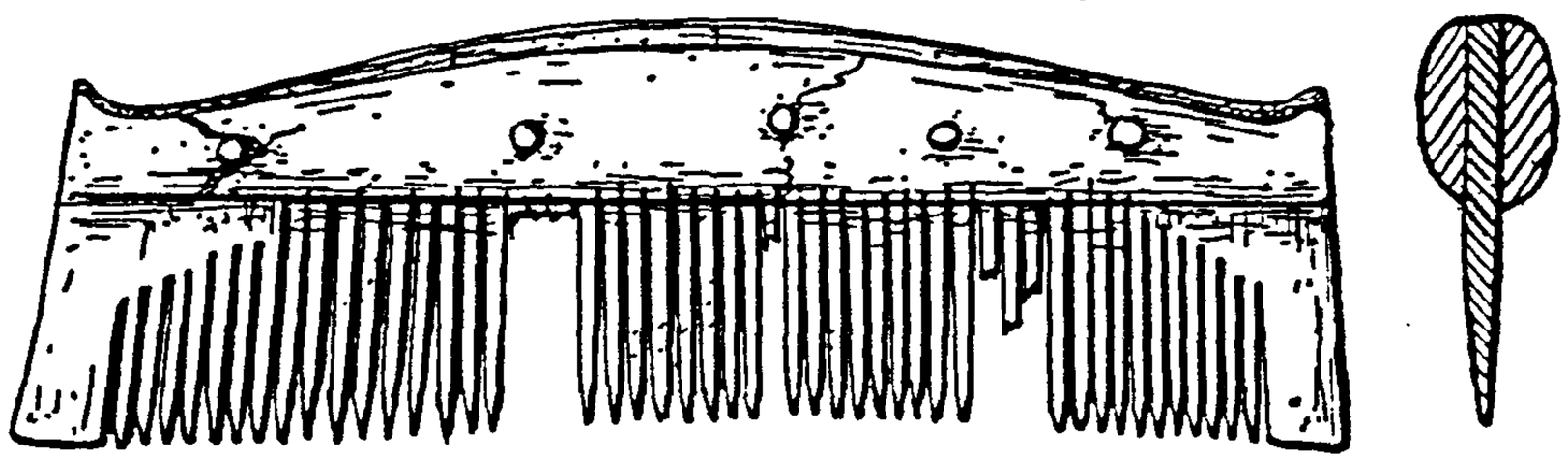


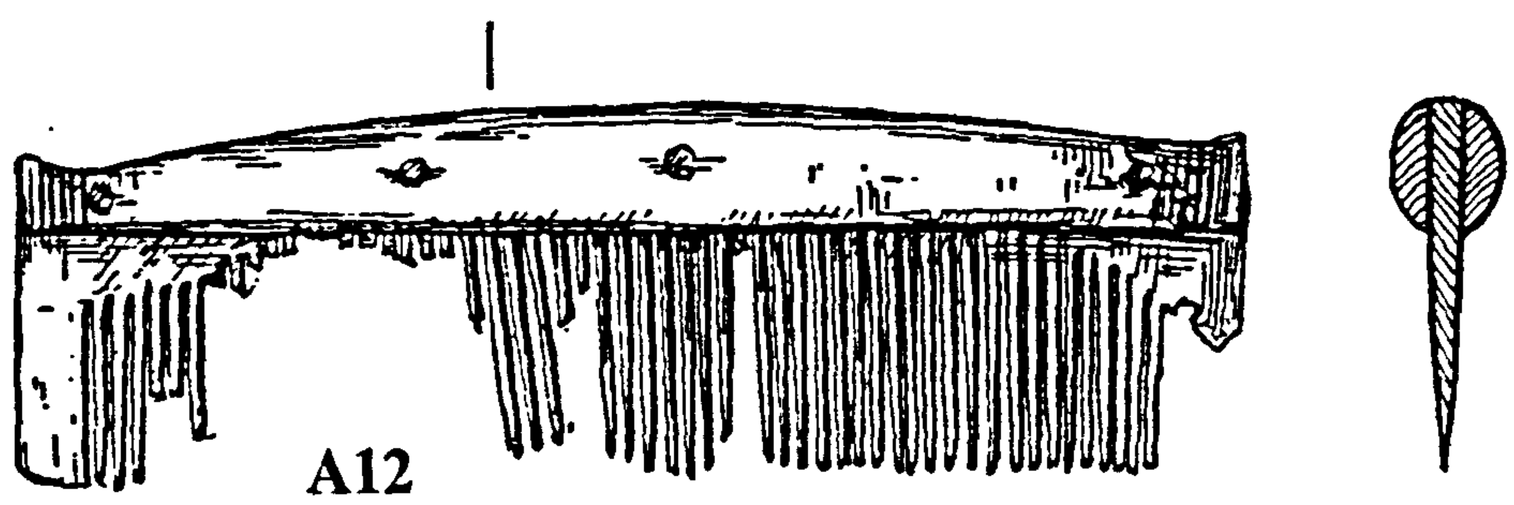
A186

Fig. 3.12 Combs with 'eared' terminals









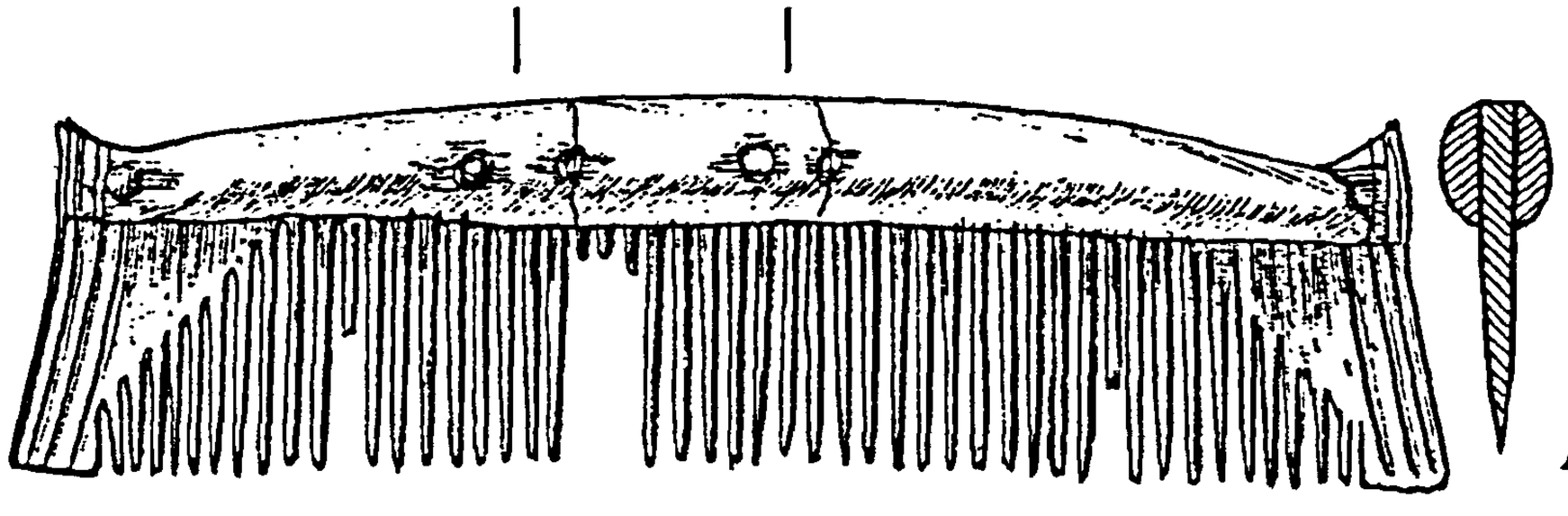
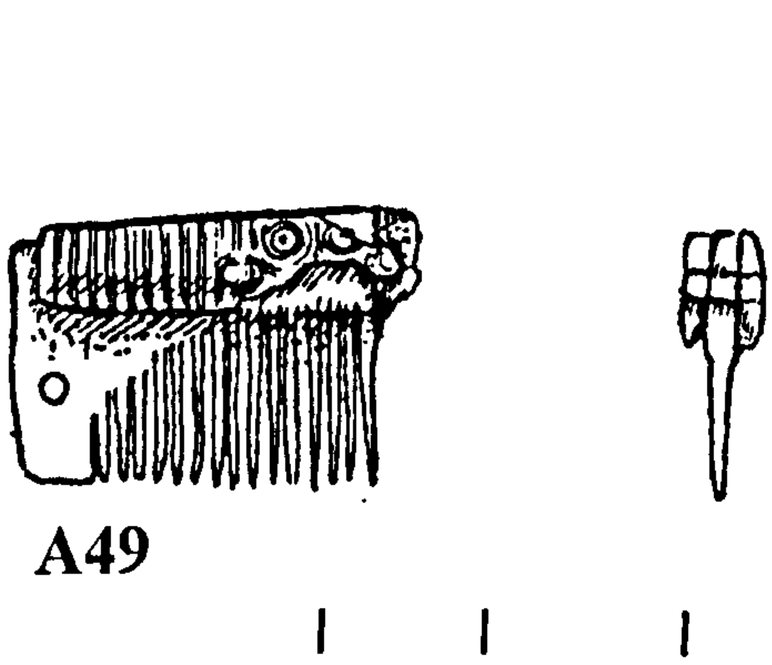


Fig. 3.13 Attributes of the end-plates of cased combs



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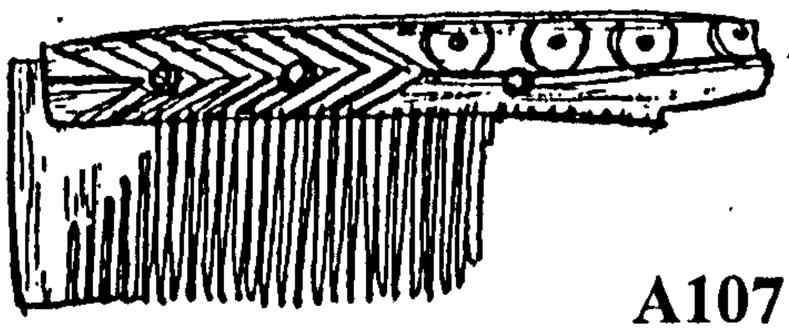

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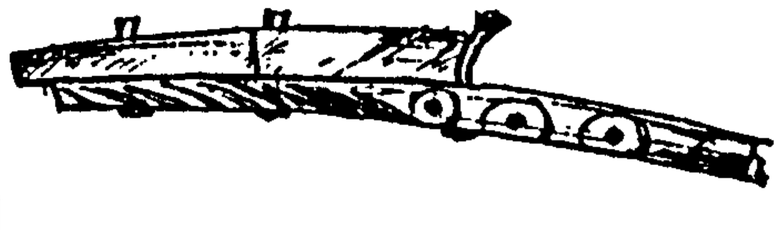

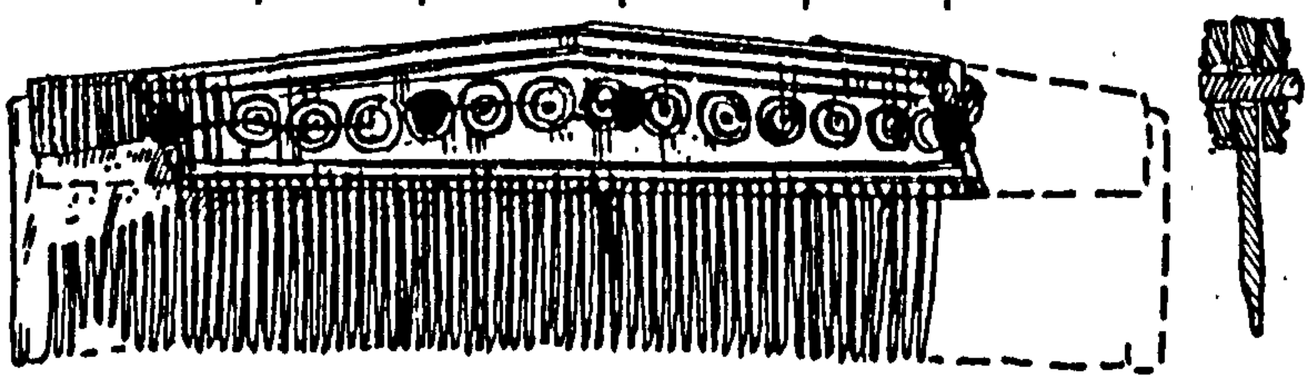

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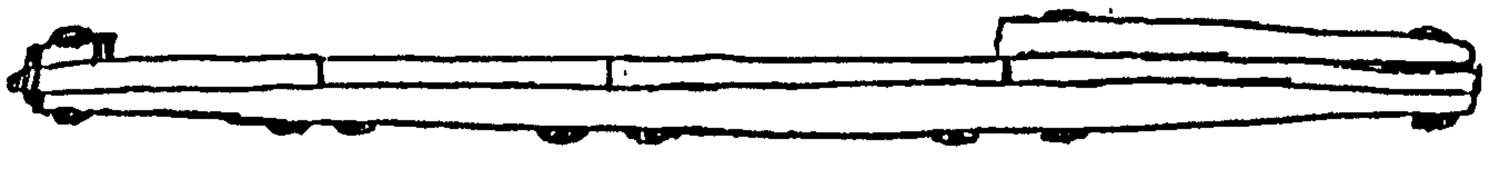

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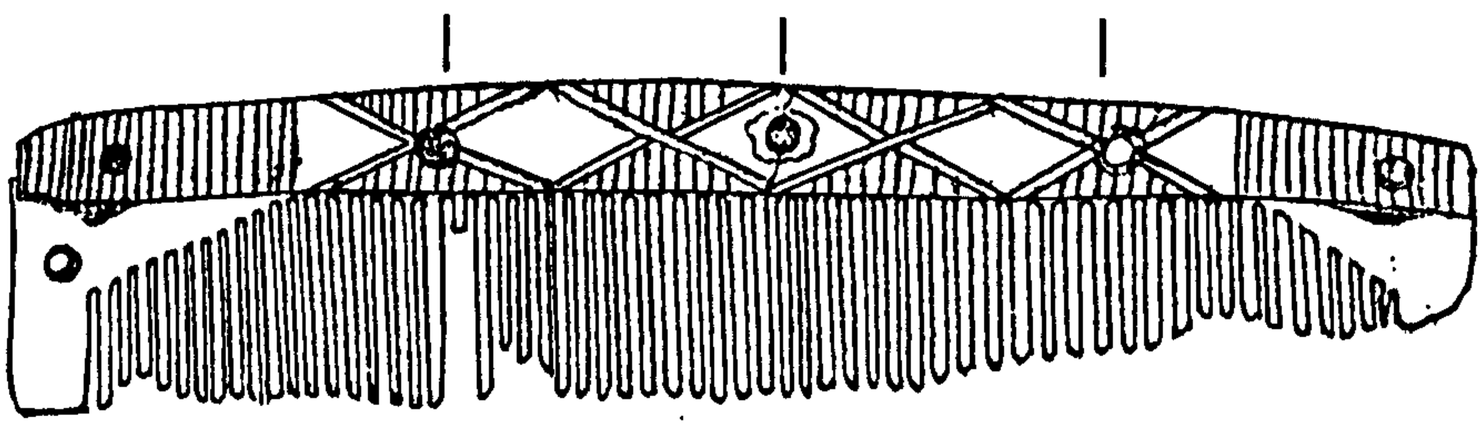

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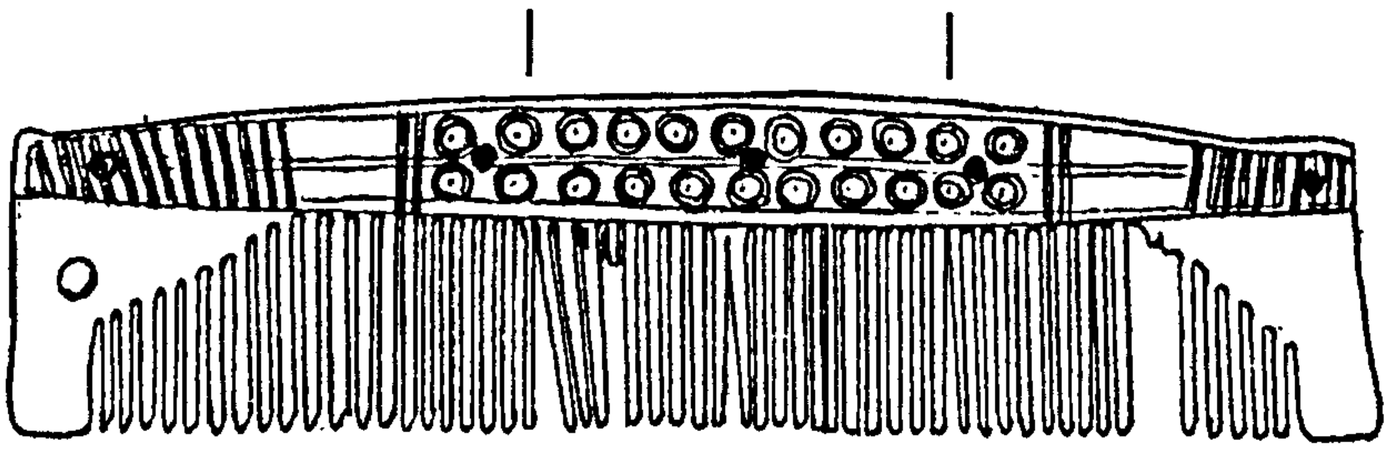
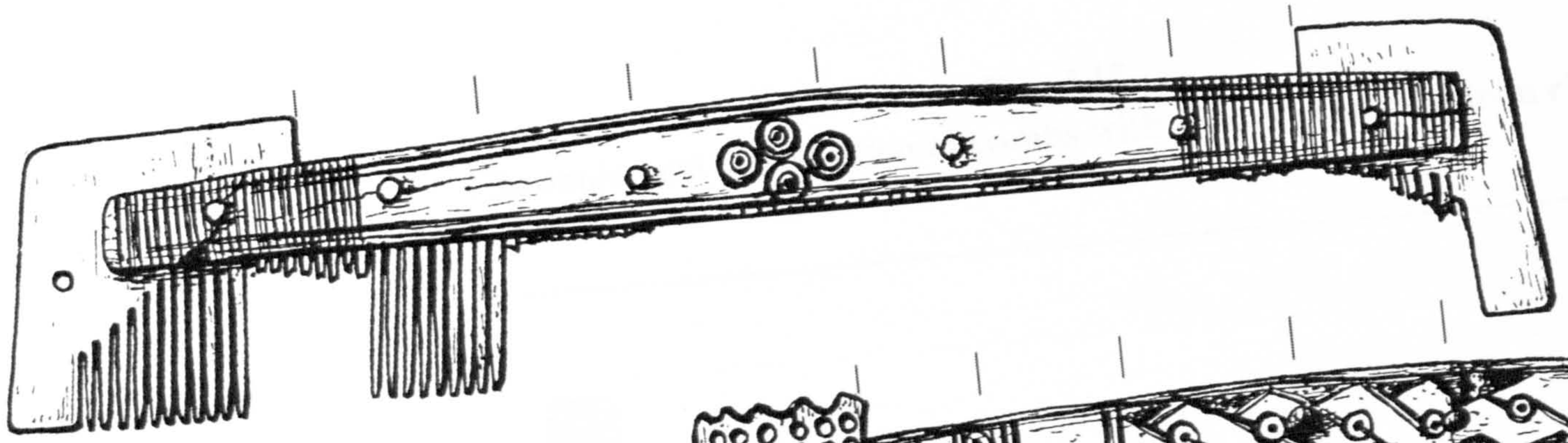


A325

Fig. 3.14 'Winged' combs



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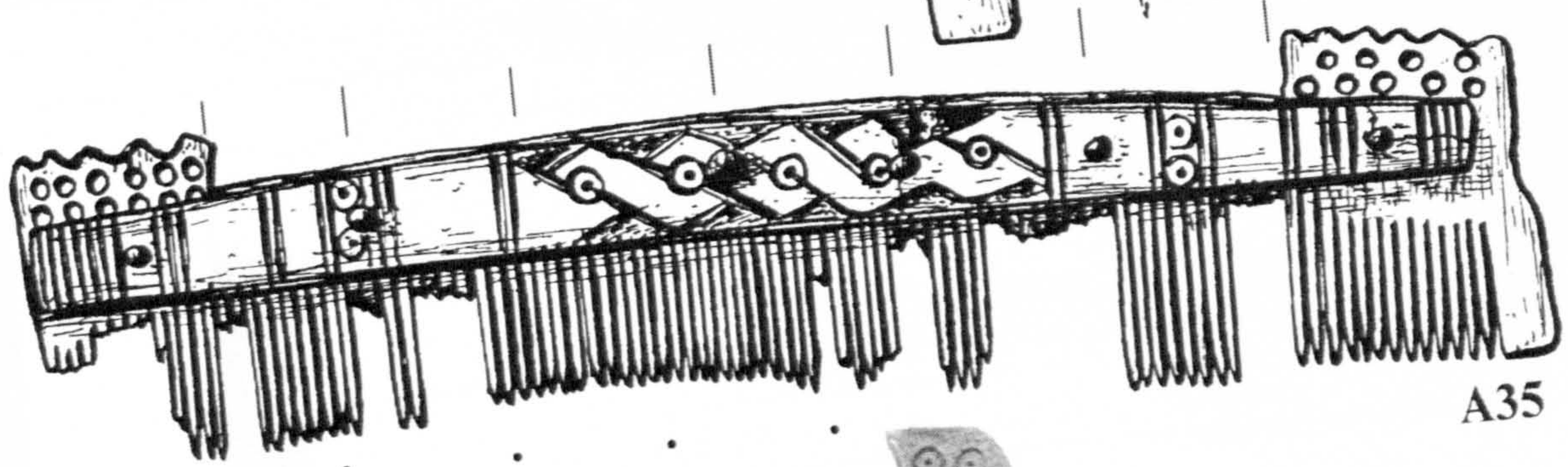

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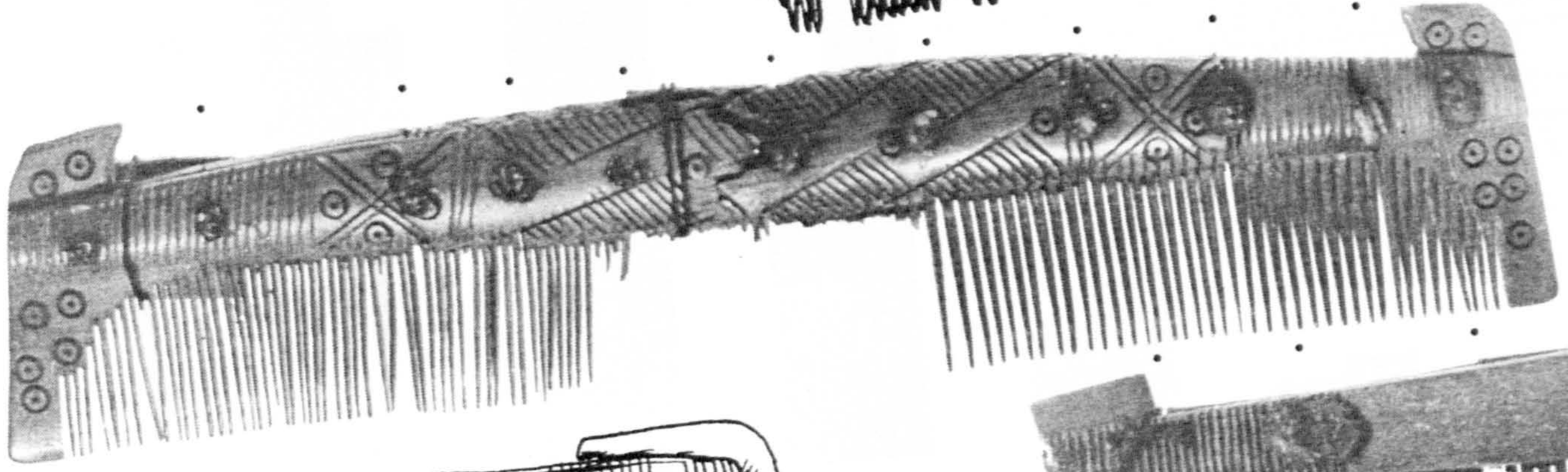

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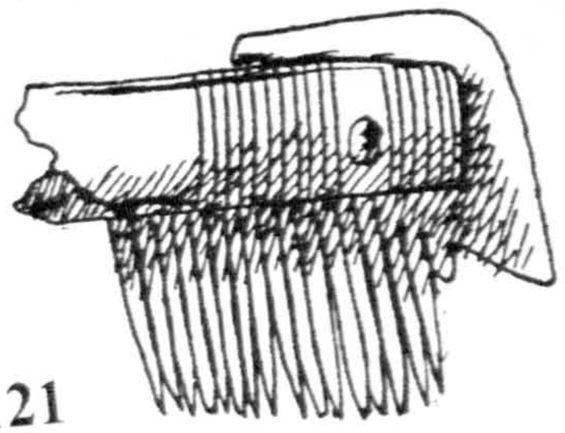

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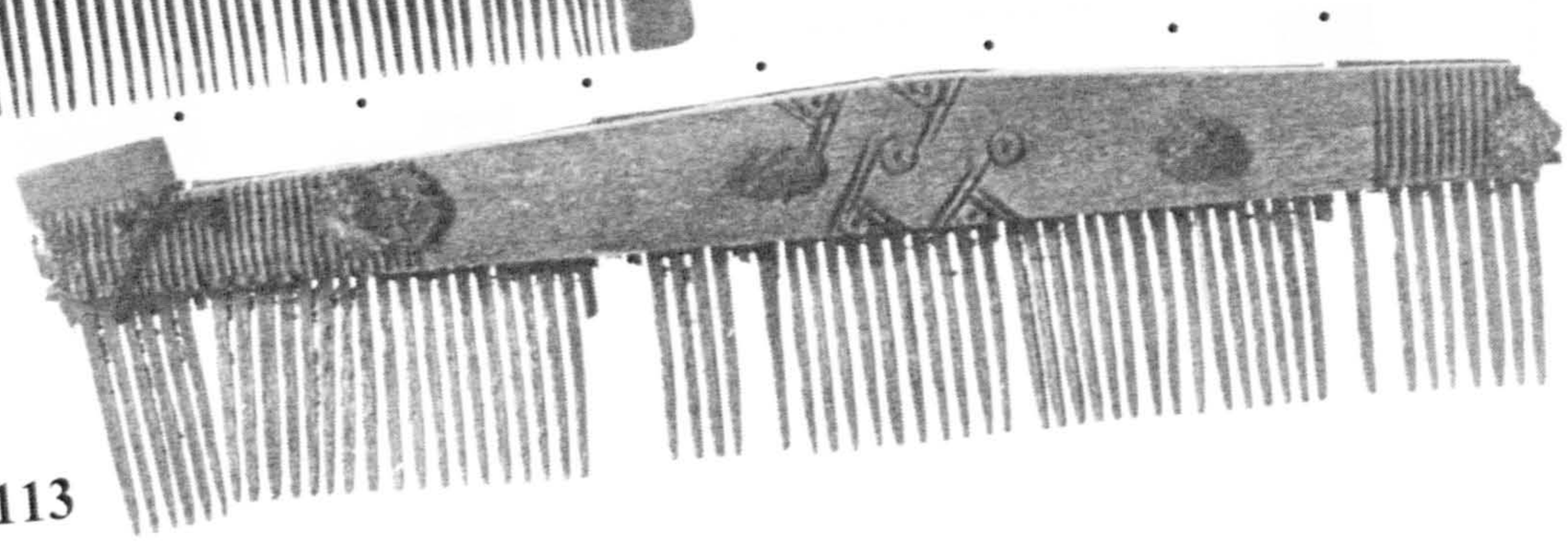
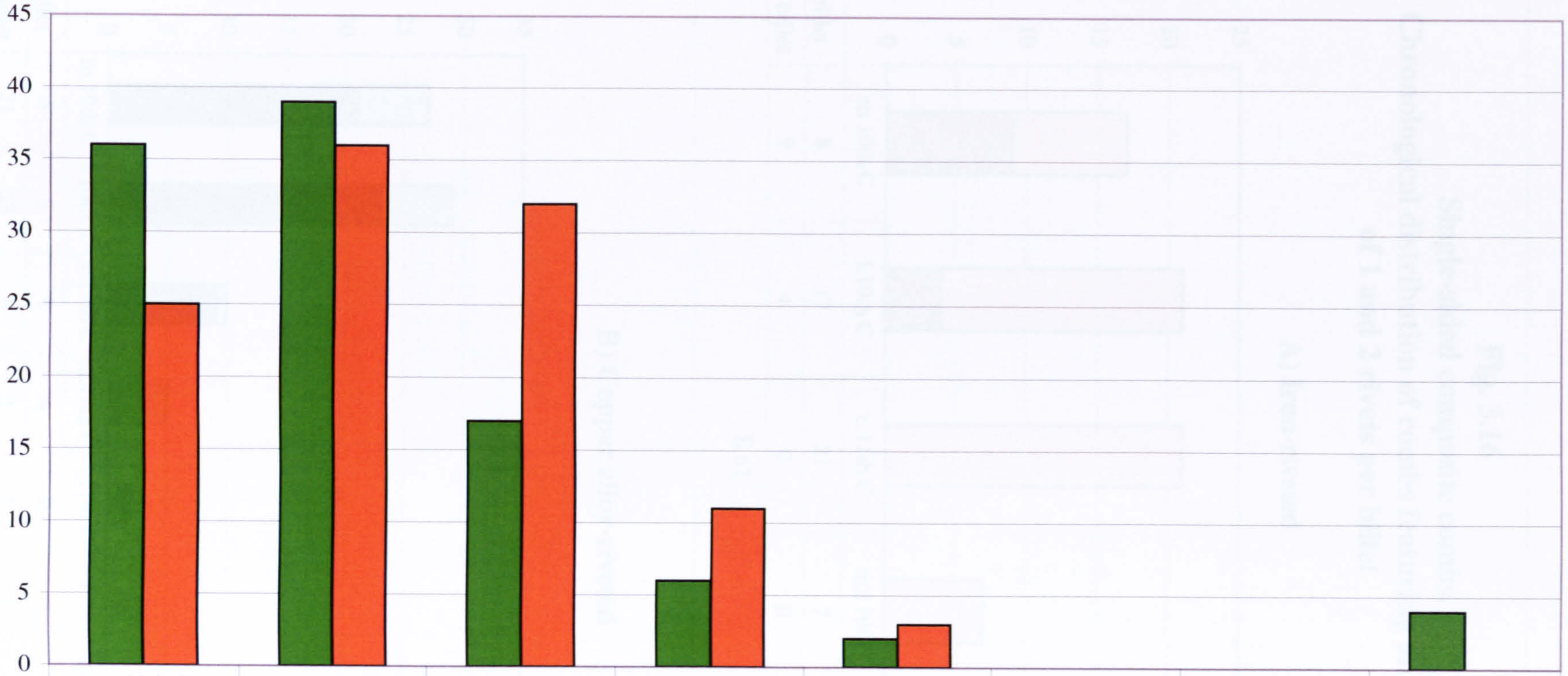


A113

Fig. 3.15
Chronological distribution of combs with copper alloy and iron rivets

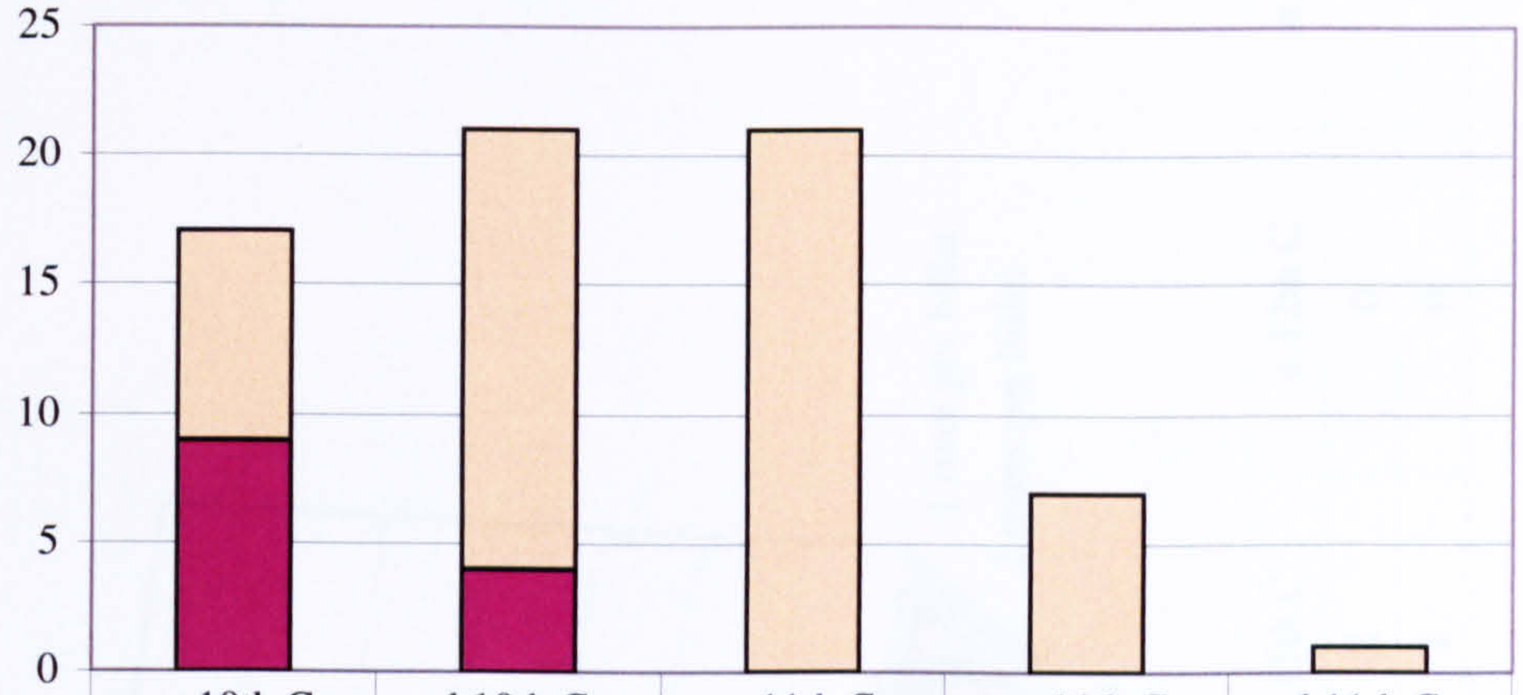


	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C	e.12th C	m.12th C	l.12th C
copper alloy	36	39	17	6	2	0	0	4
iron	25	36	32	11	3	0	0	0

Σ 211

Fig. 3.16
Single-sided composite combs.
Chronological distribution of combs featuring an average of 1 and 2 rivets per billet

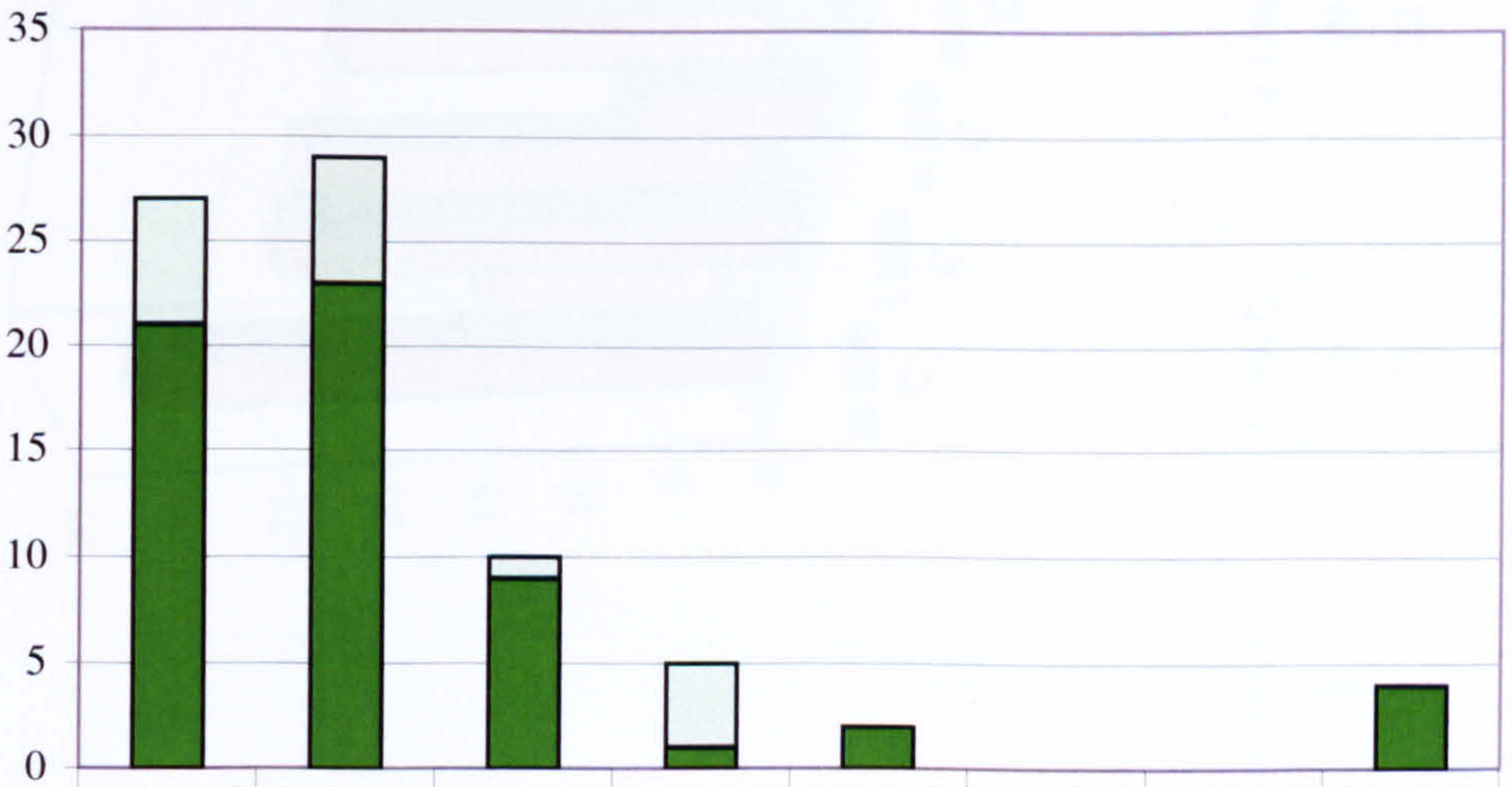
A) Iron-riveted



	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C
1 rivet per billet	8	17	21	7	1
2 rivets per billet	9	4	0	0	0

Σ 67

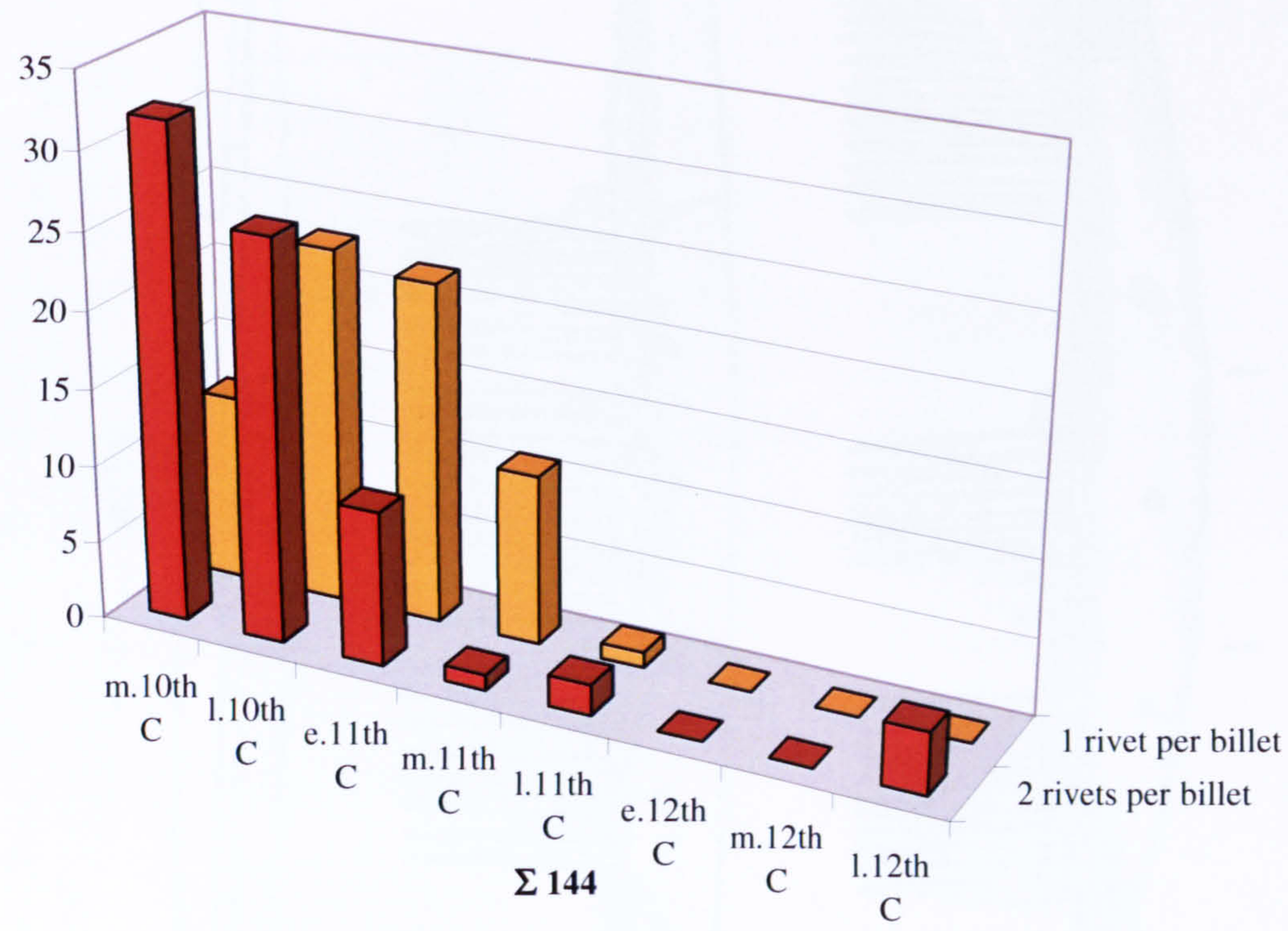
B) Copper alloy-riveted



	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C	e.12th C	m.12th C	l.12th C
1 rivet per billet	6	6	1	4	0	0	0	0
2 rivets per billet	21	23	9	1	2	0	0	4

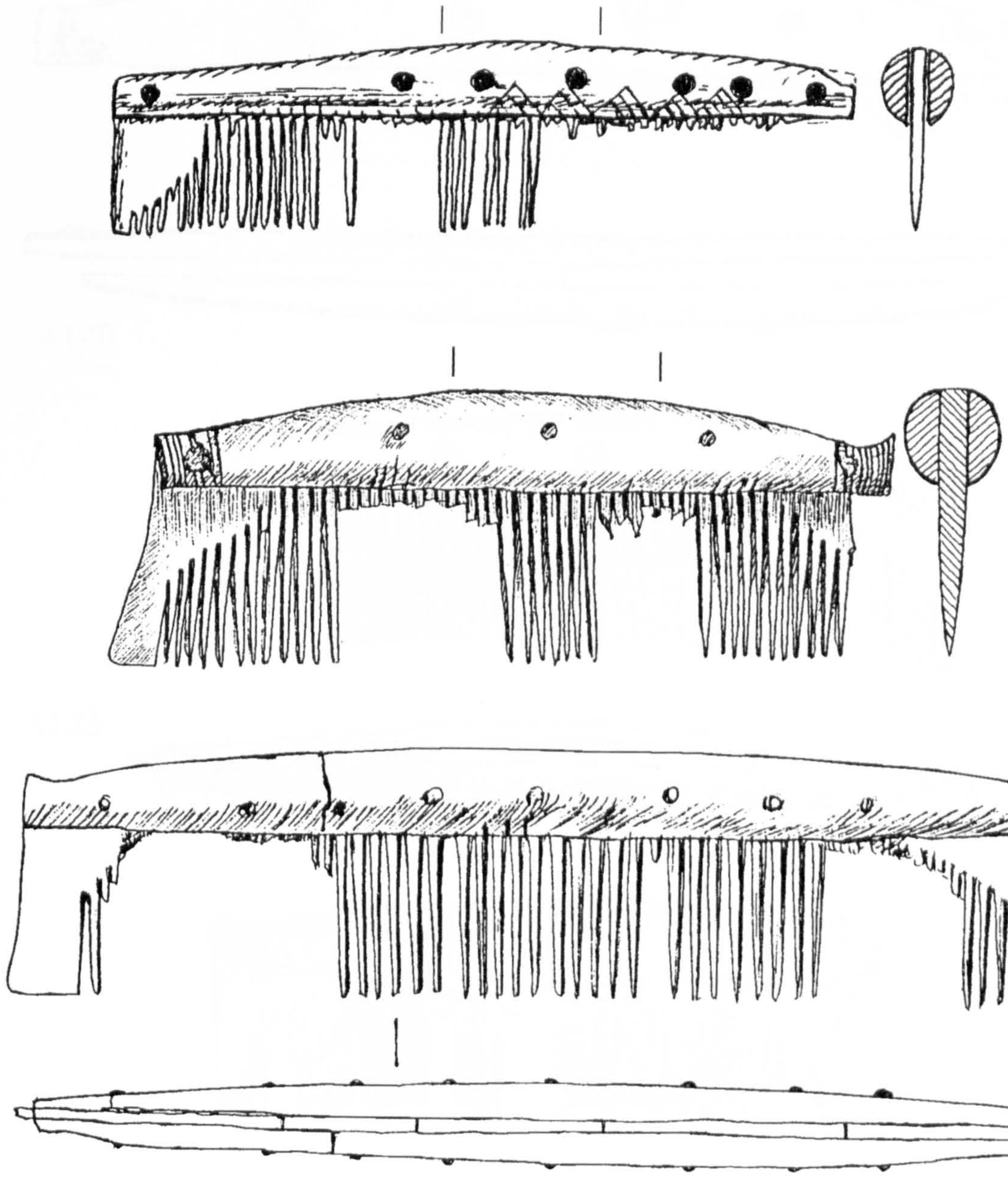
Σ 77

Fig. 3.17
Single-sided composite combs.
Chronological distribution of all combs featuring an average of 1 and 2 rivets per billet

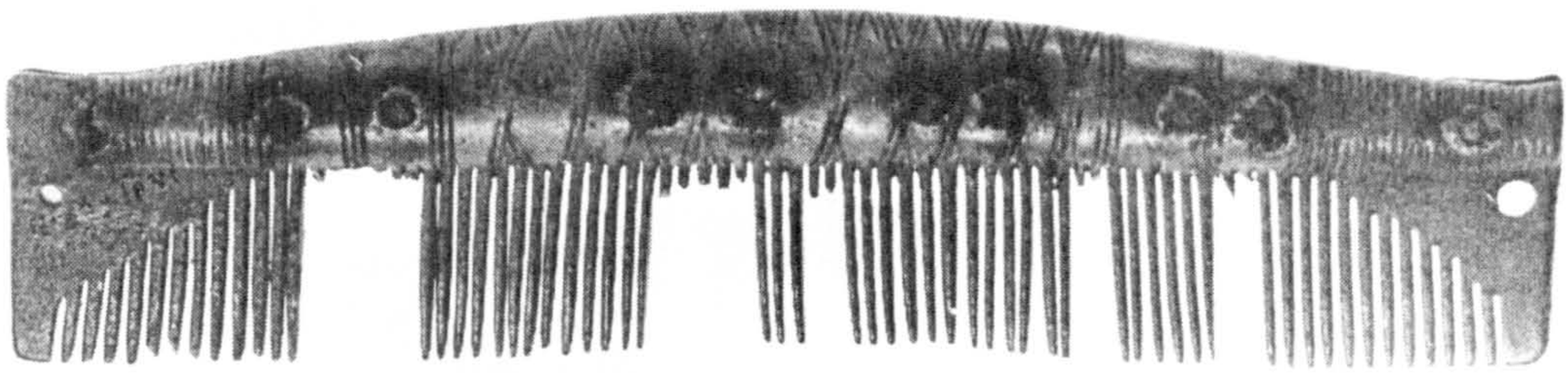


	m.10th C	l.10th C	e.11th C	m.11th C	l.11th C	e.12th C	m.12th C	l.12th C
2 rivets per billet	32	26	10	1	2	0	0	4
1 rivet per billet	12	23	22	11	1	0	0	0

Fig. 3.18 Combs riveted according to the Eastern Scandinavian tradition

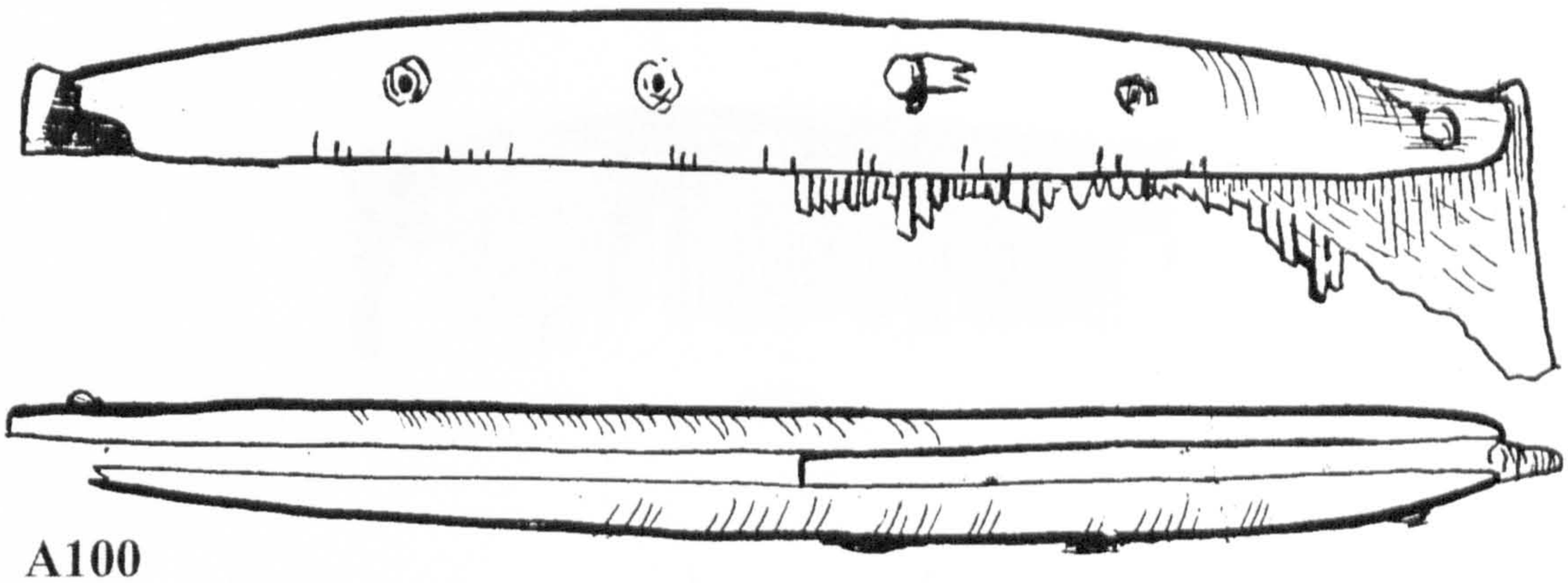


A124



A79

Fig. 3.19 Combs riveted according to the Eastern Scandinavian tradition



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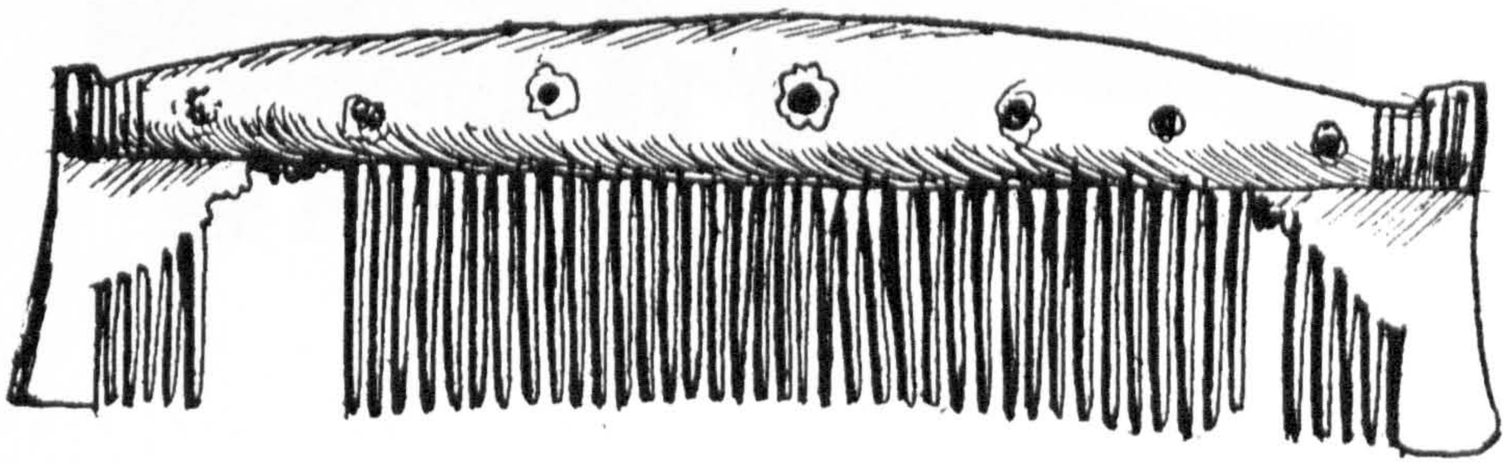
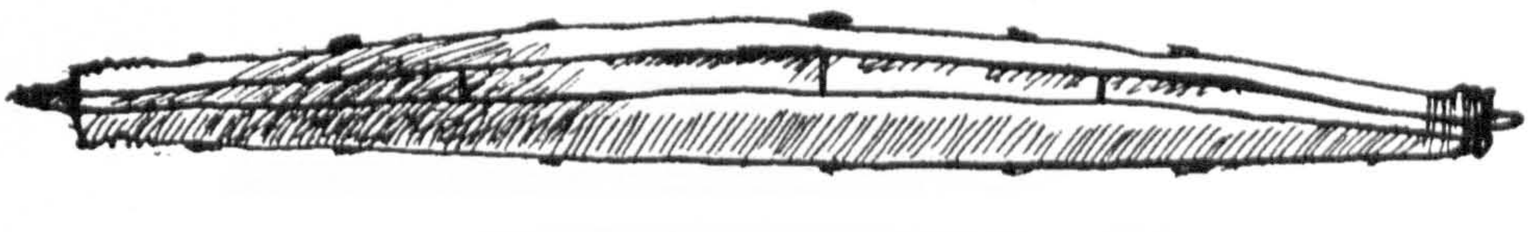
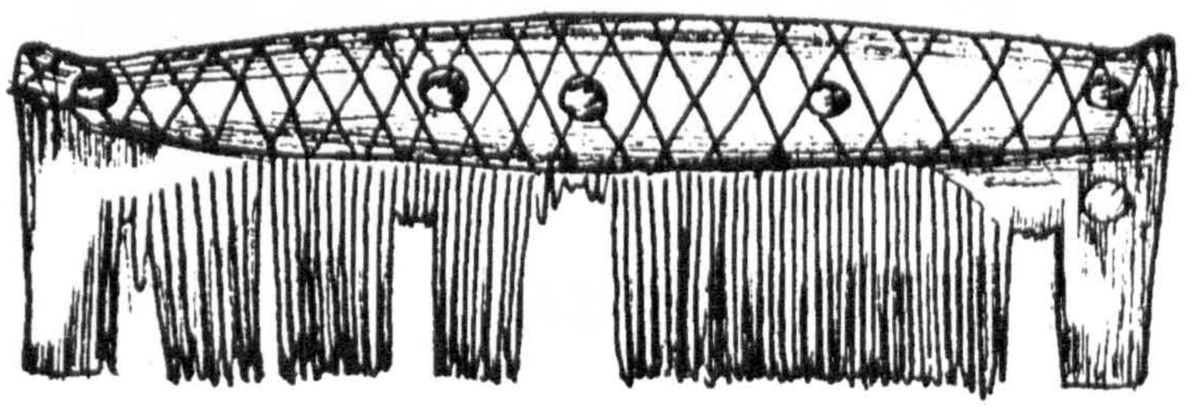
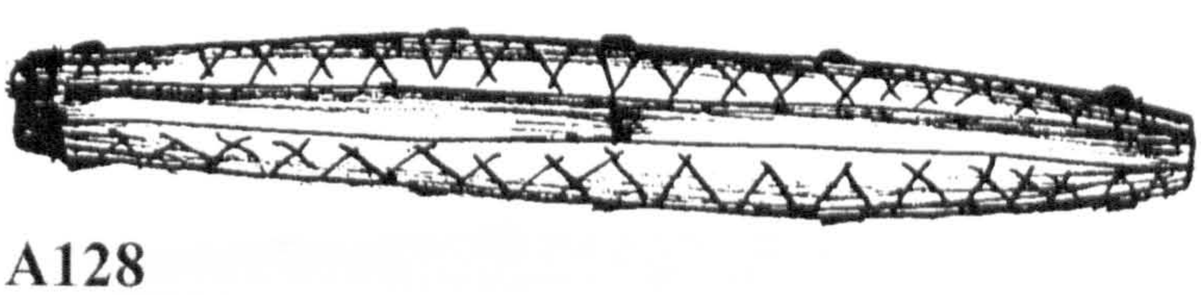


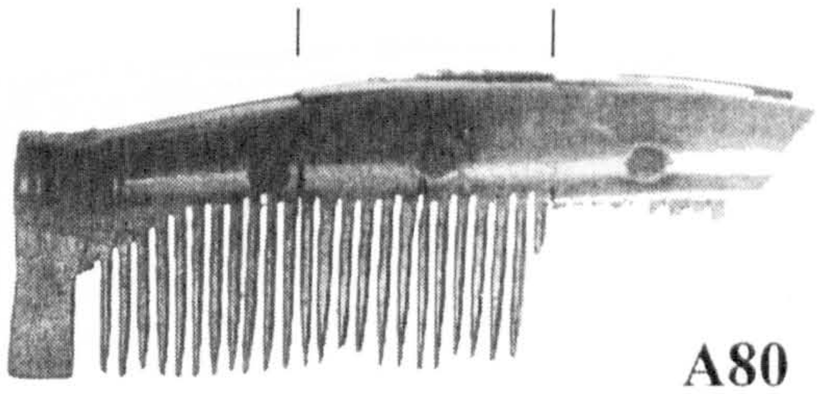
A123





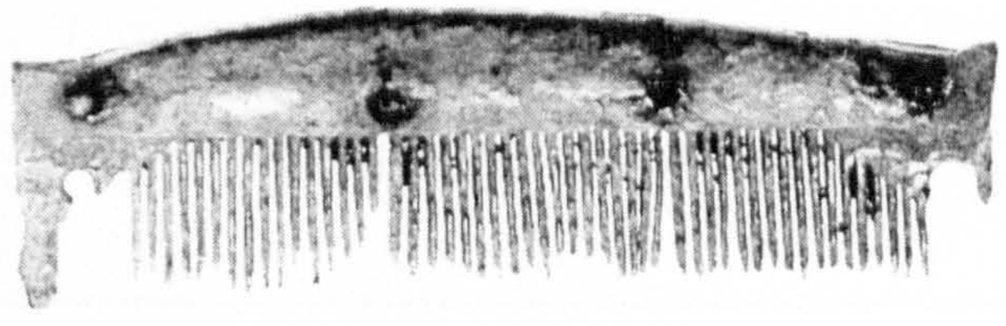


A128



A80

Fig. 3.20 Combs riveted according to the Western Scandinavian tradition



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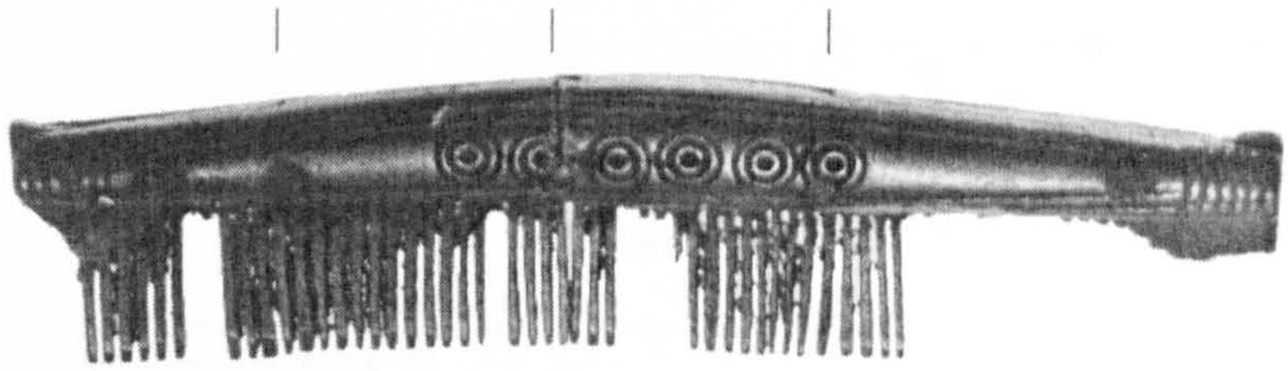

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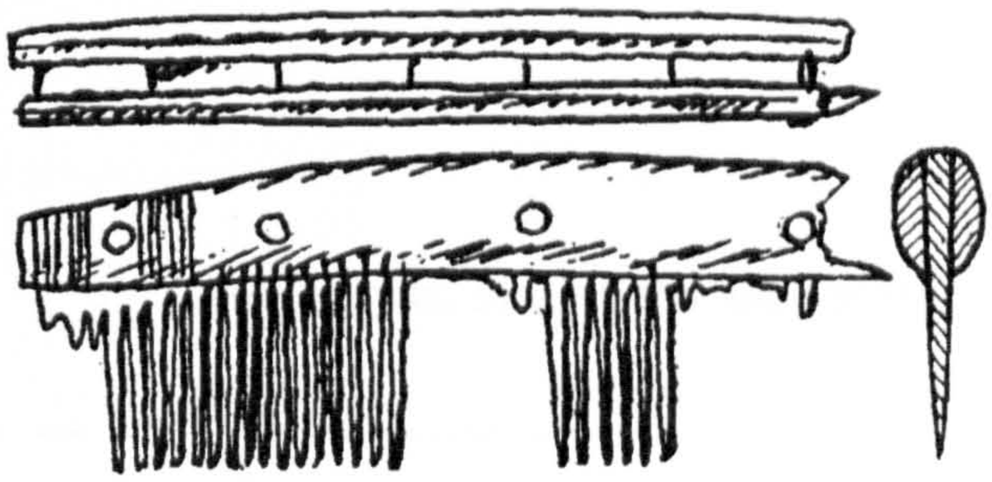

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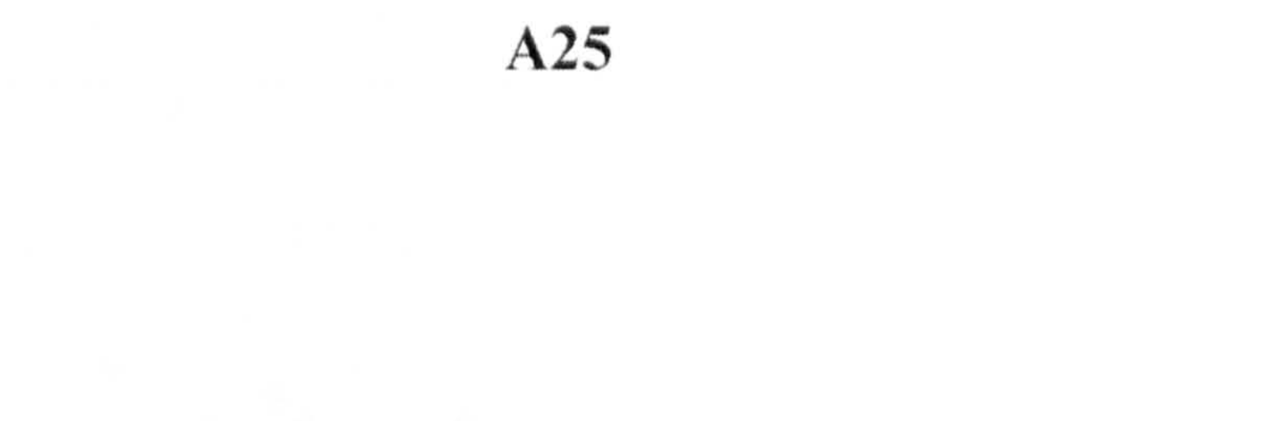
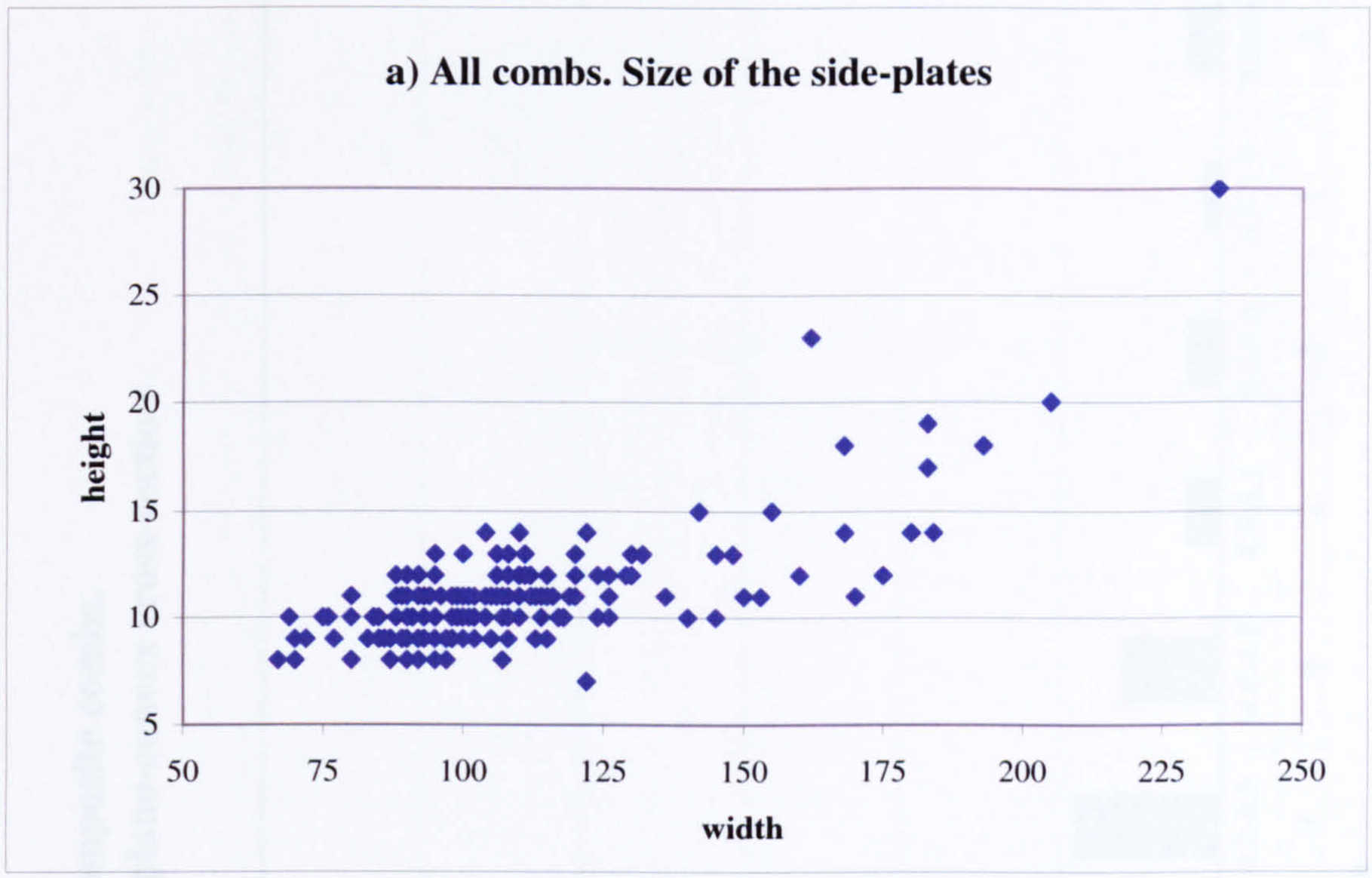


A110

Fig. 3.21 Single-sided composite combs. Side-plates



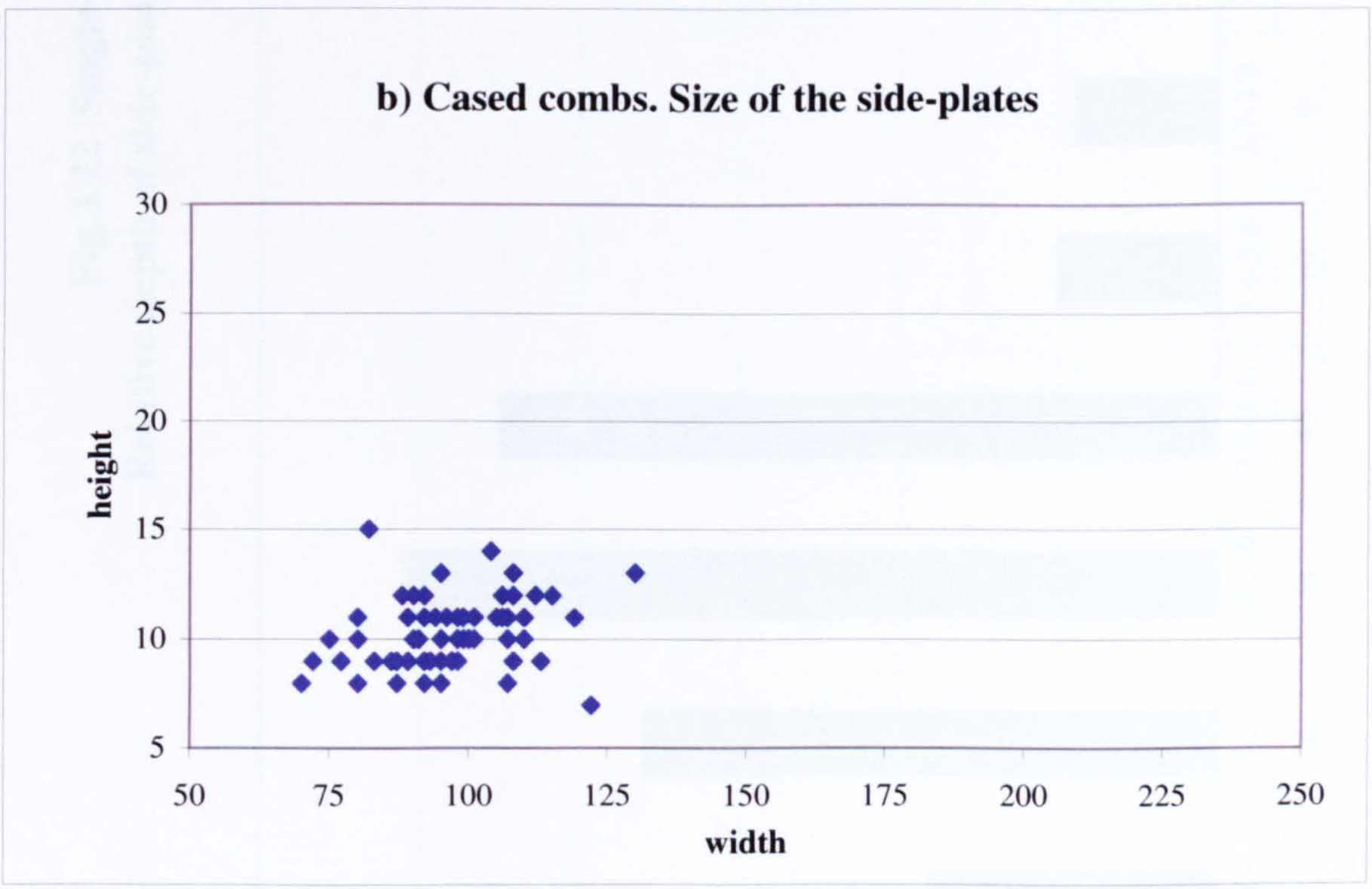
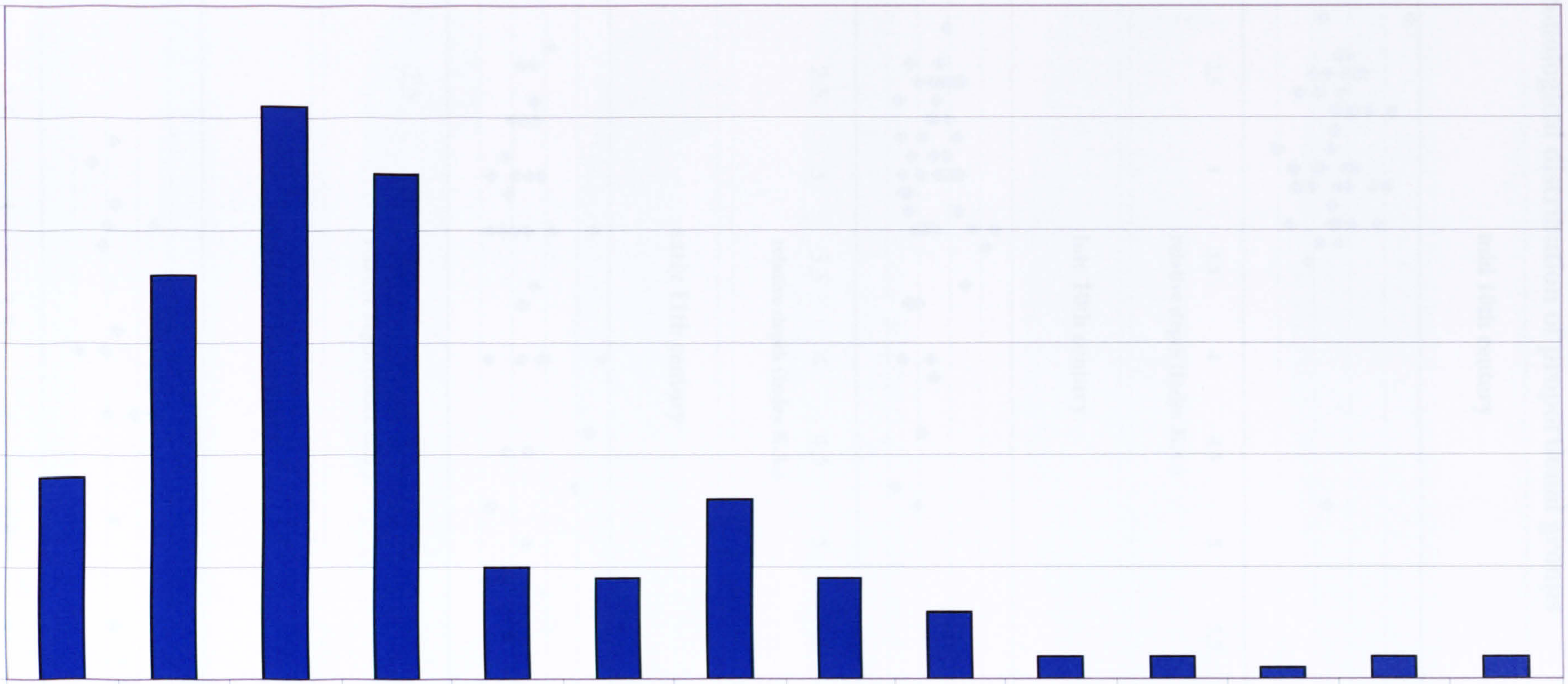


Fig.3.22 Single-sided composite combs.
Relative depth of side-plates with plano-convex cross-section



2.2-2.4	2.5-2.7	2.8-3.0	3.1-3.3	3.4-3.6	3.7-3.9	4.0-4.2	4.3-4.5	4.6-4.8	4.9-5.1	5.2-5.4	5.5-5.7	5.8-6.0	>6.0
18	36	51	45	10	9	16	9	6	2	2	1	2	2

Σ 209

Fig 3.23 Single-sided composite combs. Side-plates. Chronological distribution of proportional groups

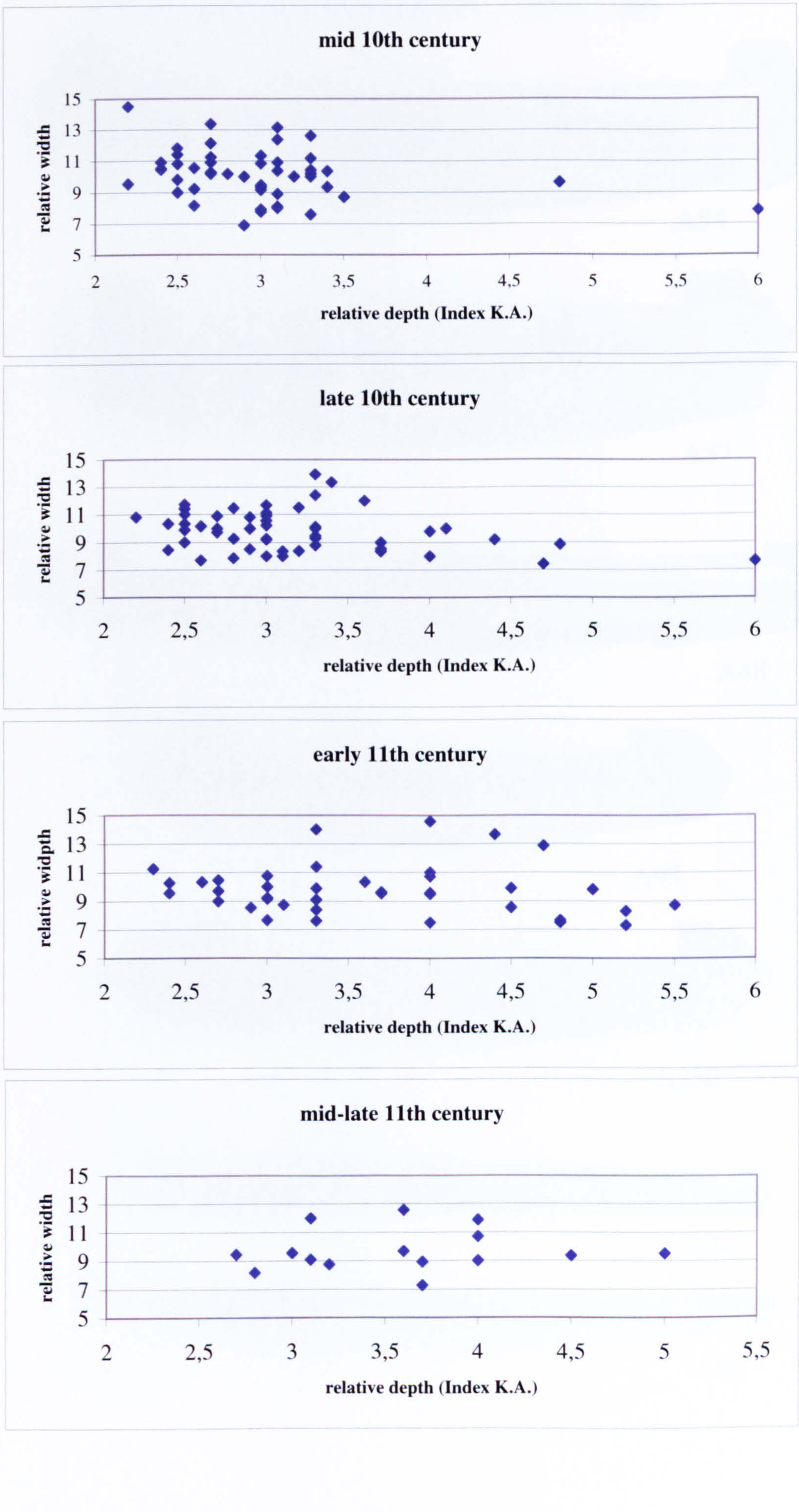
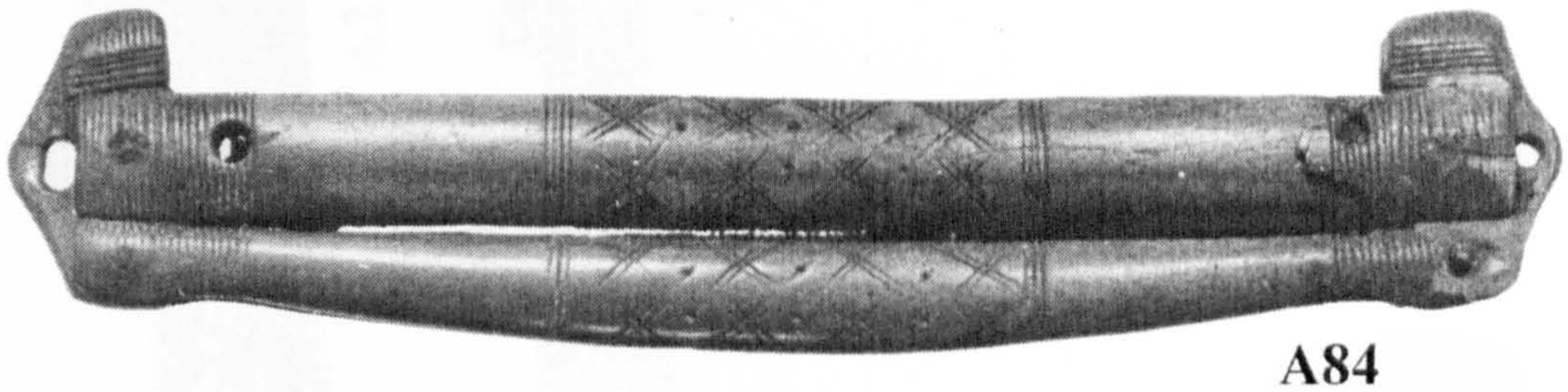
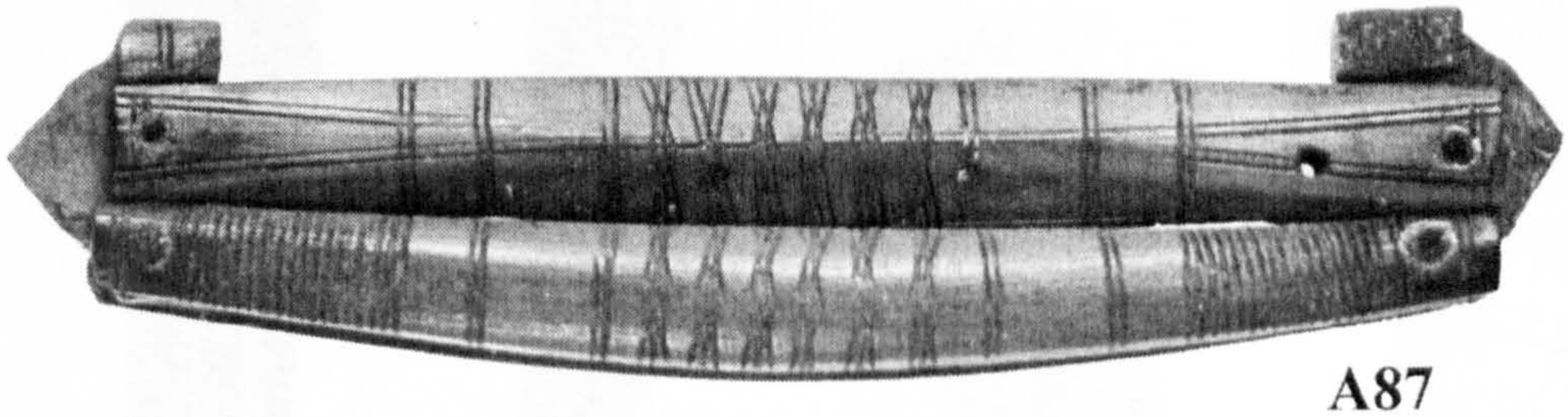


Fig. 3.24 Comb cases with two pairs of contiguous side-plates and a comb case with a single pair of B-shaped cross-sectional side-plates imitating pairs of contiguous plates (A88)



A84



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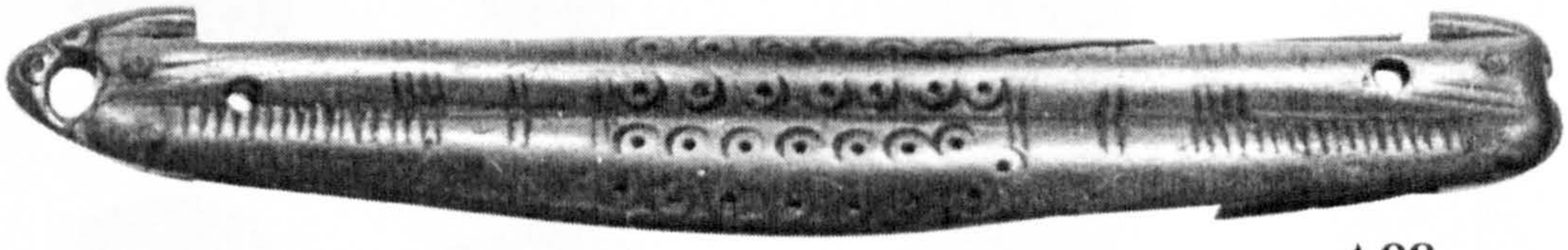

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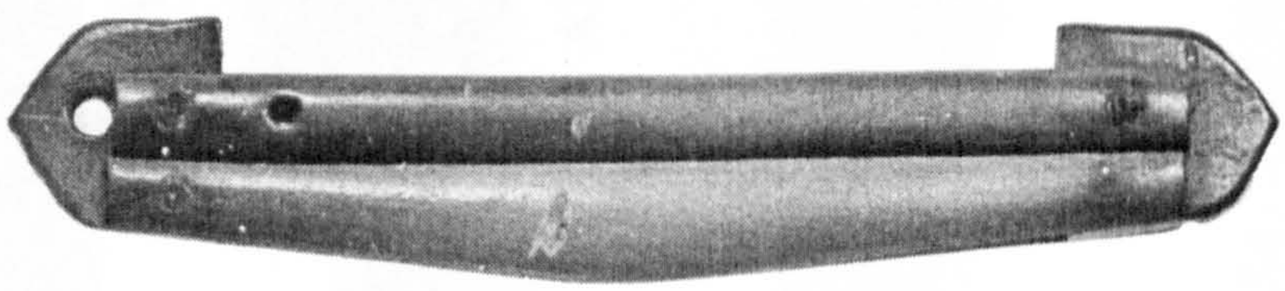

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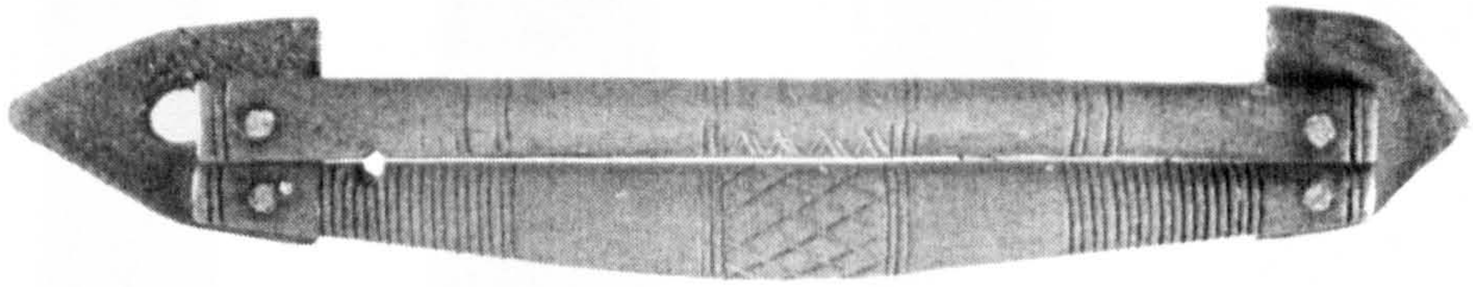
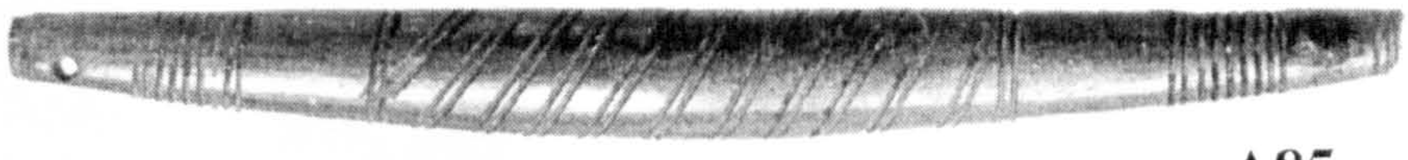


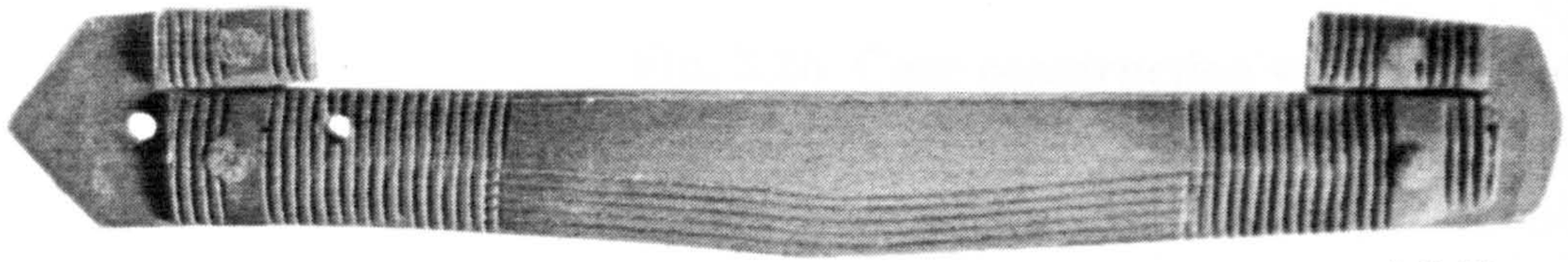
A350

A86



A85

Fig. 3.25 Comb cases with a single pair of side-plates



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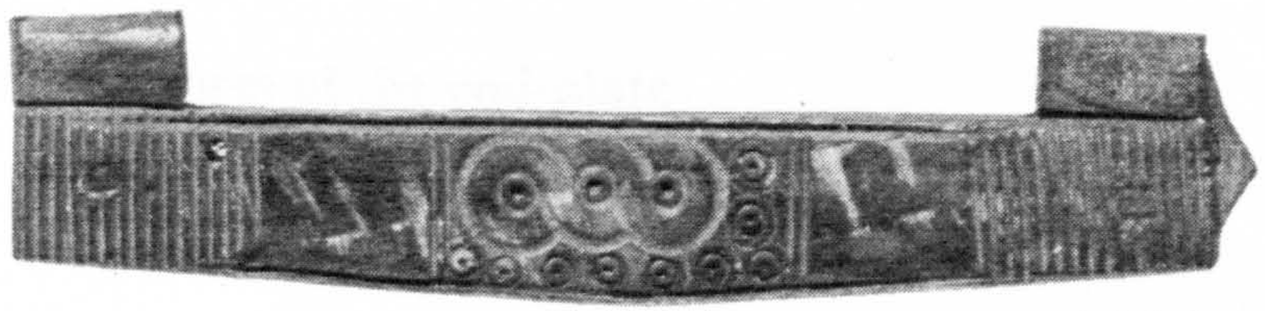

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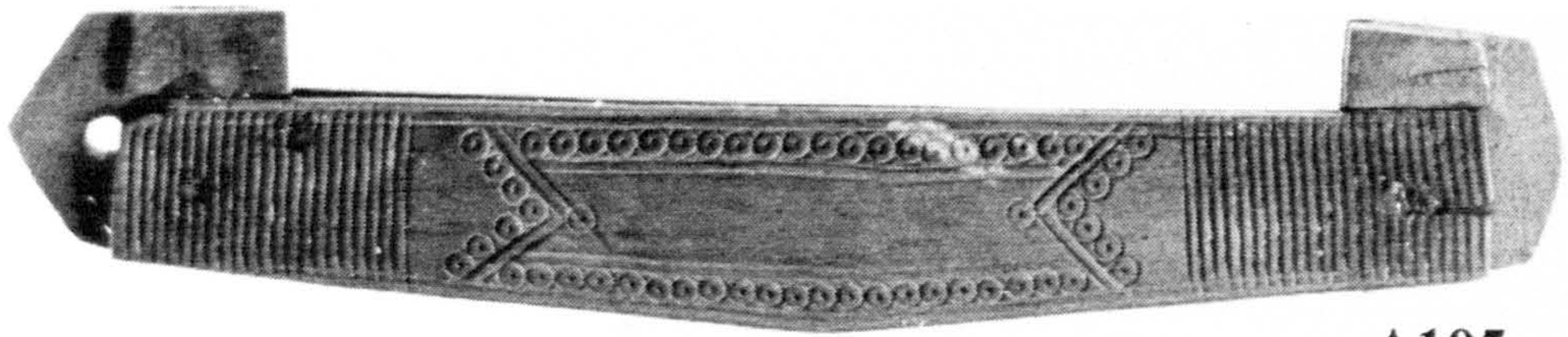

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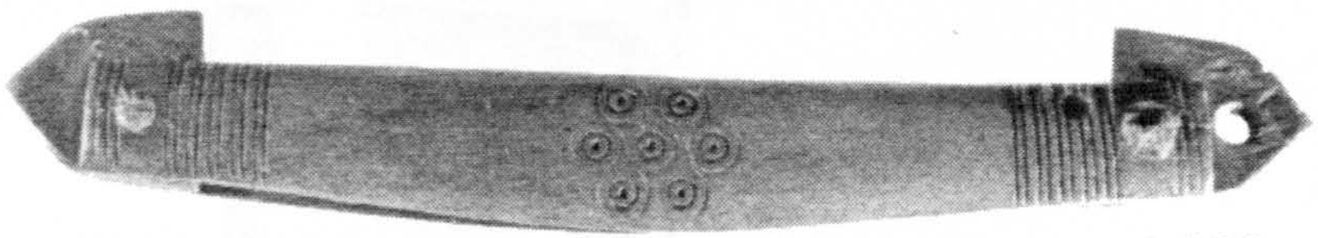

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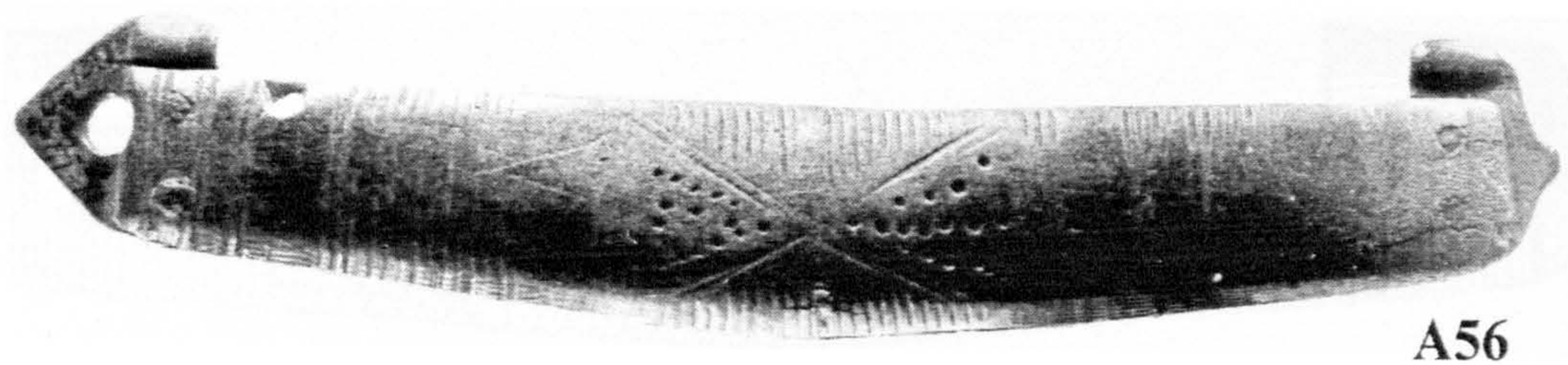

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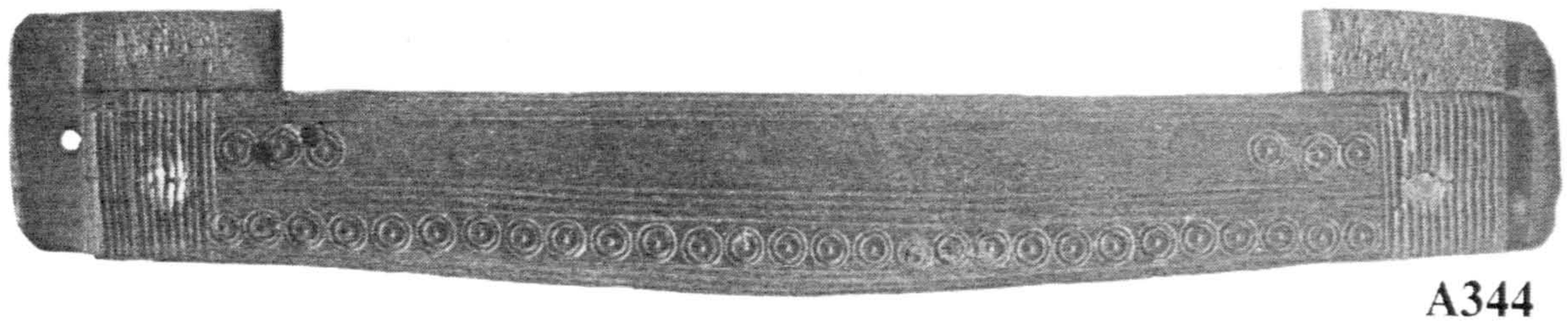


A344

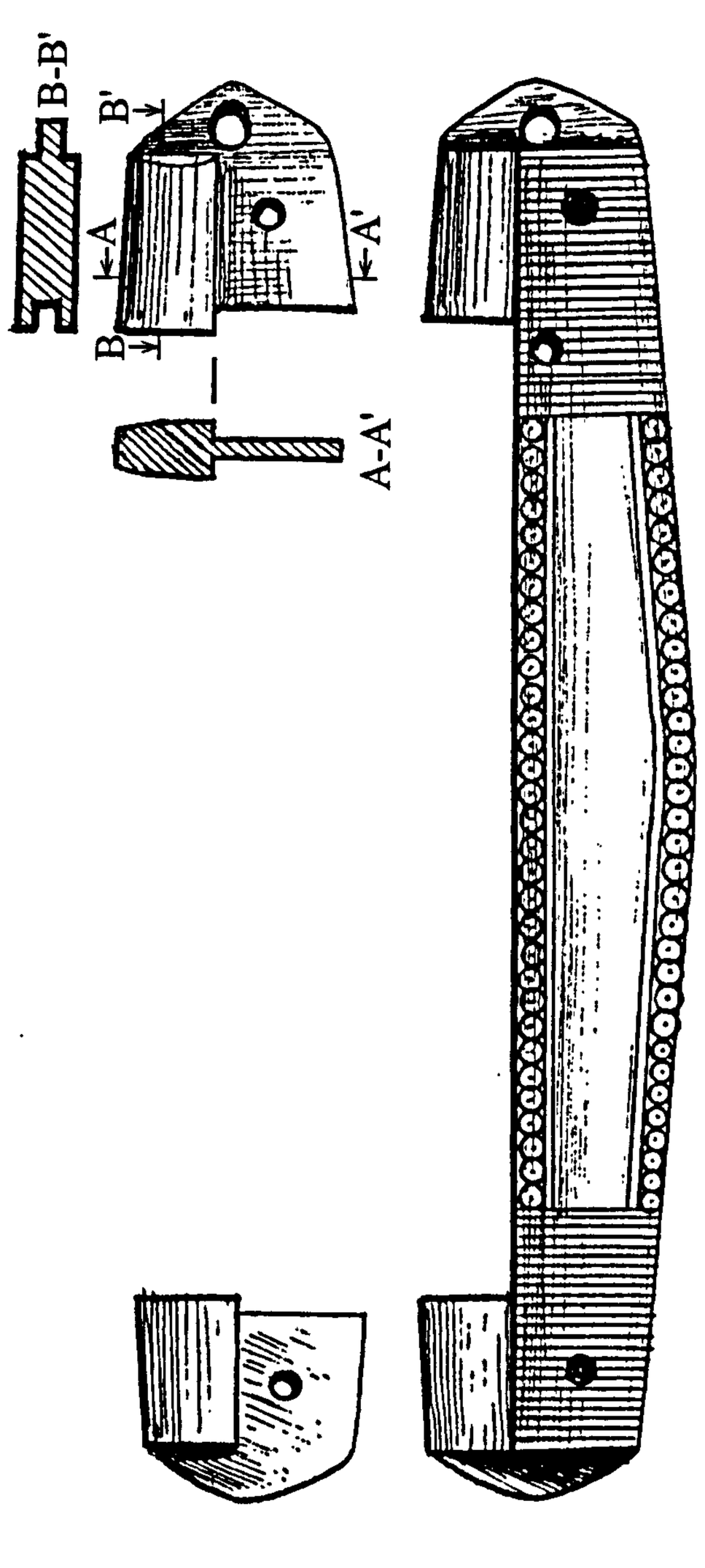


Fig. 3.26 Case construction with the emphasis on the form of the end-plate

Fig. 3.27 Cases featuring lower side-plates secured with an additional rivet

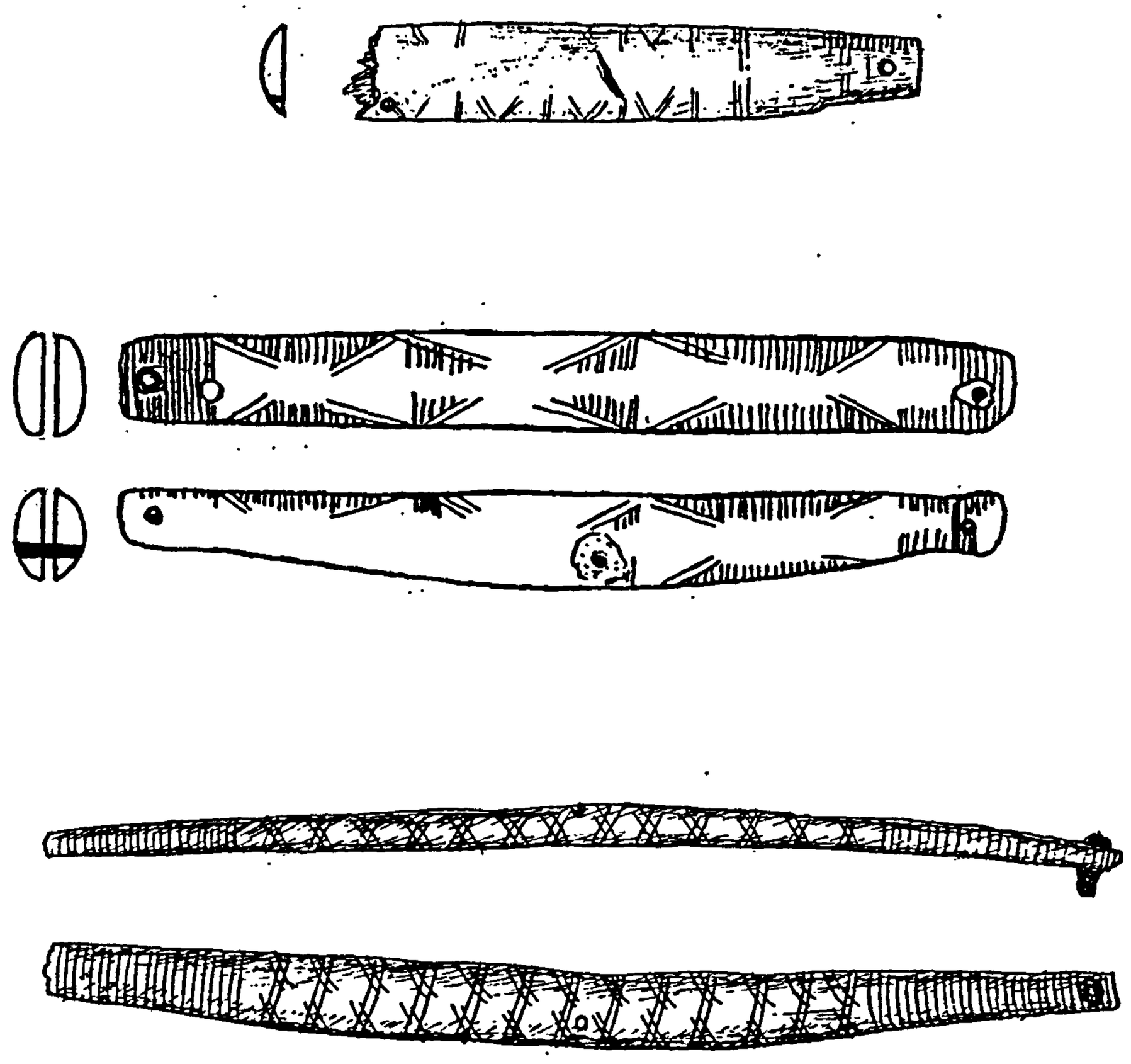
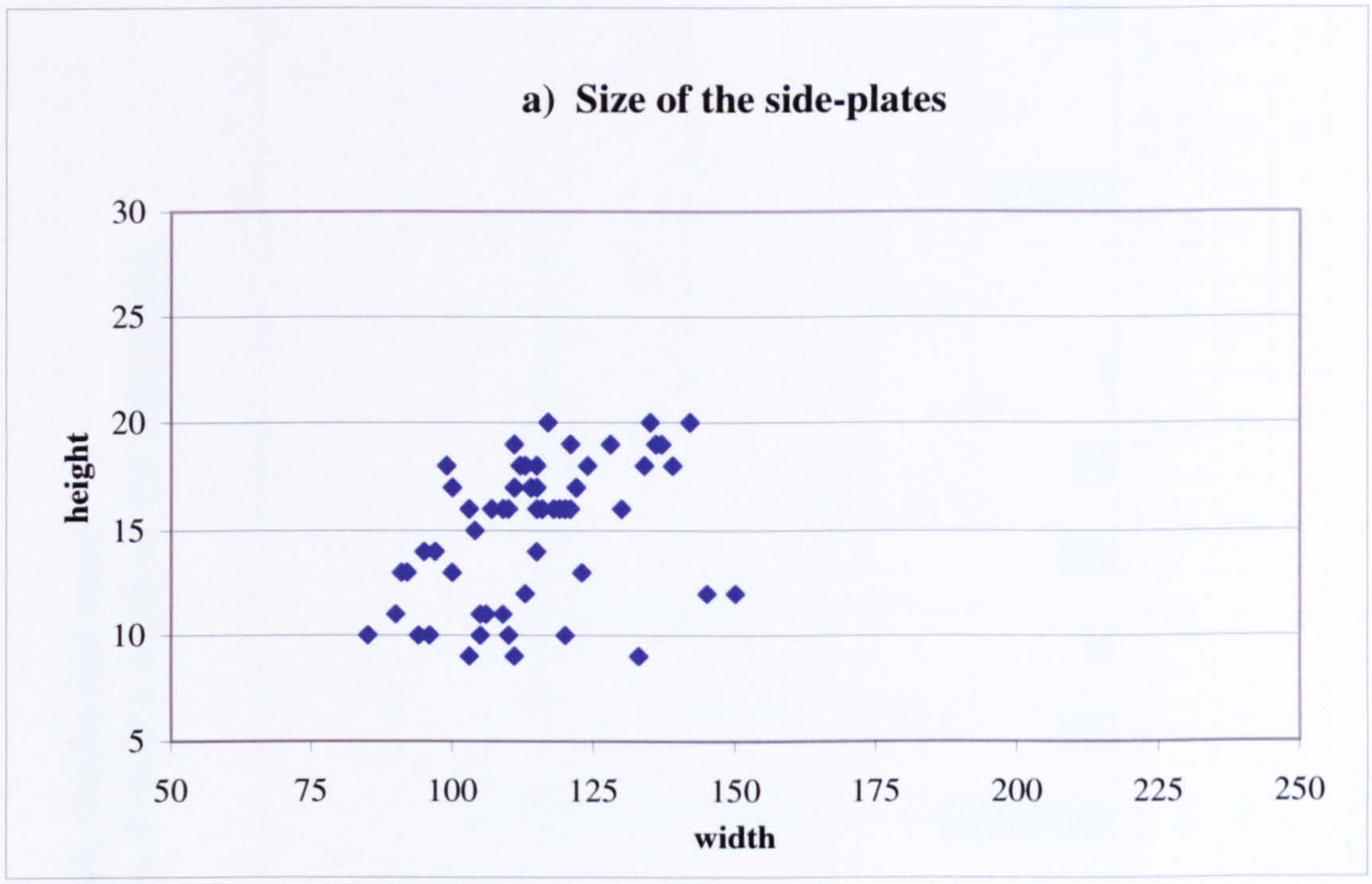


Fig. 3.28 Single-sided composite comb cases.
Side-plates



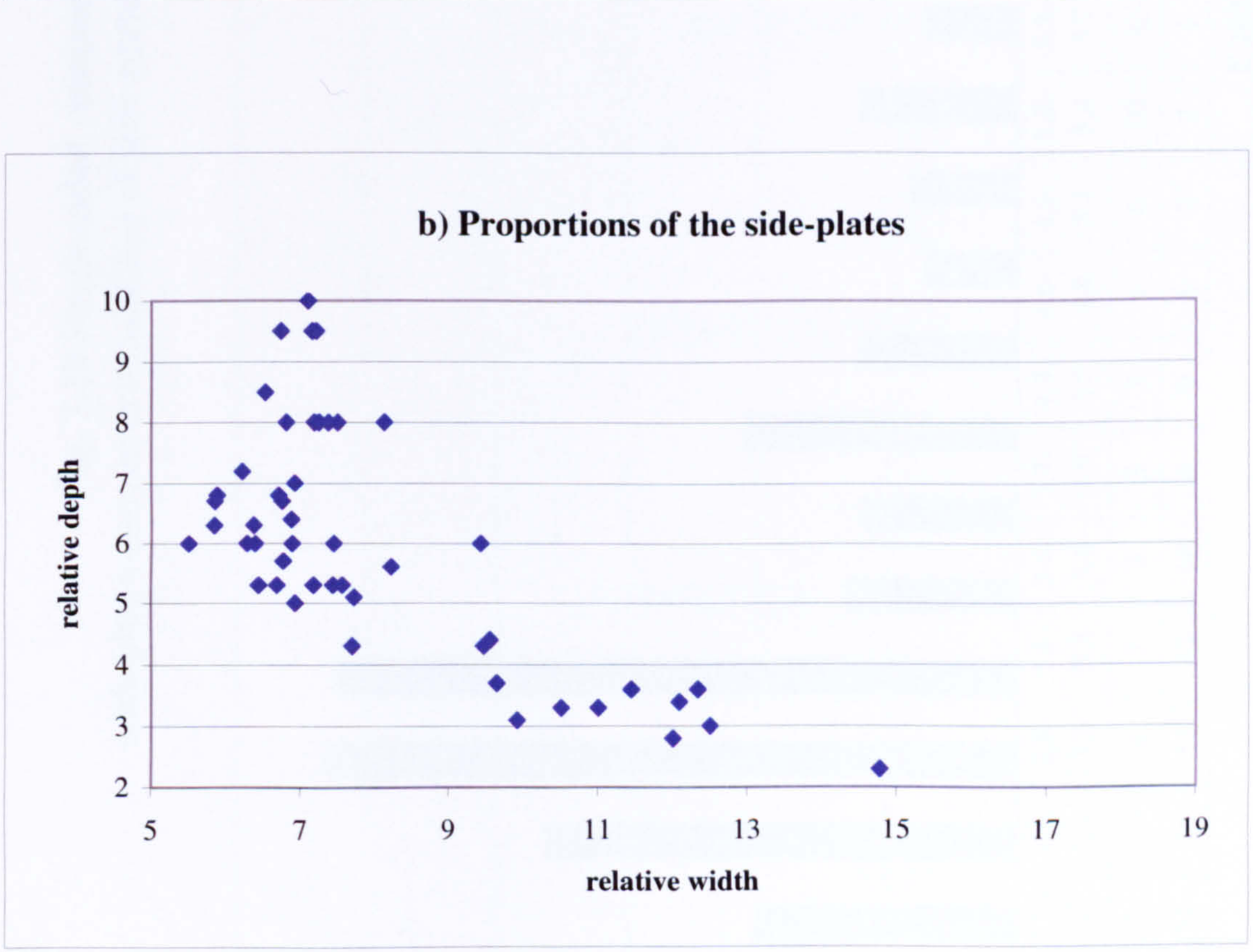
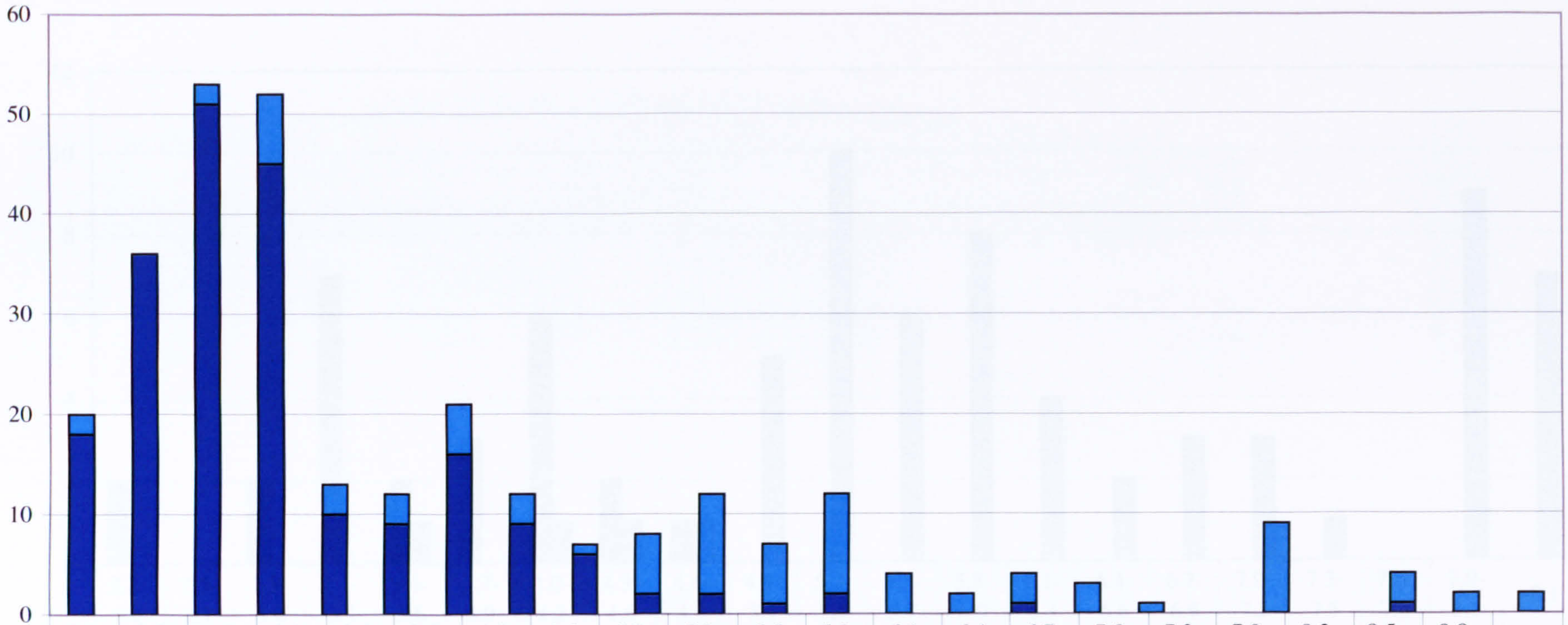


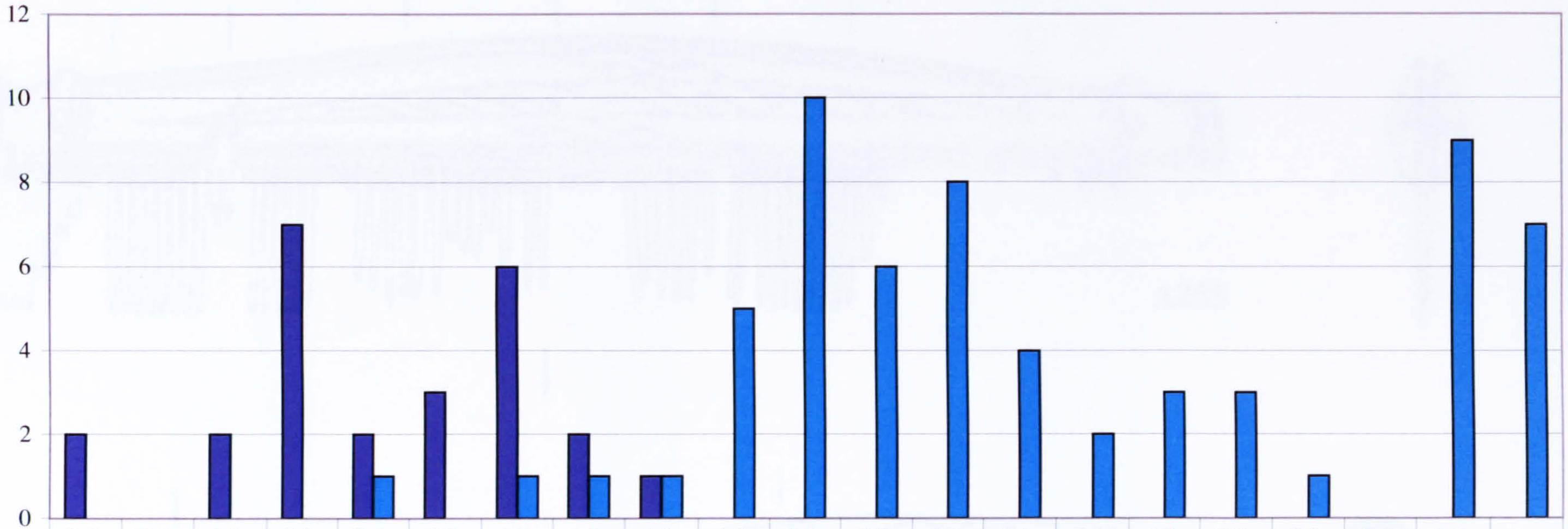
Fig. 3.29 Single-sided composite combs and cases with plano-convex cross-section of side-plates. Relative depth of the side-plates



	2.2-2.4	2.5-2.7	2.8-3.0	3.1-3.3	3.4-3.6	3.7-3.9	4.3-4.5	4.6-4.8	4.9-5.1	5.2-5.4	5.5-5.7	5.8-6.0	6.1-6.3	6.4-6.6	6.7-6.9	7.0-7.2	7.3-7.5	7.9-8.1	8.2-8.4	8.5.-8.7	8.8-9.0	>9.0
Cases	2	0	2	7	3	3	3	1	6	10	6	10	4	2	3	3	1	9	0	3	2	2
Combs	18	36	51	45	10	9	9	6	2	2	1	2	0	0	1	0	0	0	0	1	0	0

Σ 292 (87/209)

Fig. 3.30 Single-sided composite comb cases
with plano-convex cross-section of side-plates. Relative depth of the side-plates

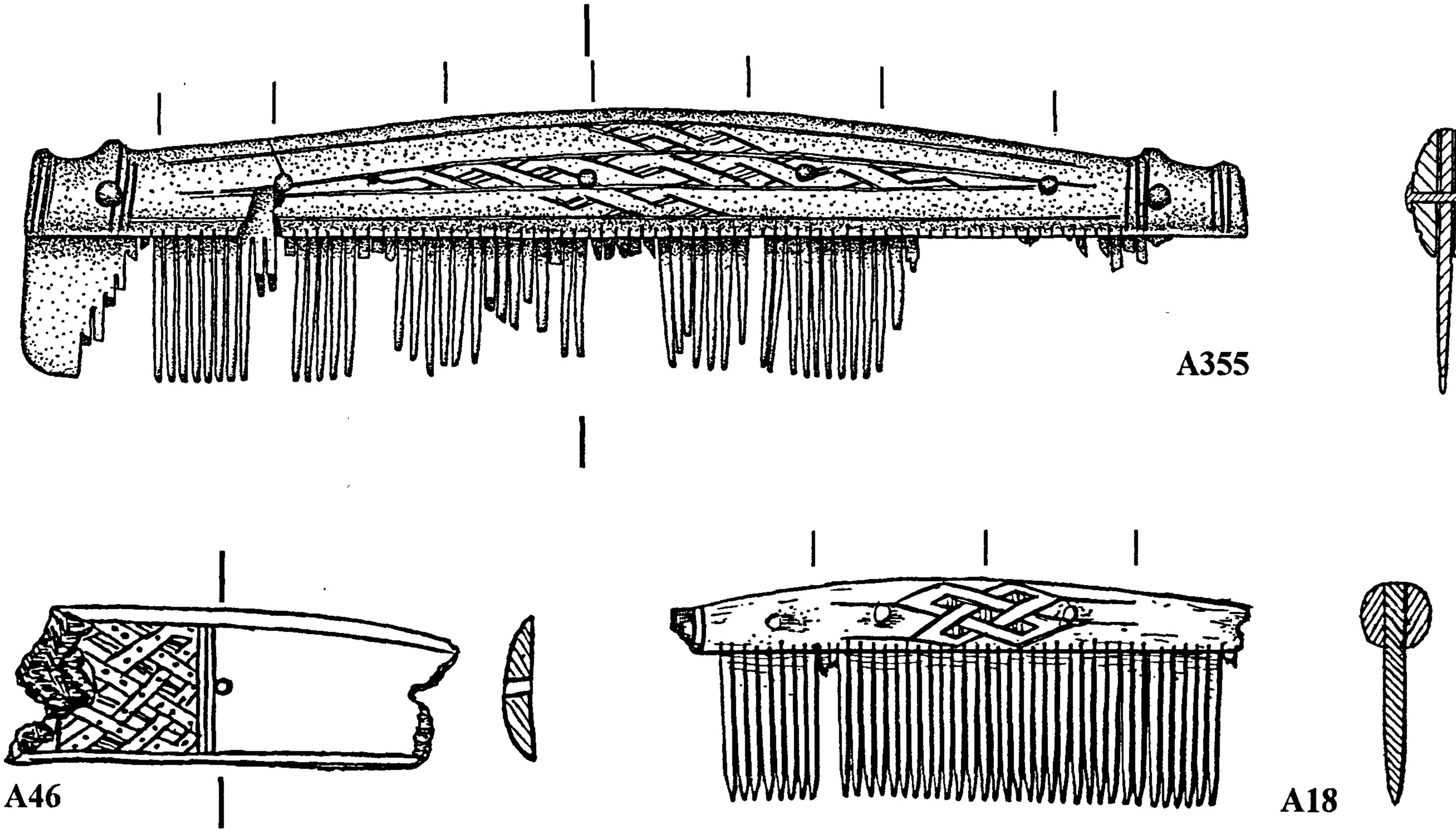


	2.2-2.4	2.5-2.7	2.8-3.0	3.1-3.3	3.4-3.6	3.7-3.9	4.0-4.2	4.3-4.5	4.6-4.8	4.9-5.1	5.2-5.4	5.5-5.7	5.8-6.0	6.1-6.3	6.4-6.6	6.7-6.9	7.0-7.2	7.3-7.5	7.6-7.8	7.9-8.1	>8.1
4 side-plated	2	0	2	7	2	3	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0
2 side-plated	0	0	0	0	1	0	1	1	1	5	10	6	8	4	2	3	3	1	0	9	7

Σ 87

4 side-plated **2 side-plated**

Fig. 3.31 Combs with interlaced linear decoration

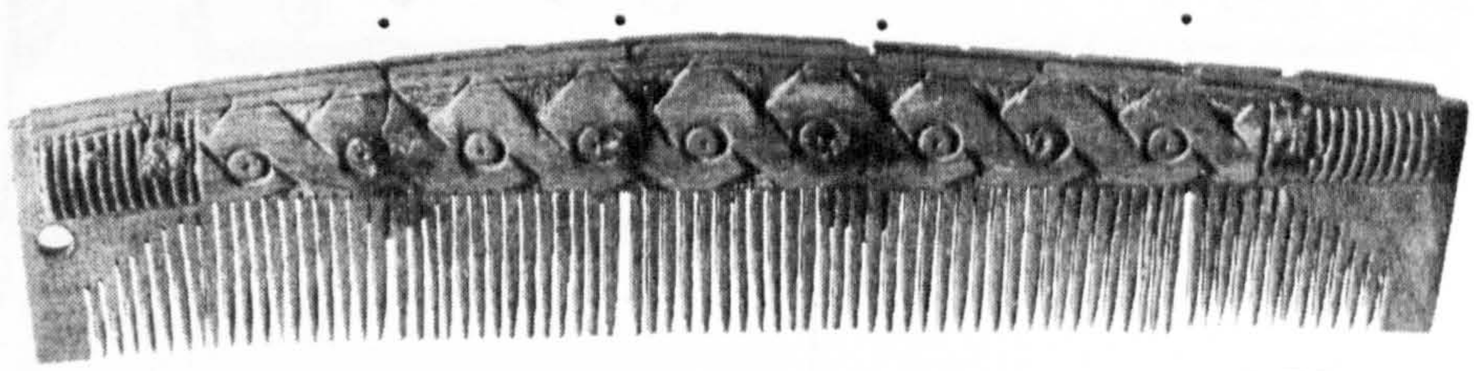


A355

A46

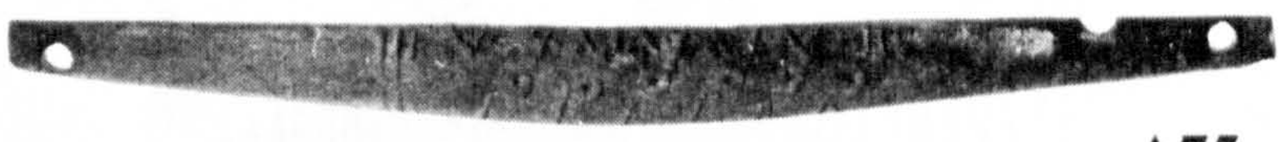
A18

Fig. 3.32 Single-sided composite combs and cases with stylised interlaced decoration



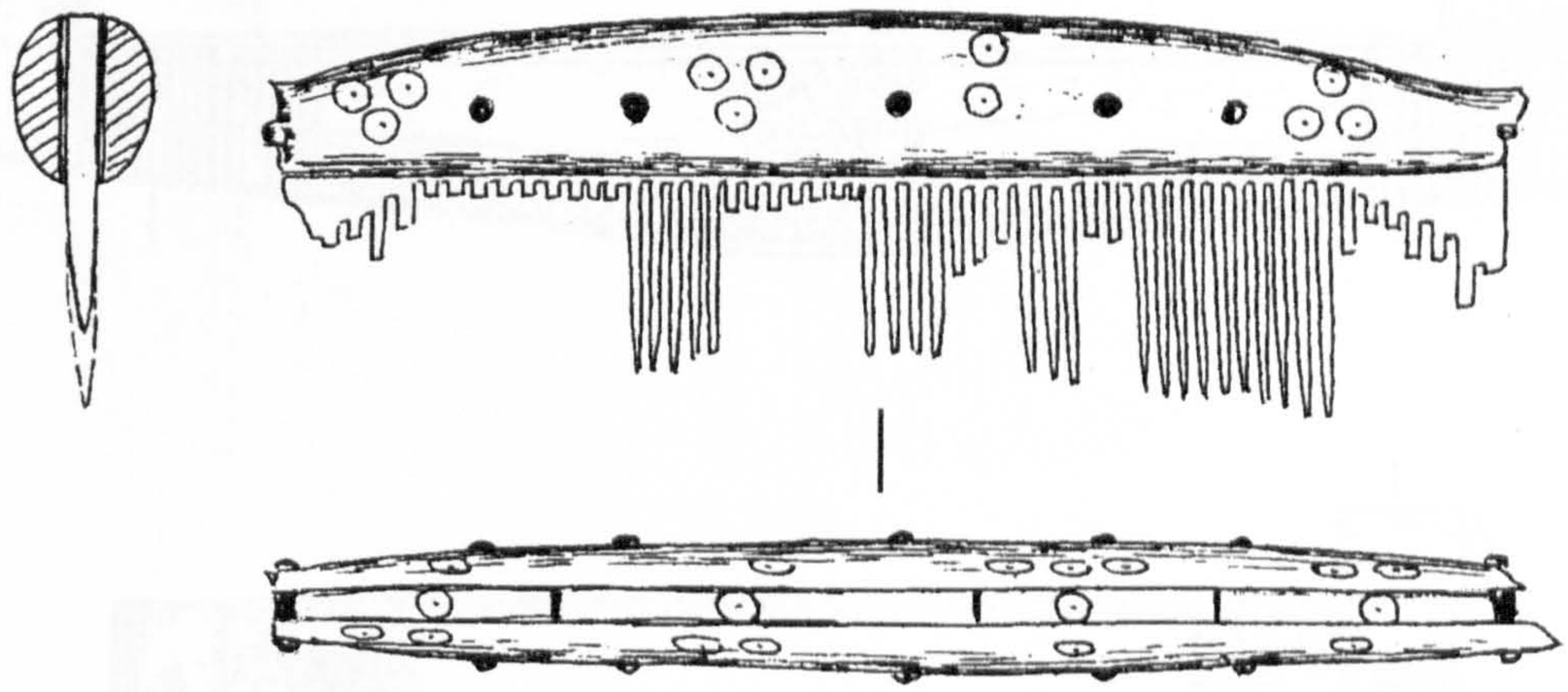
A59

A70

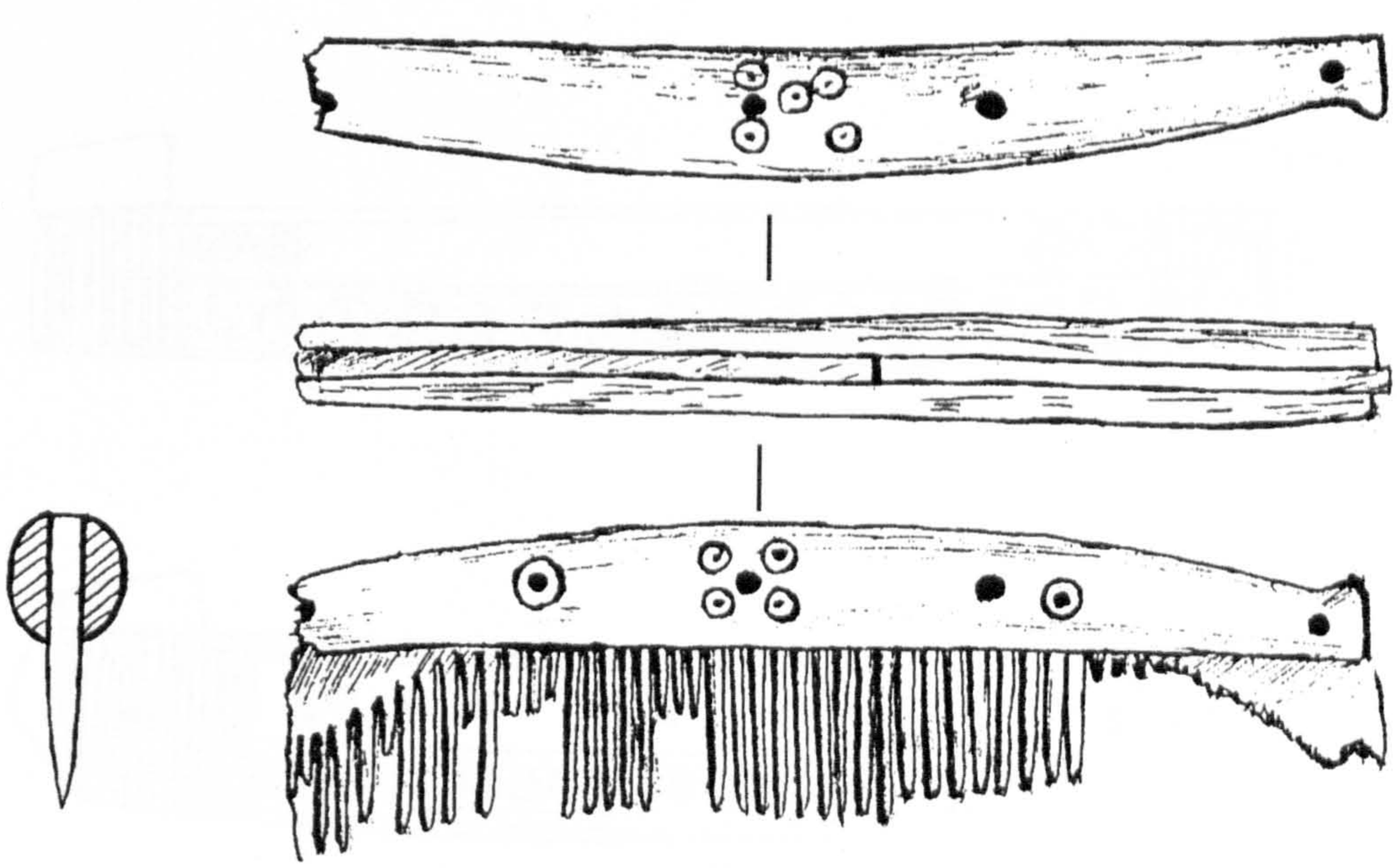


A75

Fig. 3.33 Mid 10th century combs decorated with groups of ring-and-dot motifs

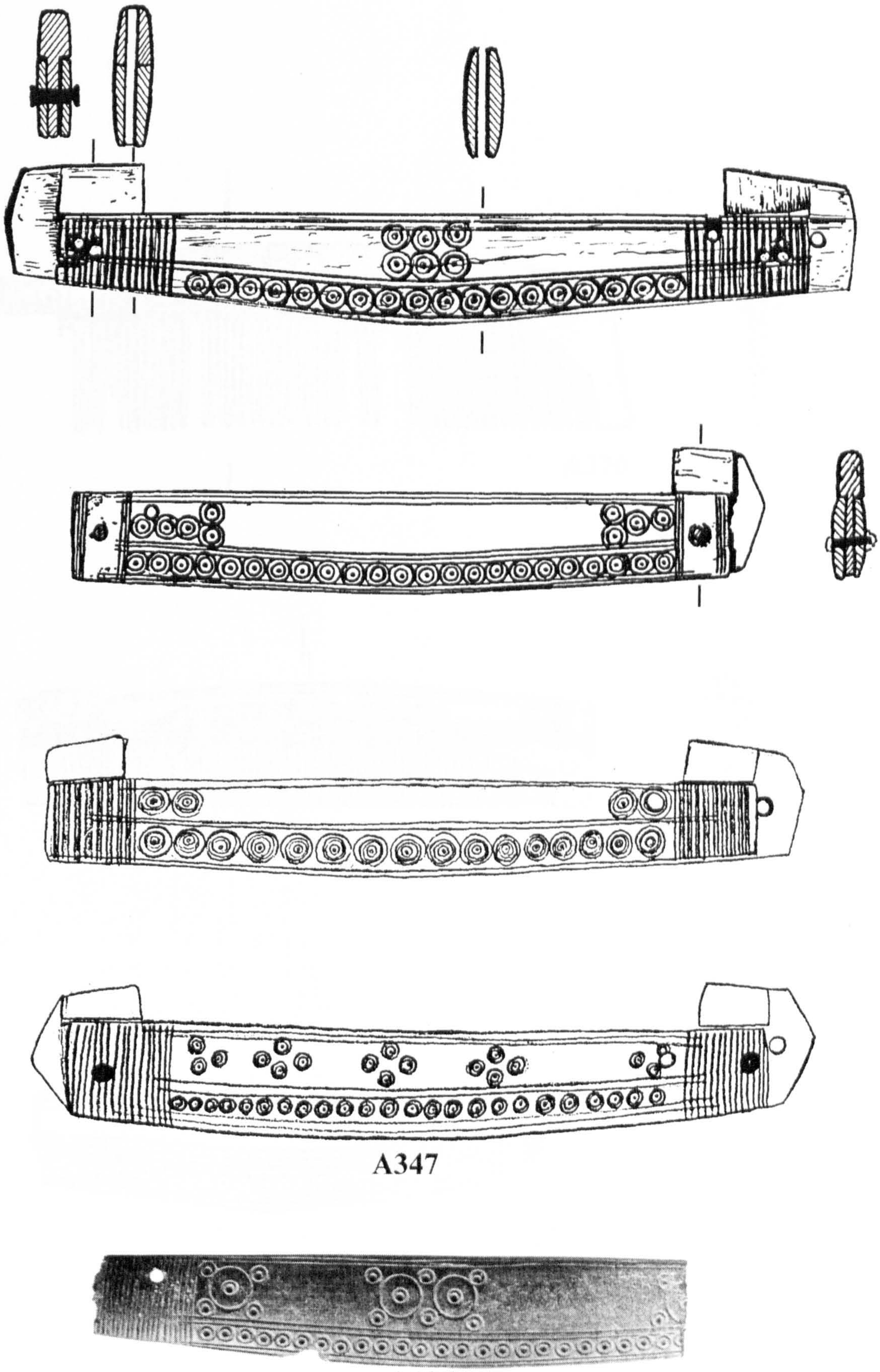


A144



A122

Fig. 3.34 Cases decorated with bands of multiple ring-and-dot motifs and groups of ring-and-dot motifs



A347

A106

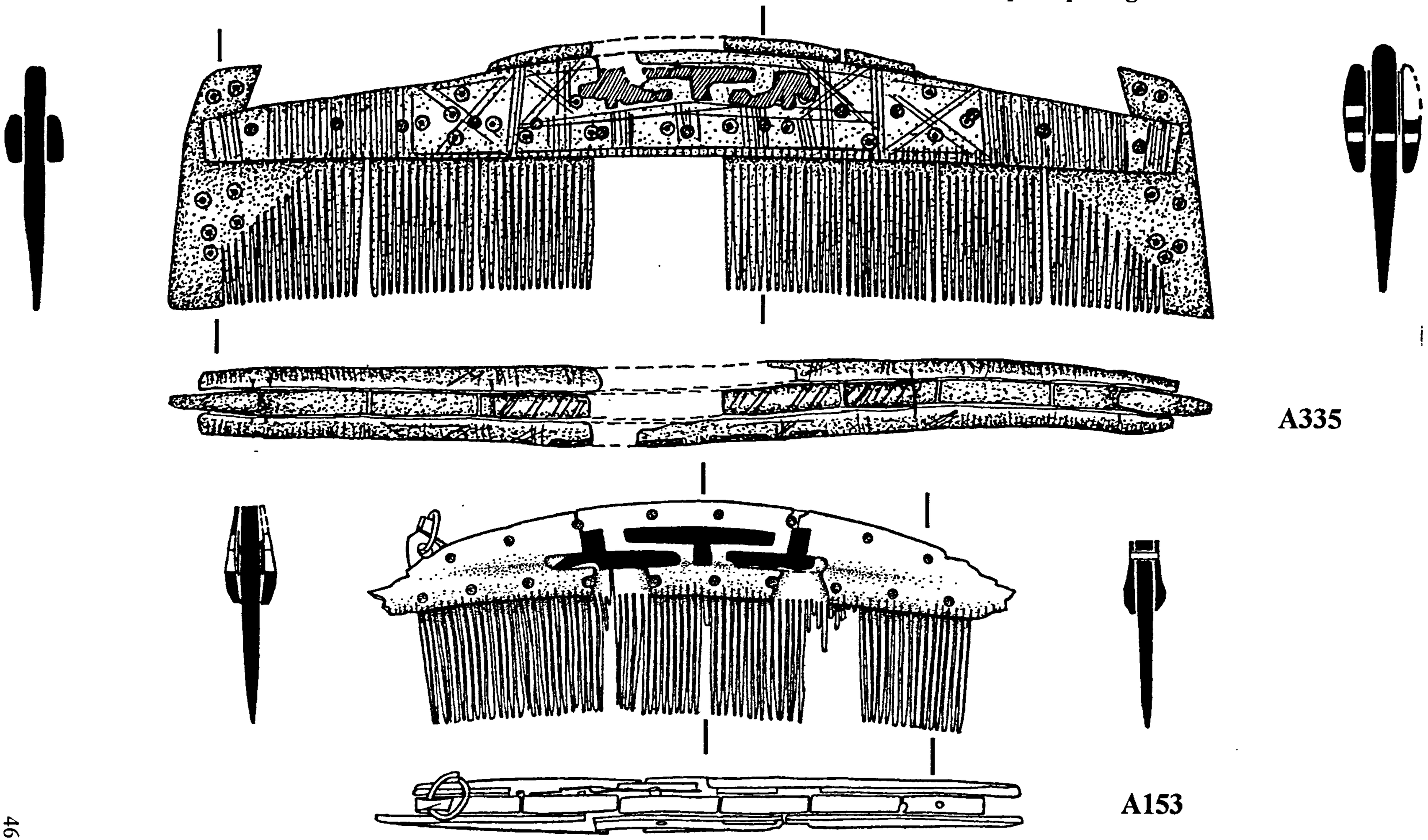
Fig. 3.35 Combs and cases decorated with bands of multiple ring-and-dot motifs arranged vertically and horizontally

A370

A192

A170

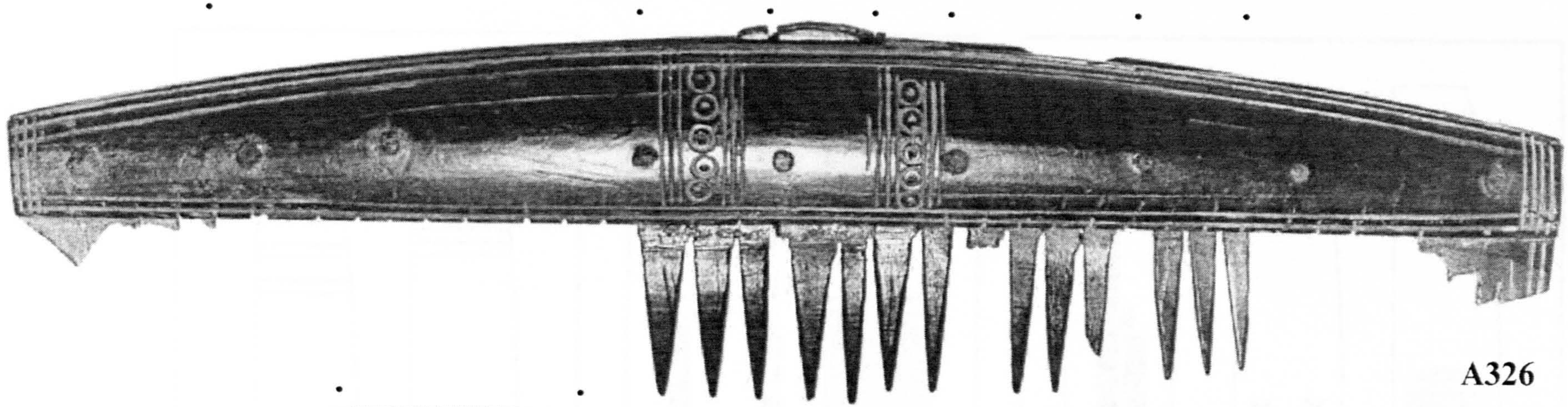
Fig. 3.36 Combs with bronze sheeting behind the side-plates with T-shaped openings



A335

A153

Fig. 3.37 The 10th century single-sided composite combs with decorated end-plates



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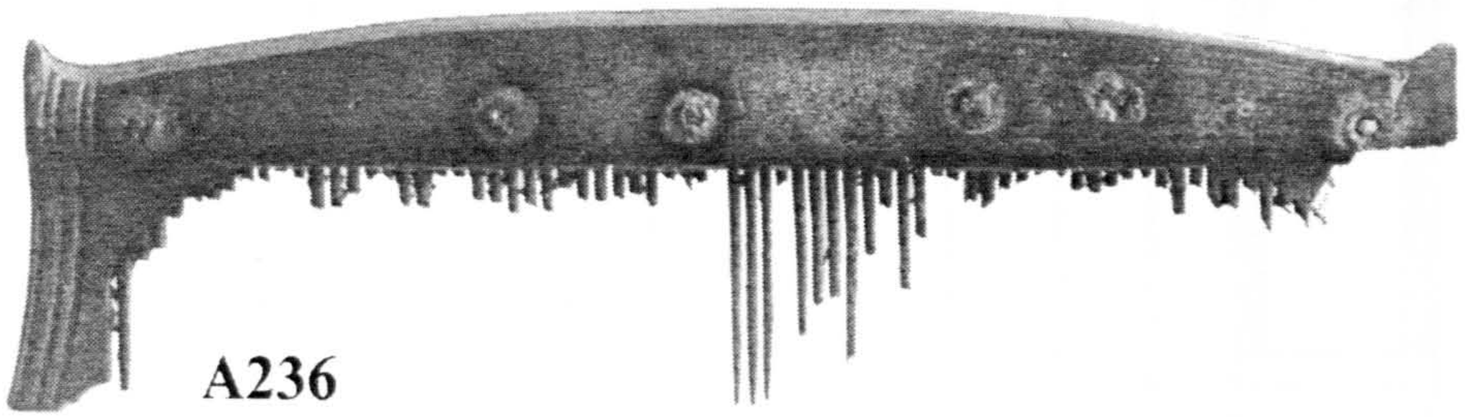

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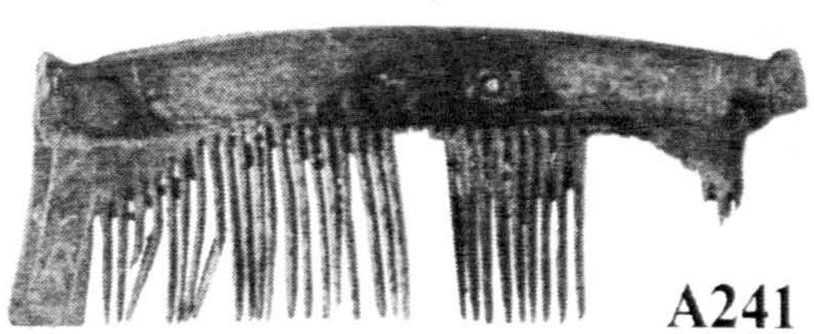

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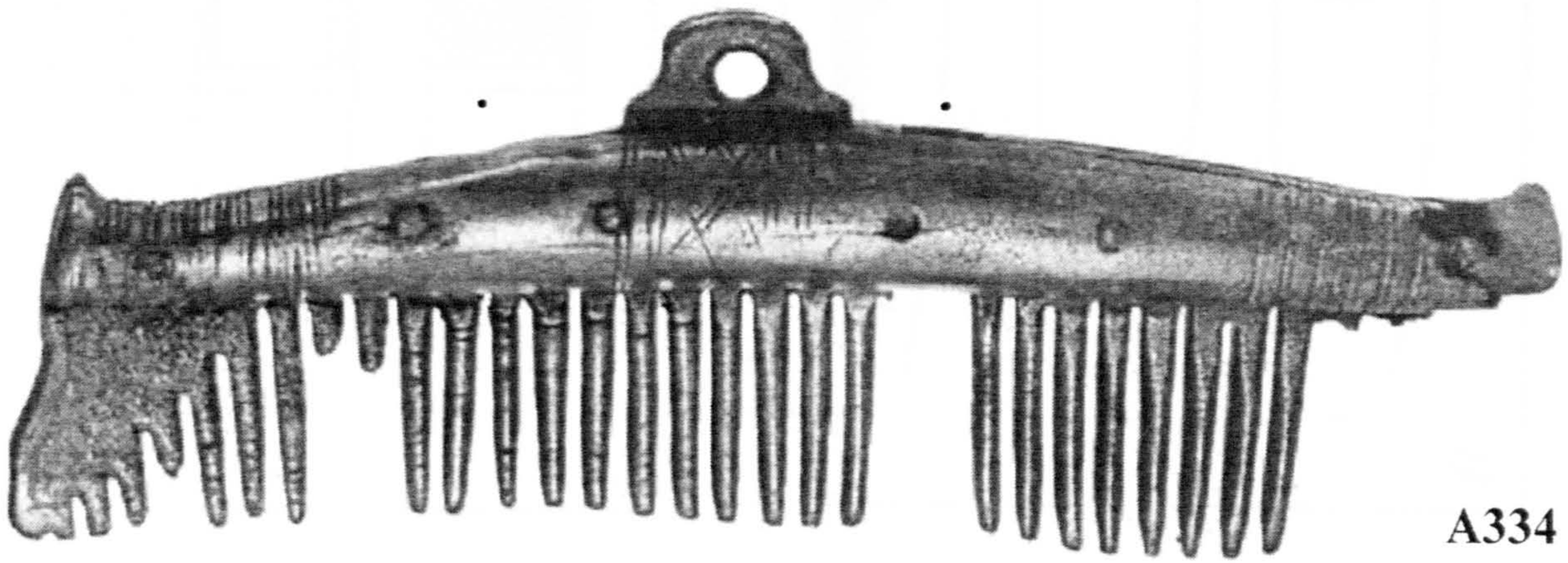
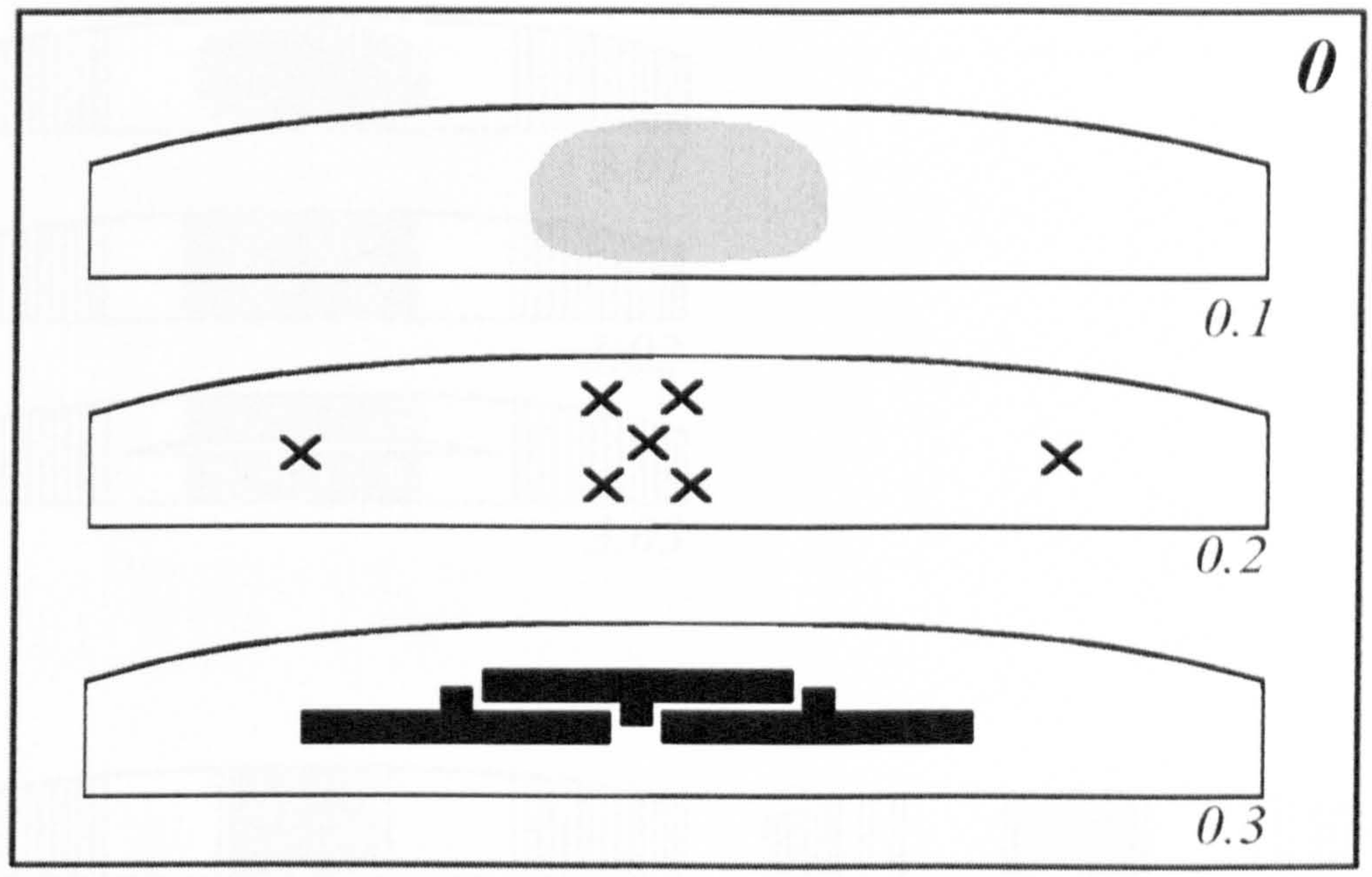
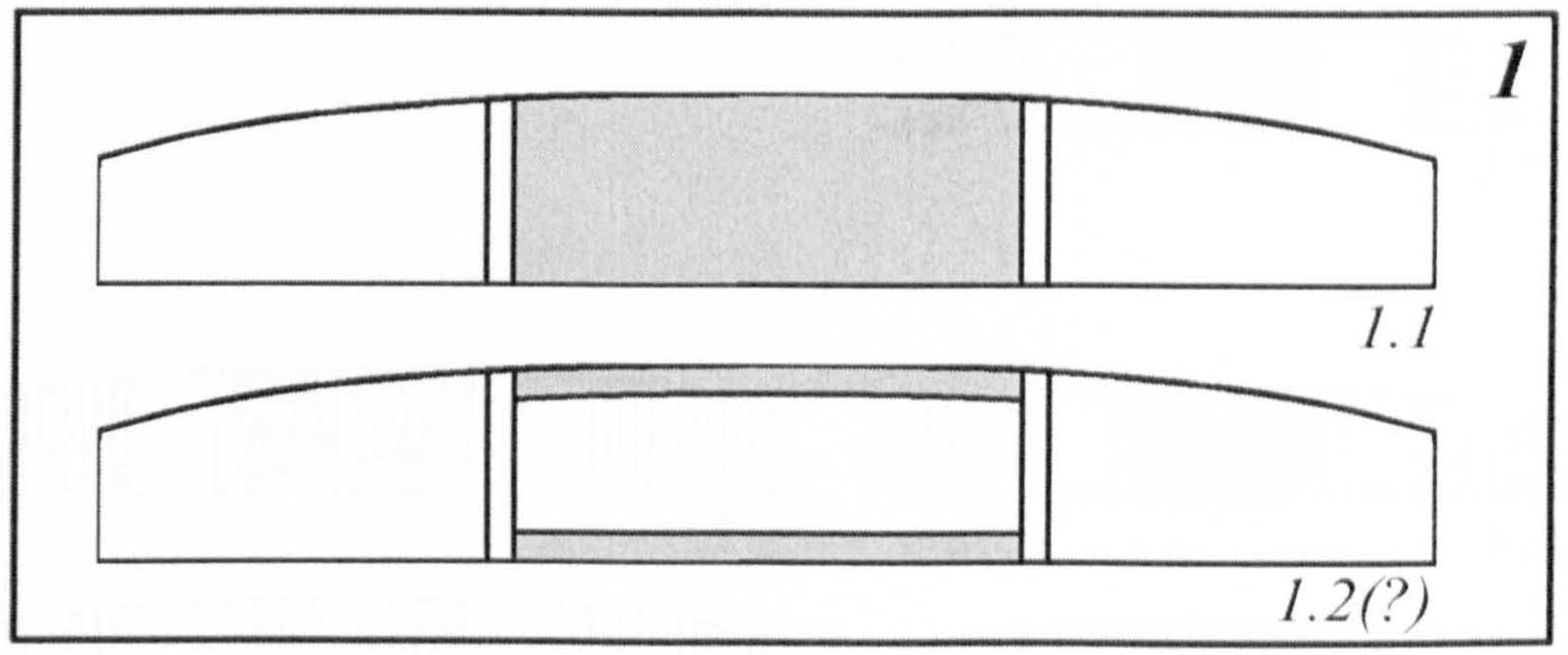
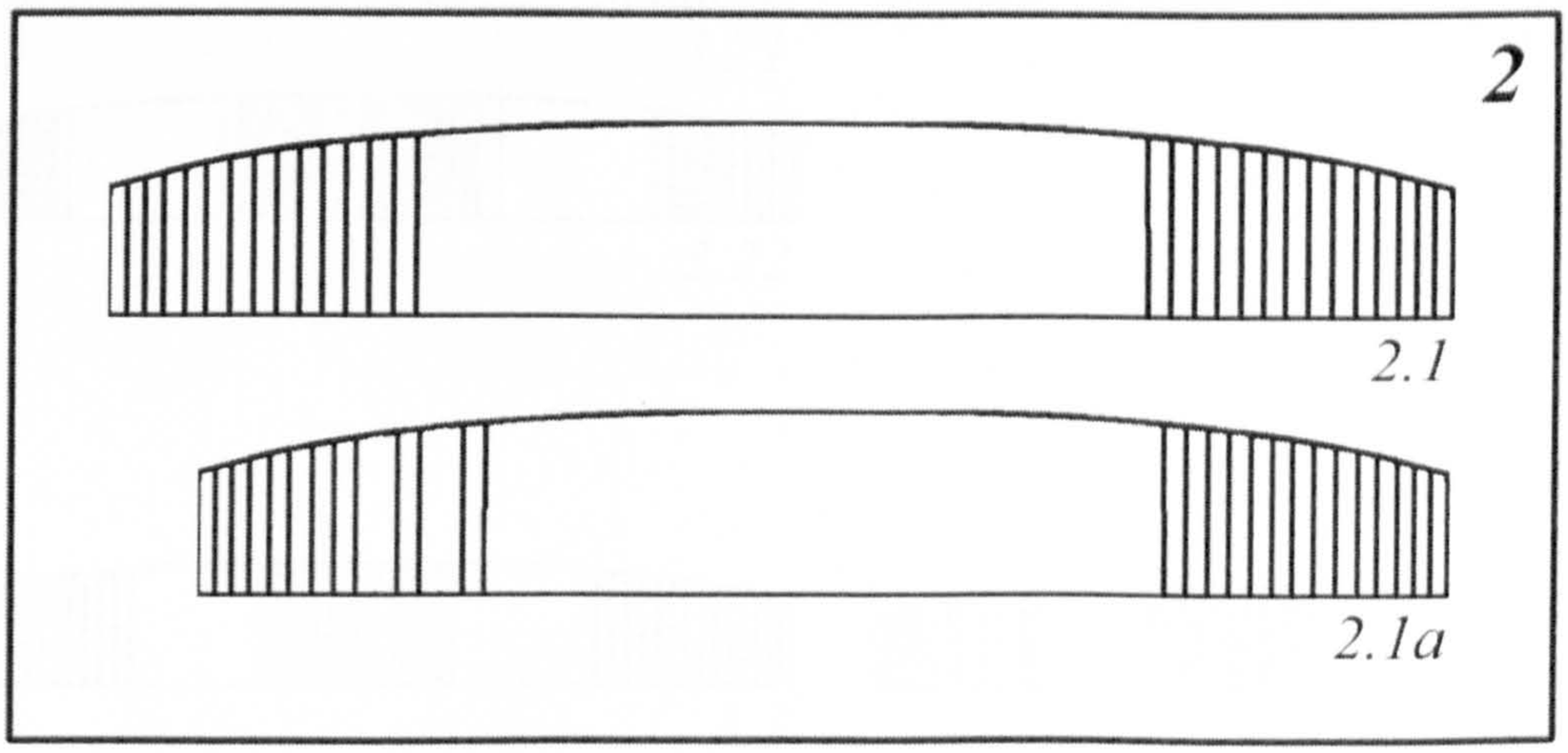


A334

Fig. 3.38 Decorative schemes 0, 1 and 2







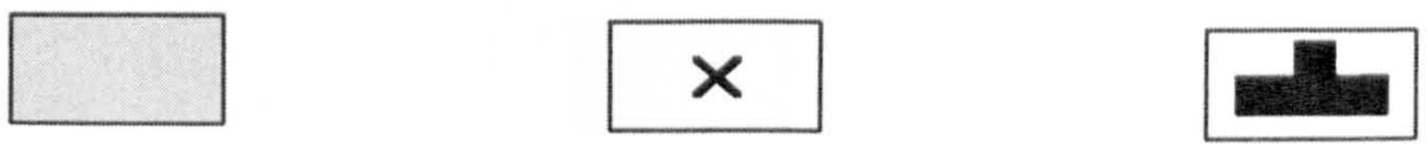
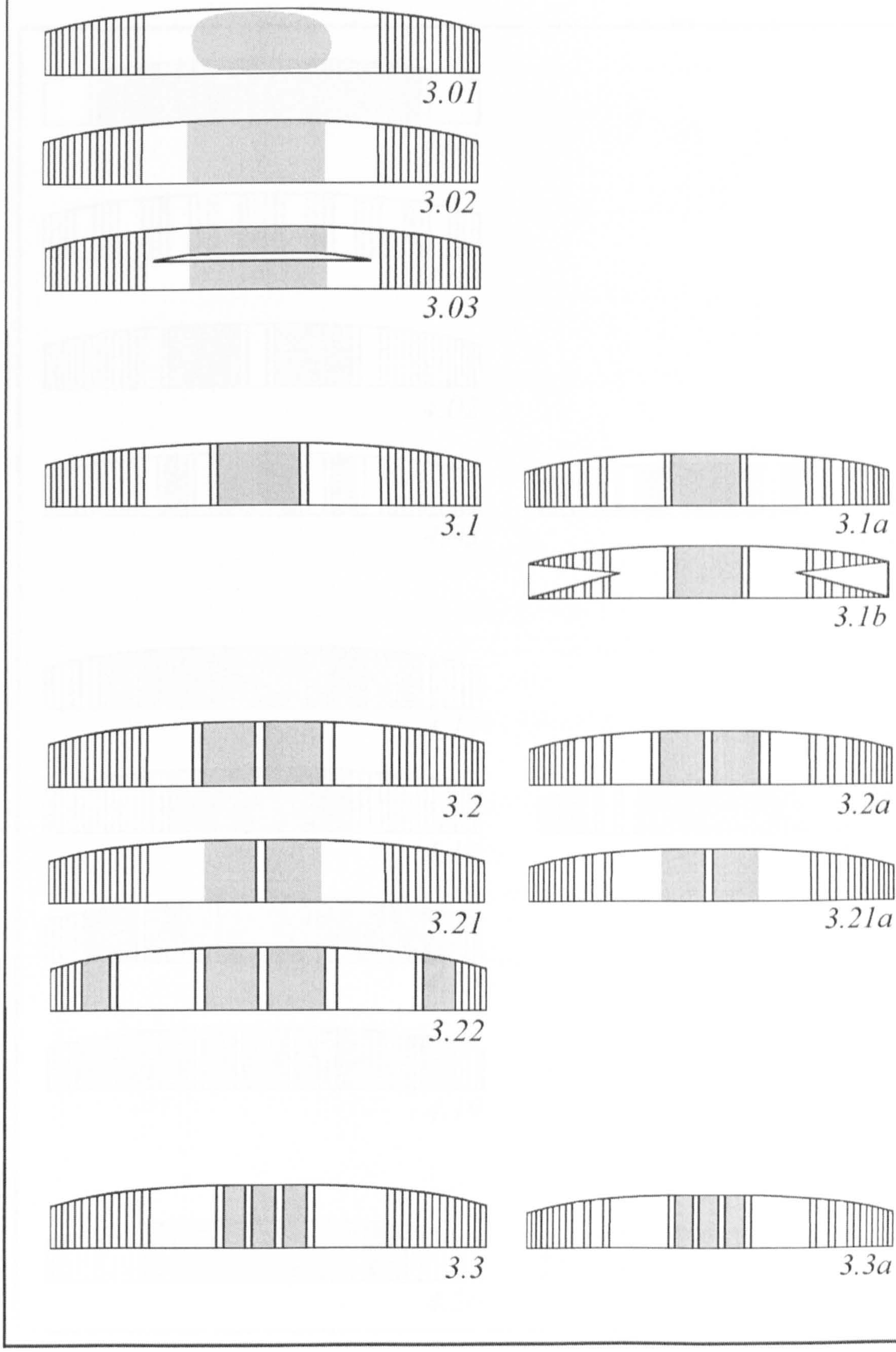


Fig. 3.39 Decorative scheme 3



decorated areas

Fig. 3.40 Decorative scheme 4

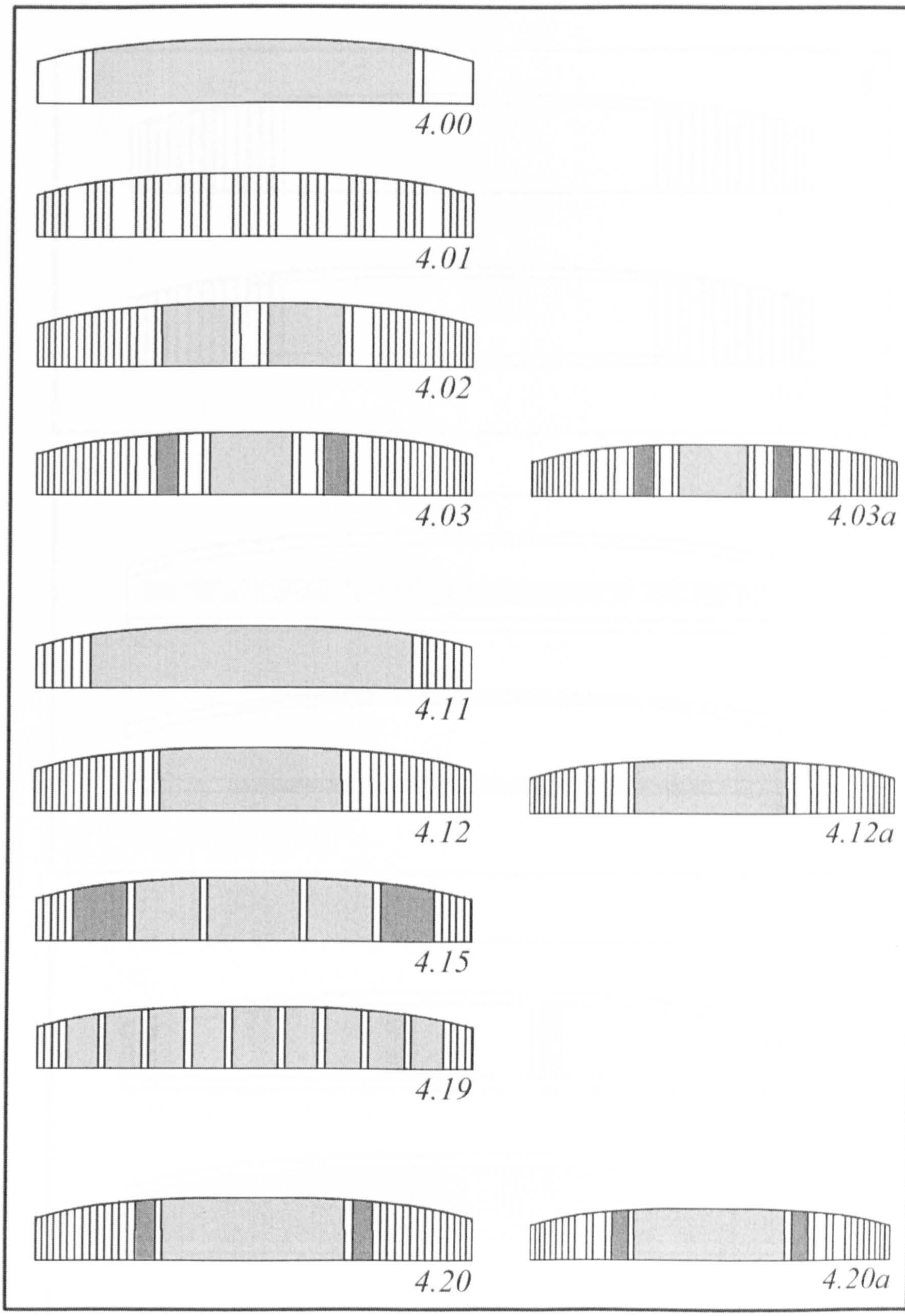


Fig. 3.41 Decorative schemes 5, 7 and 8

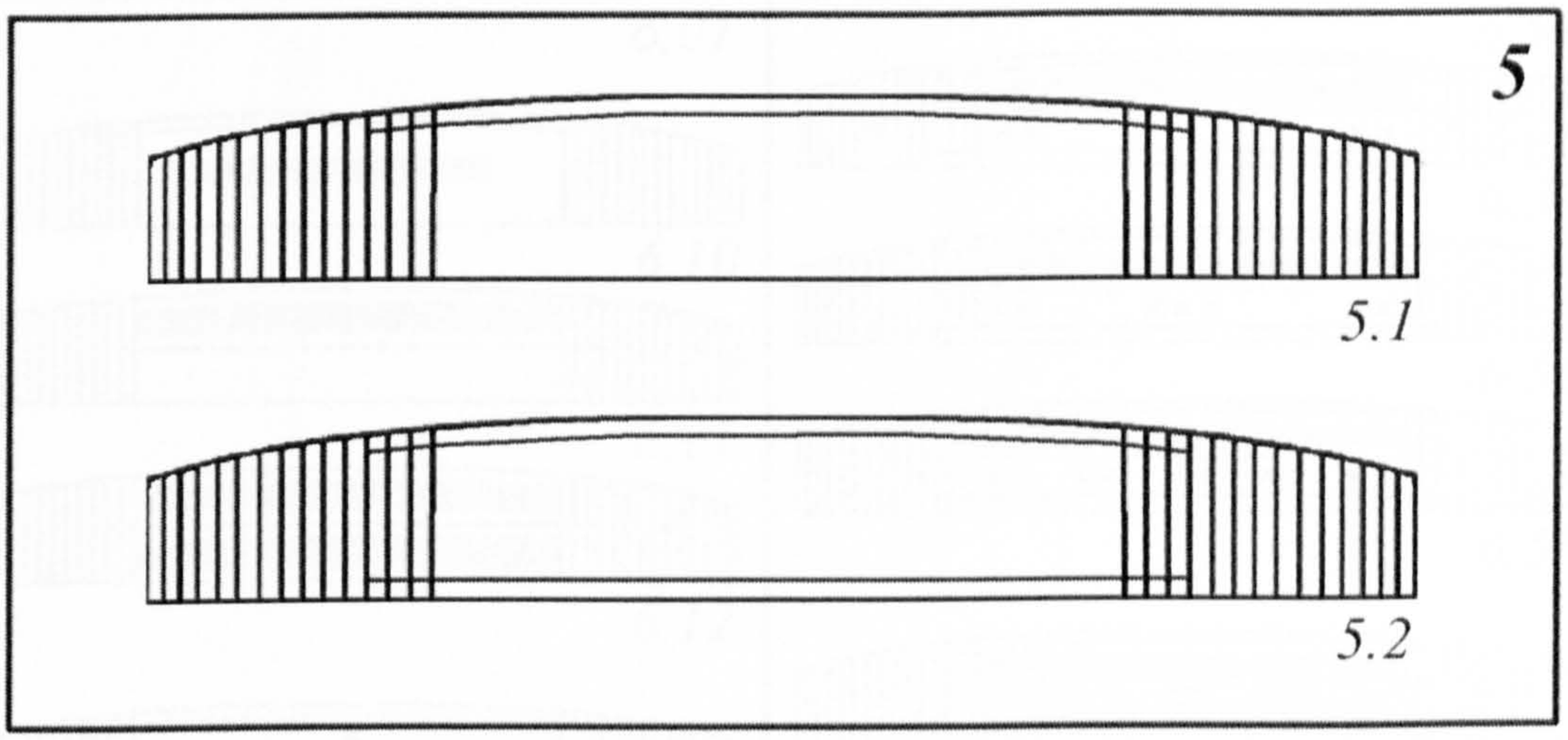
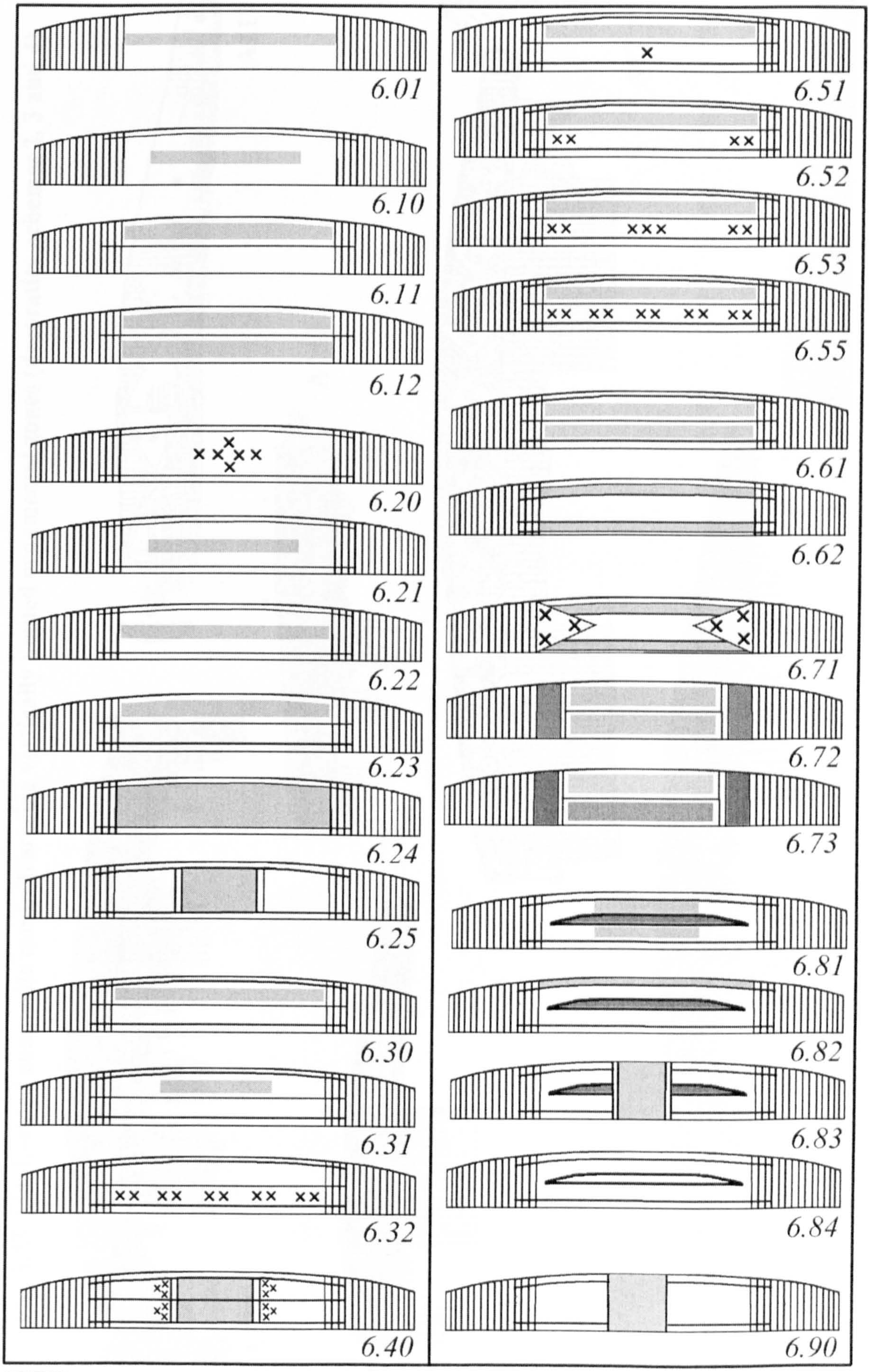
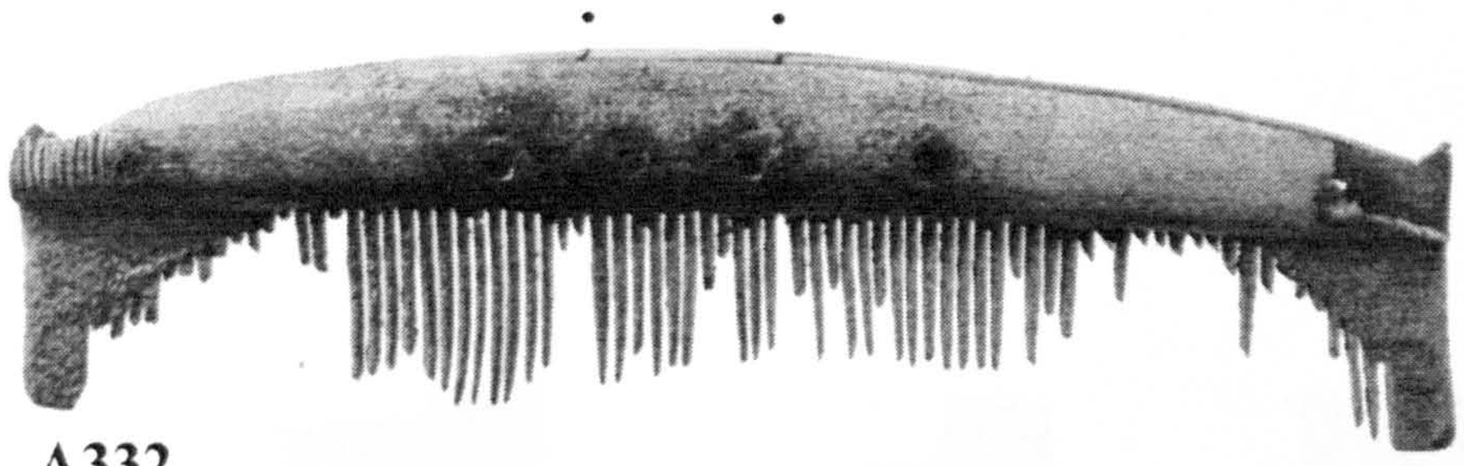


Fig. 3.42 Decorative scheme 6

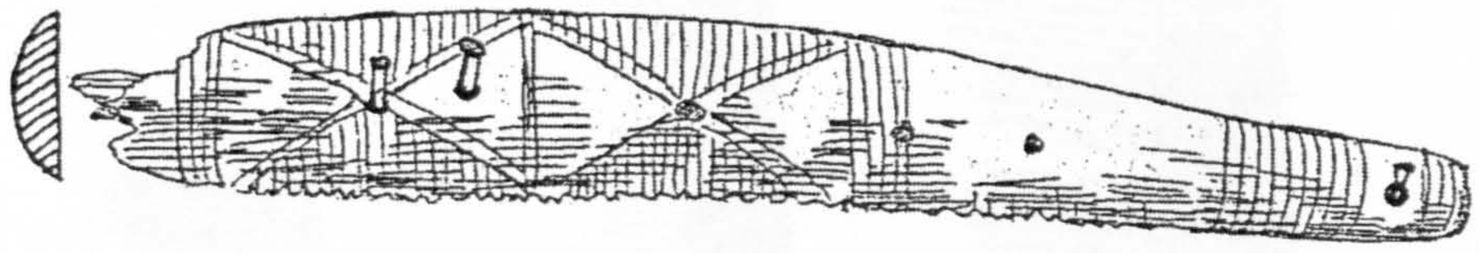


×—single decorative motifs —areas decorated differently—

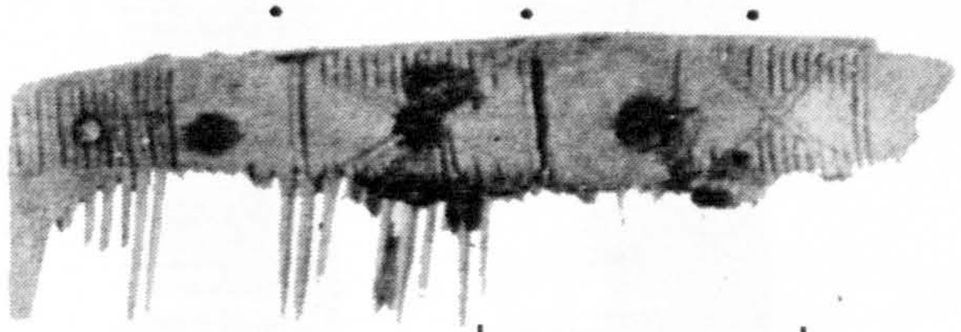
Fig. 3.43 Single-sided composite combs featuring vertically limited ornamental zones (decoratice achemes 2, 3 and 4)



A332



A117



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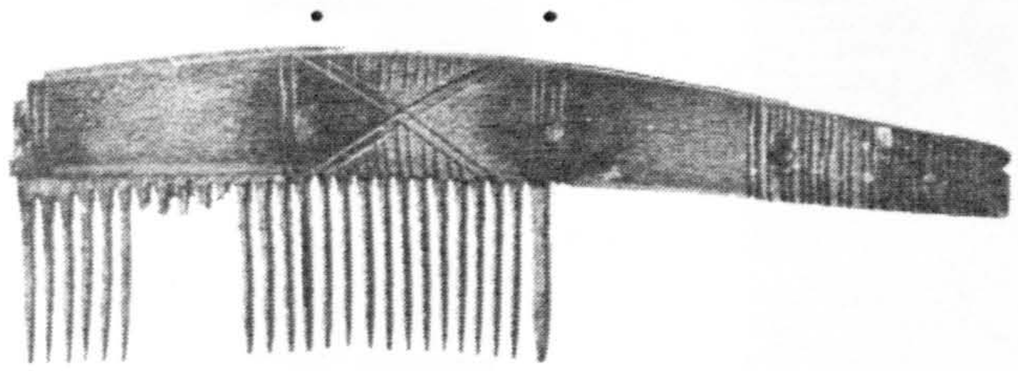

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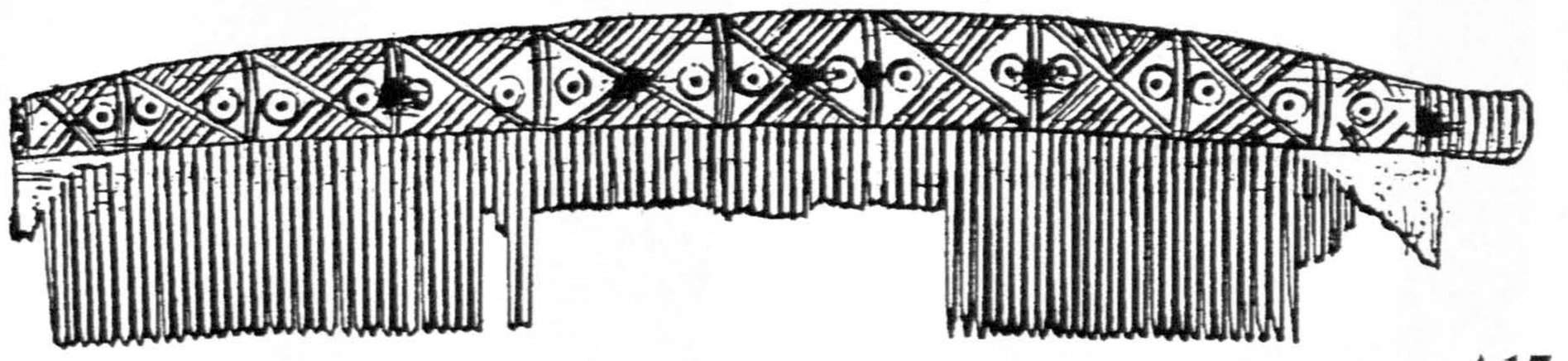

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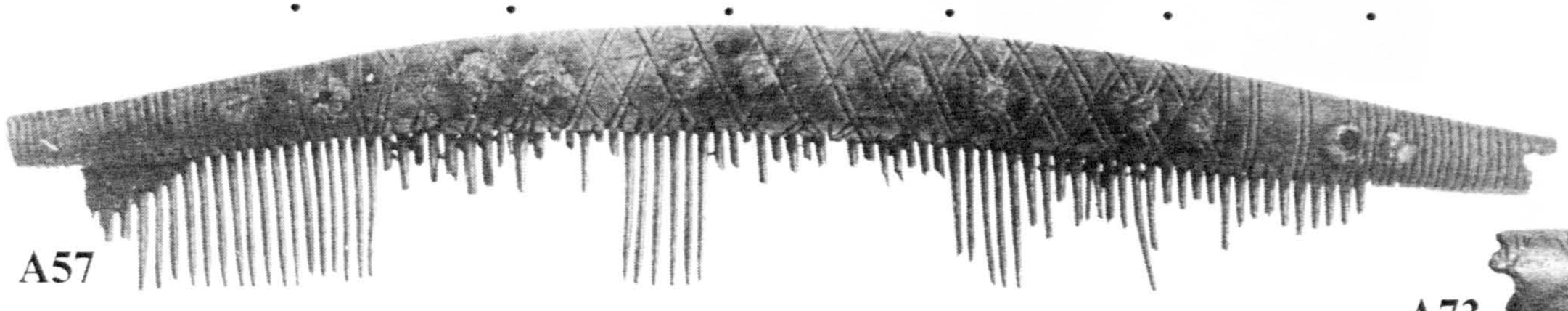

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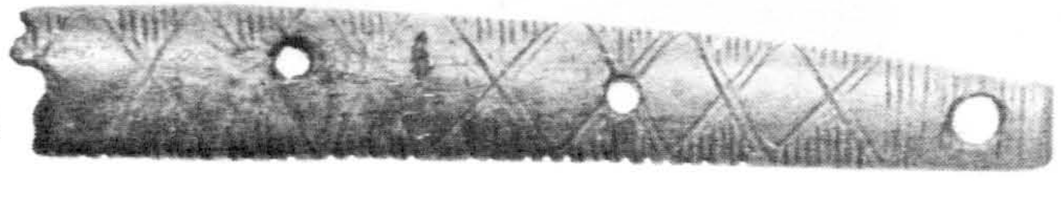
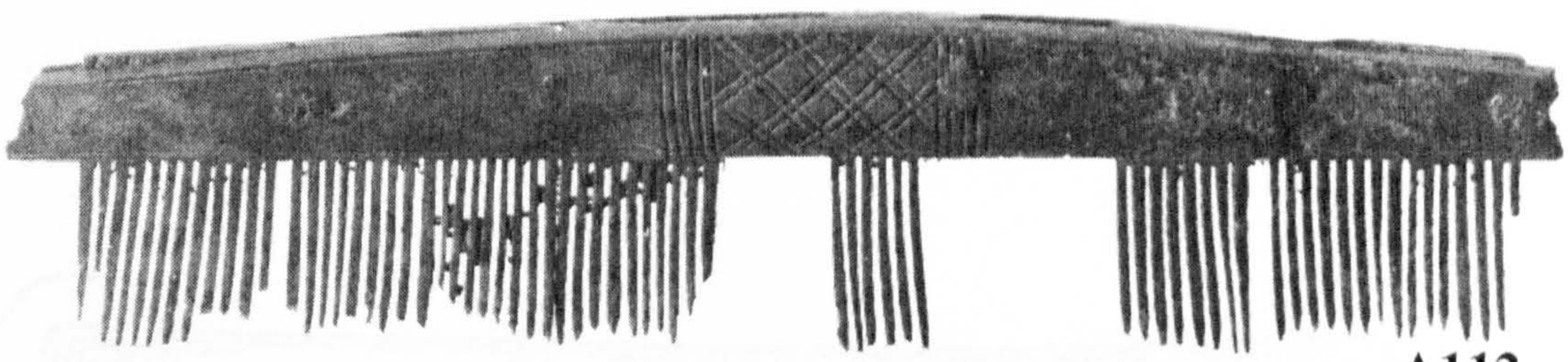


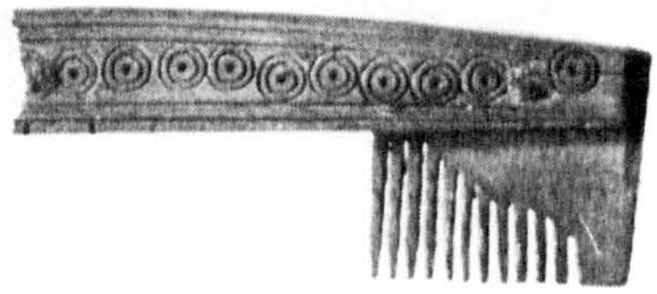
A73

Fig. 3.44 Single-sided composite combs featuring ornamentation according to decorative scheme 6

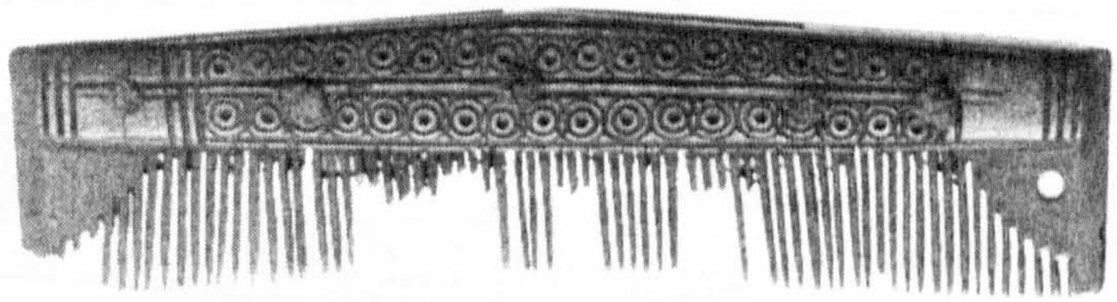


A112

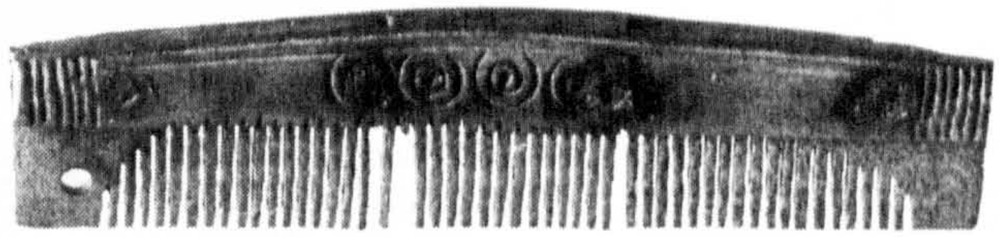
A107



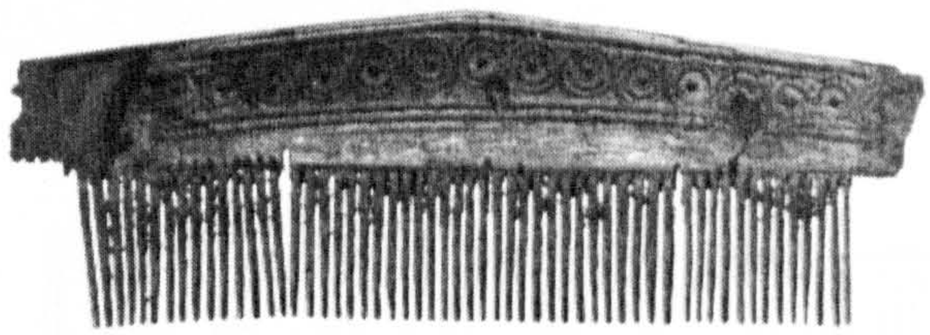
A60



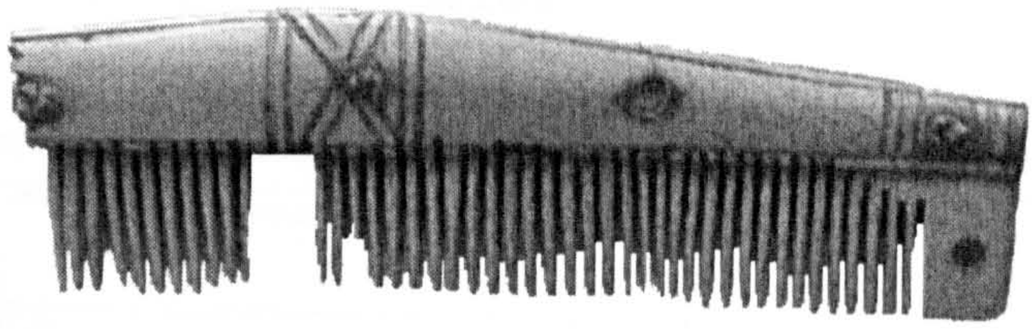
A92



A69

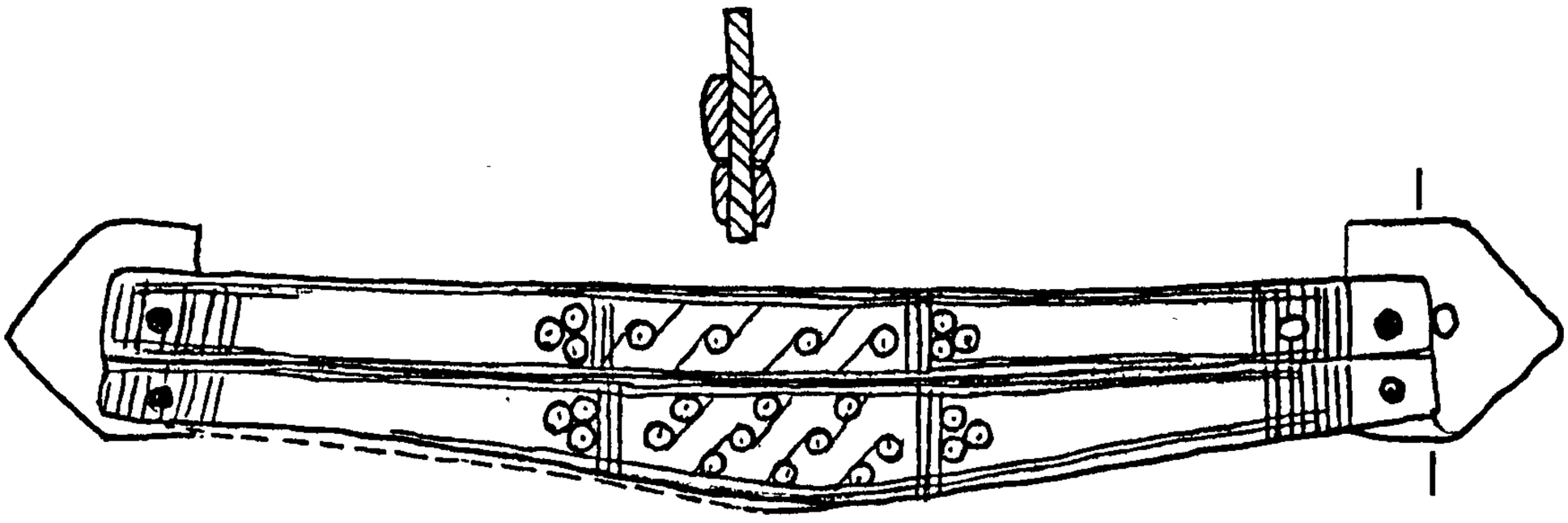


A91

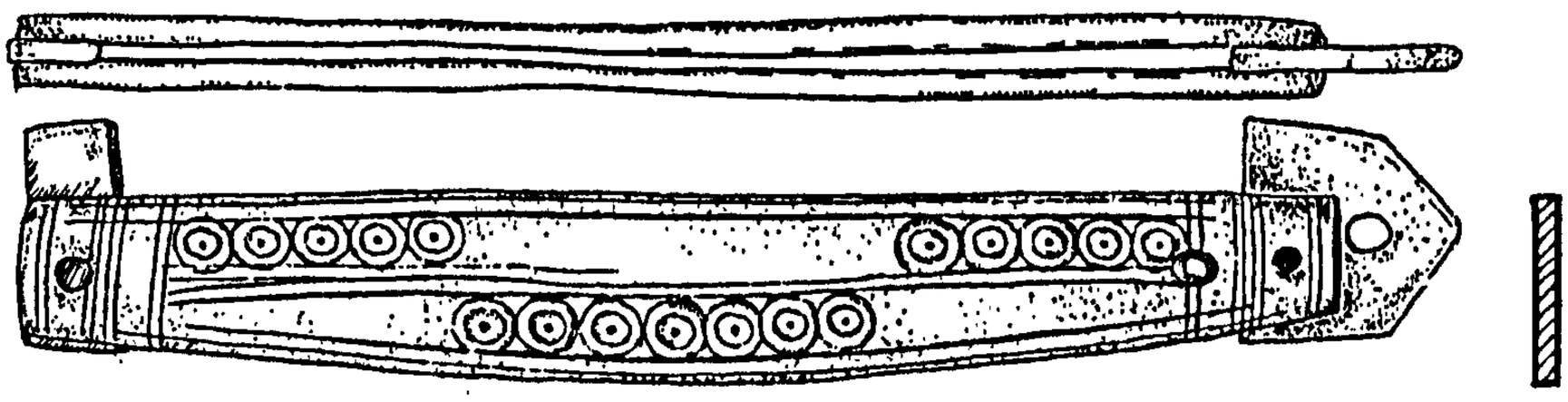


A187

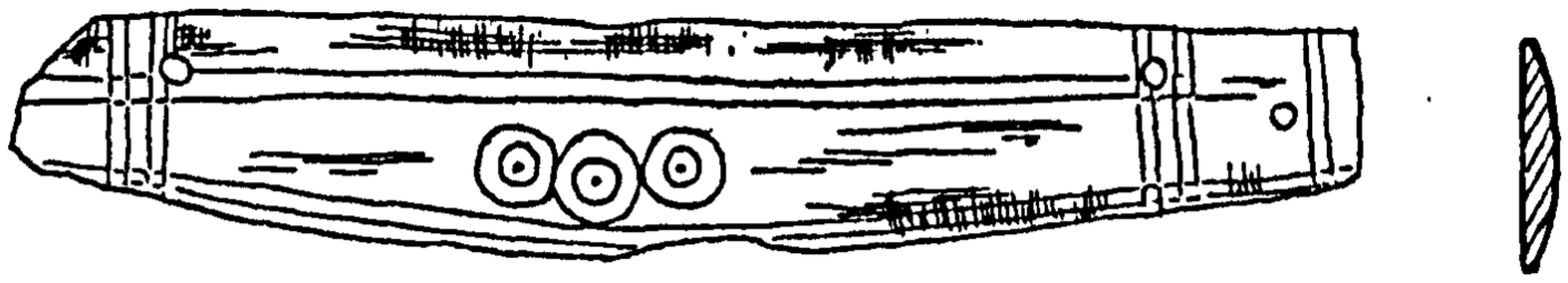
Fig. 3.45 Cases featuring ornamentation according to decorative scheme 6



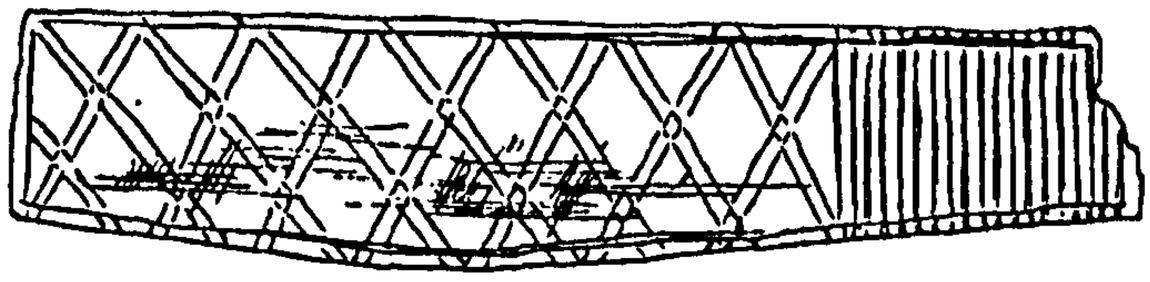
A348



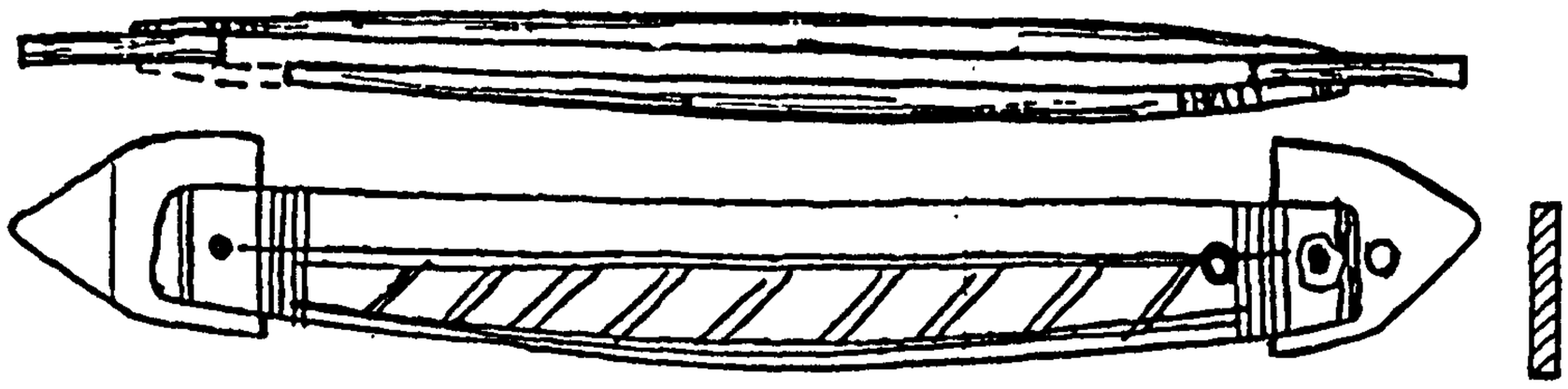
A134



A159

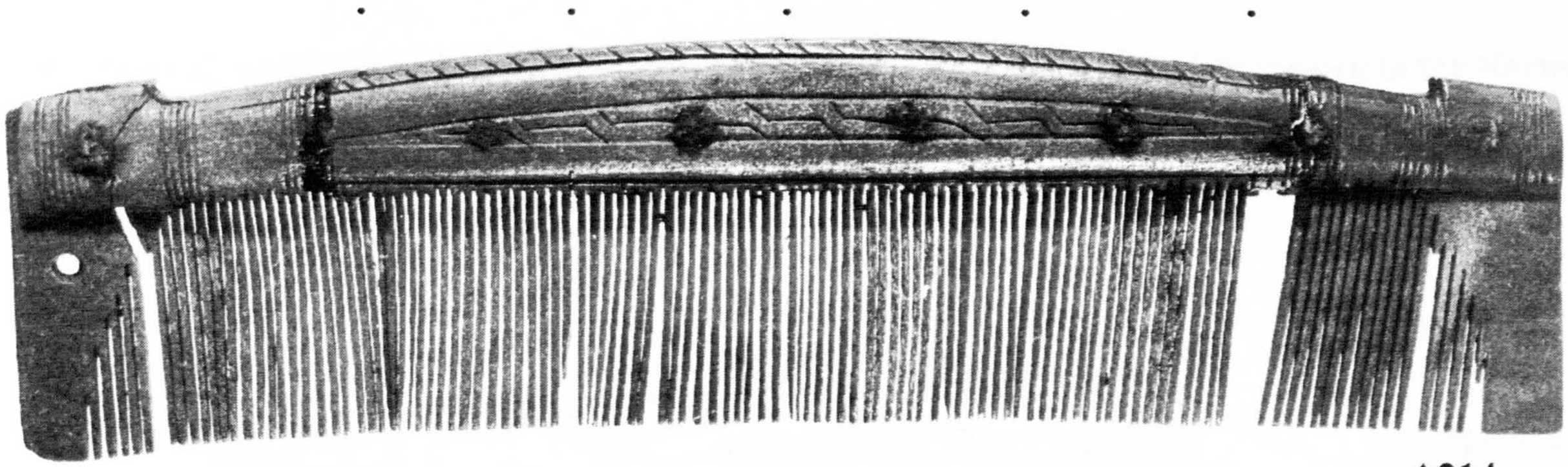


A161

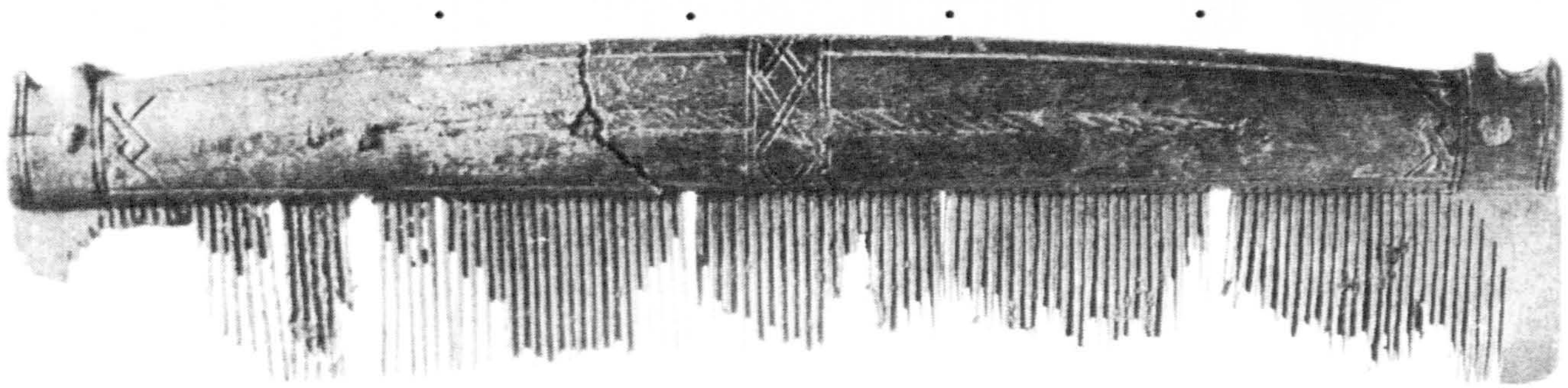


A37

Fig. 3.46 Combs featuring Scandinavian tradition of ornamentation (variant 6.8 of decorative scheme 6)

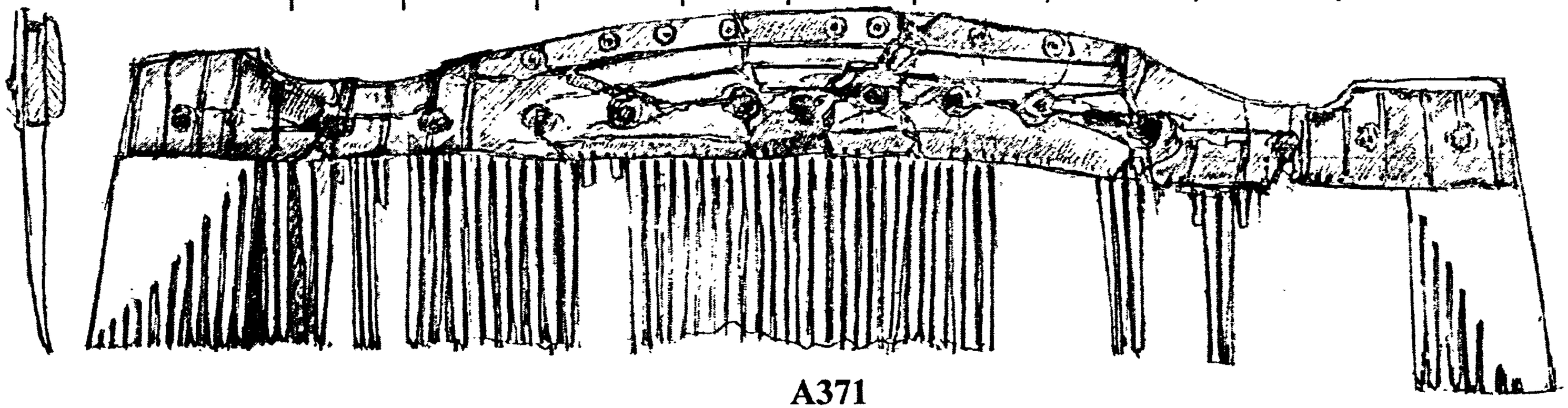


A214



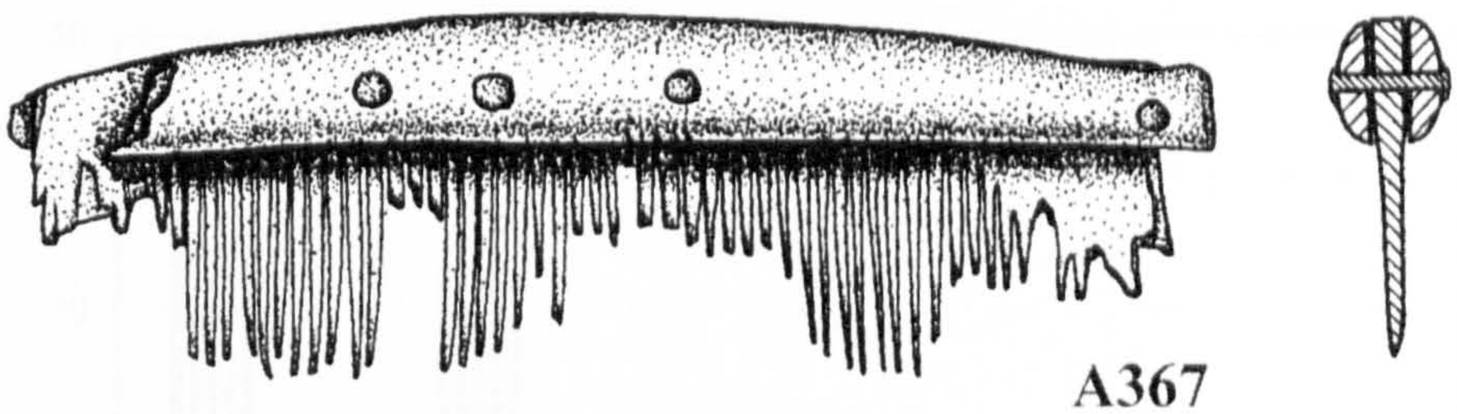
A328

Fig. 3.47 The 11th century comb from the Novgorod Kremlin, manufactured and decorated in the Norwegian tradition



A371

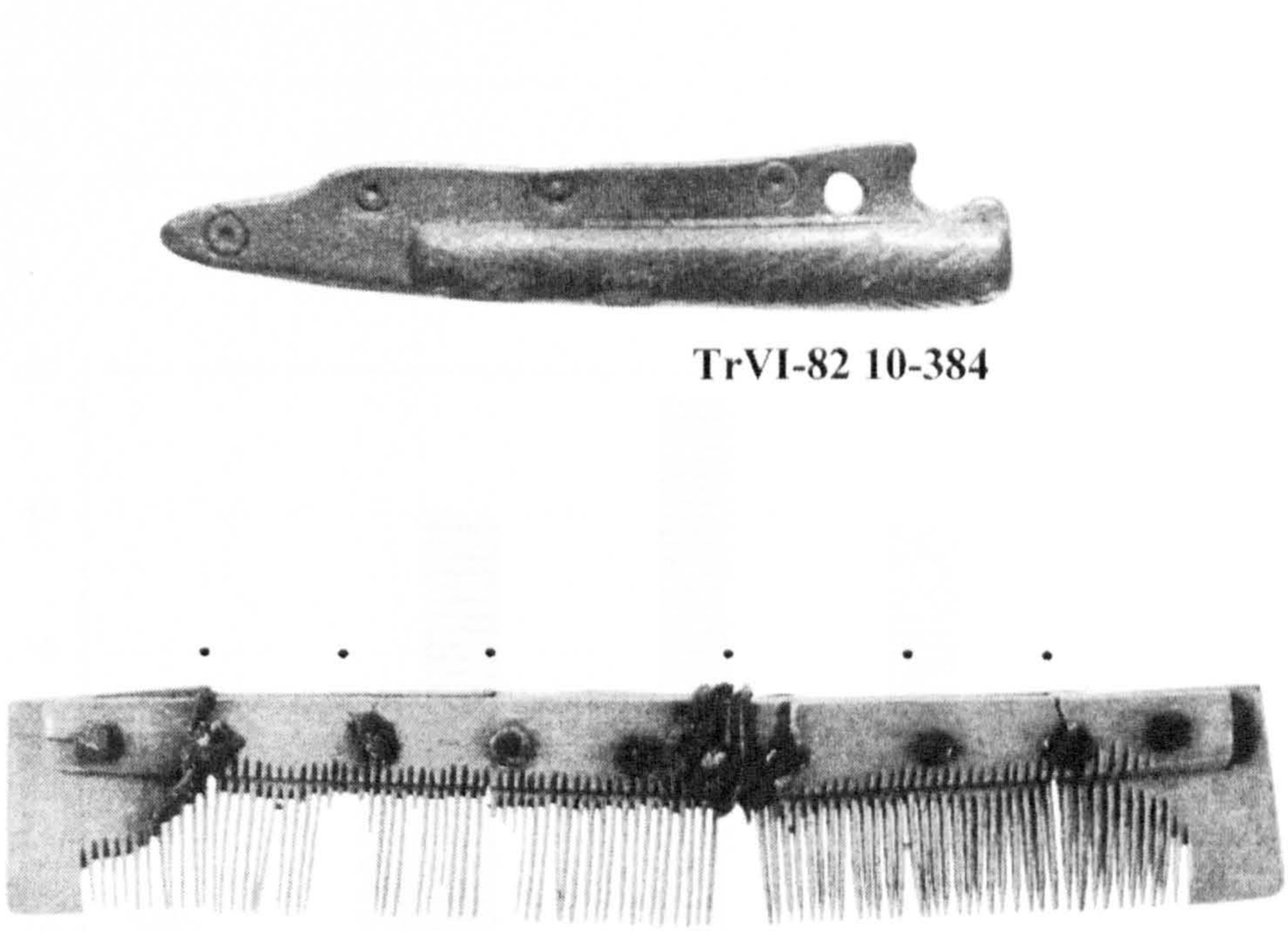
Fig. 3.48 Undecorated combs from the 10th (A367) and the late 12th (A114 and A337) century deposits and amulets in the forms of a comb (A330) and a sheathed knife



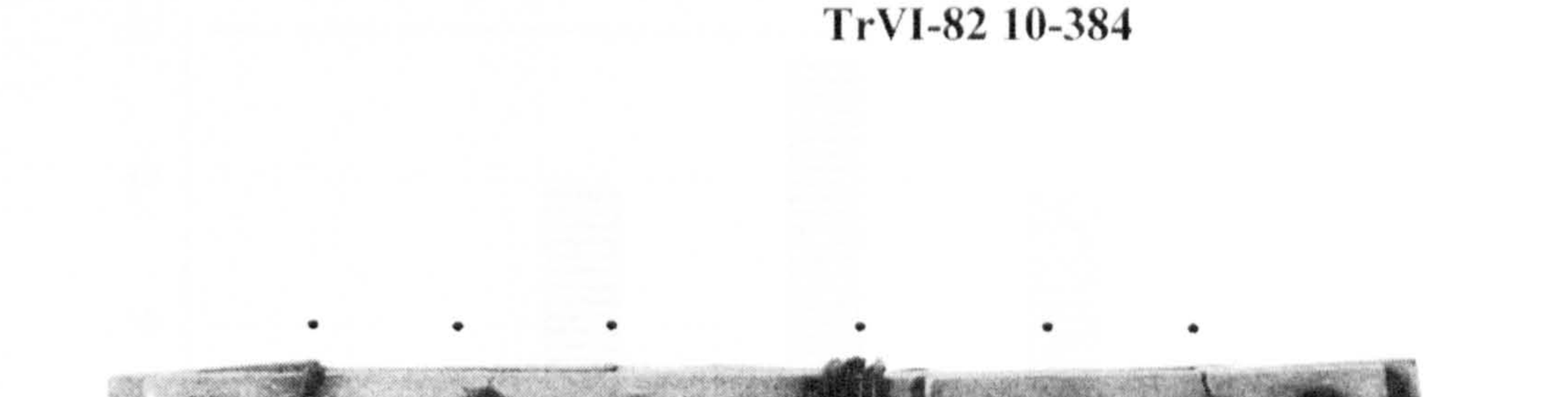
A367

A330

TrVI-82 10-384



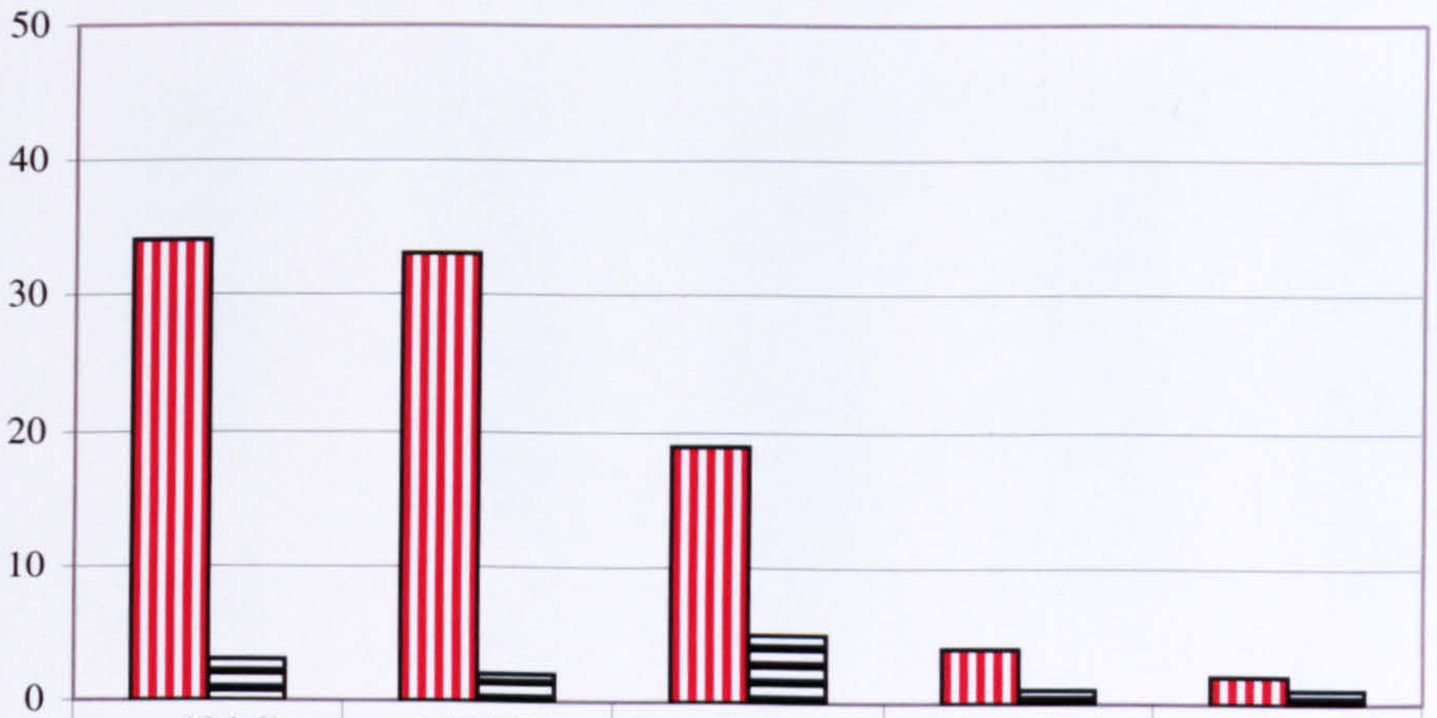
A114



A337

Fig. 3.49 Chronological distribution of combs with vertical and horizontal arrangement of decoration

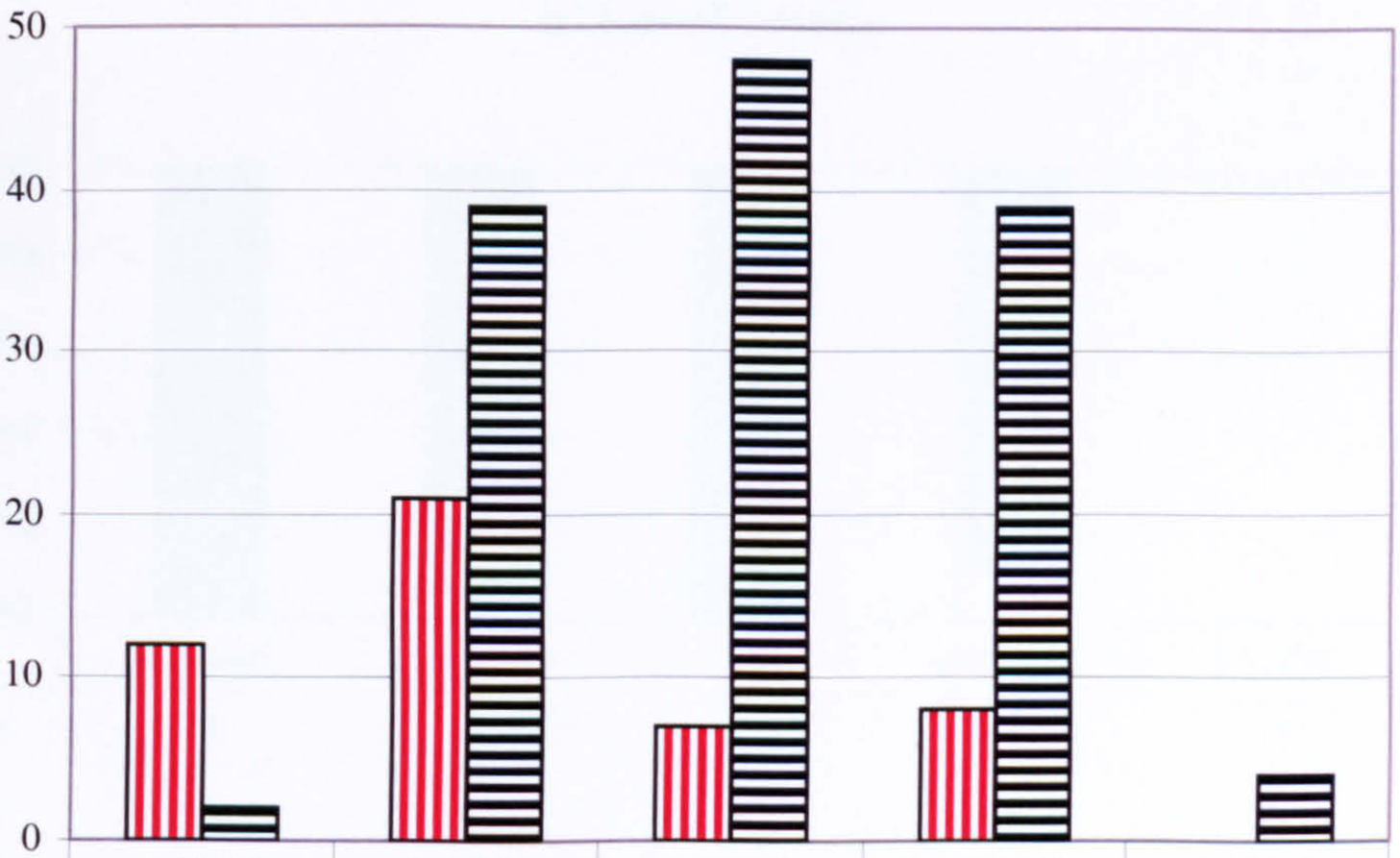
a) Non-cased combs



	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
vertical	34	33	19	4	2
horizontal	3	2	5	1	1

Σ 104

b) Cased combs

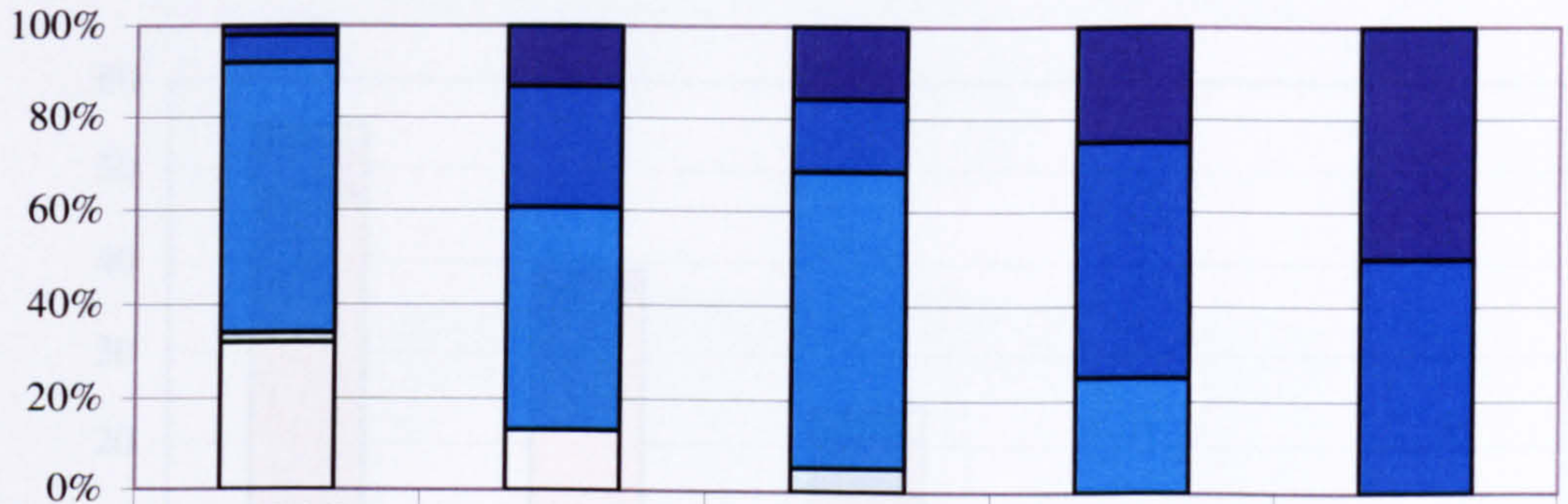


	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
vertical	12	21	7	8	0
horizontal	2	39	48	39	4

Σ 180

Fig. 3.50 Chronological changes in the combination of vertically arranged decorative schemes on single-sided composite combs

a) Non-cased combs

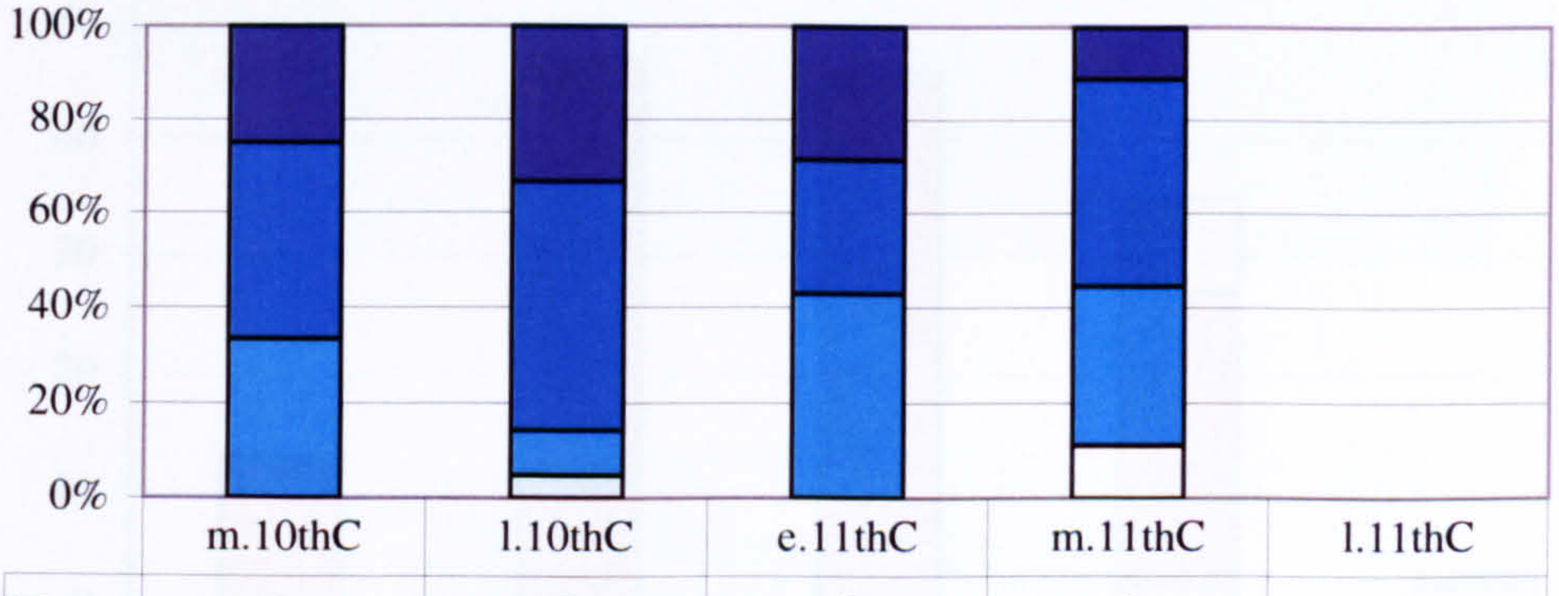


	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
4	1	5	3	1	1
3	3	10	3	2	1
2	29	18	12	1	0
1	1	0	1	0	0
0 *	16	5	0	0	0

Σ 113

*including undecorated objects

b) Cased combs



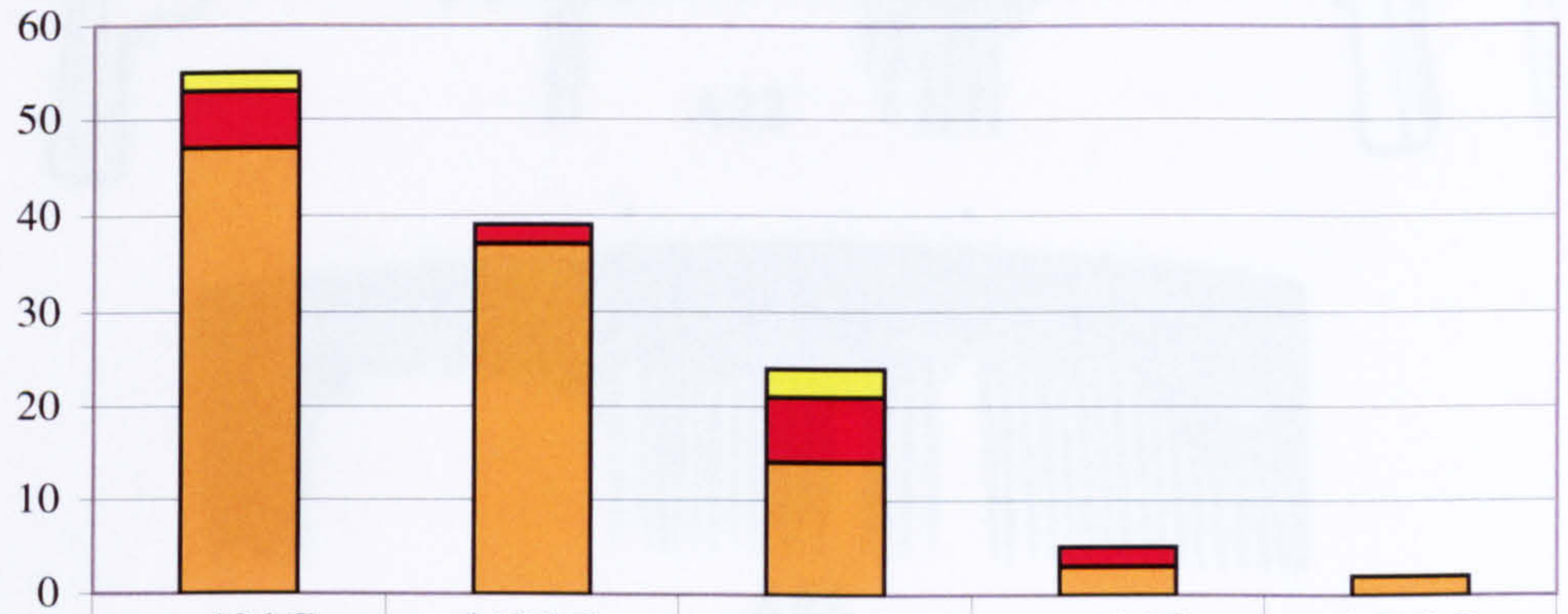
	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
4	3	7	2	1	0
3	5	11	2	4	0
2	4	2	3	3	0
1	0	1	0	0	0
0 *	0	0	0	1	0

Σ 49

* including undecorated objects

Fig. 3.51 Single-sided composite combs. Dynamics of chronological changes in the use of antler raw material

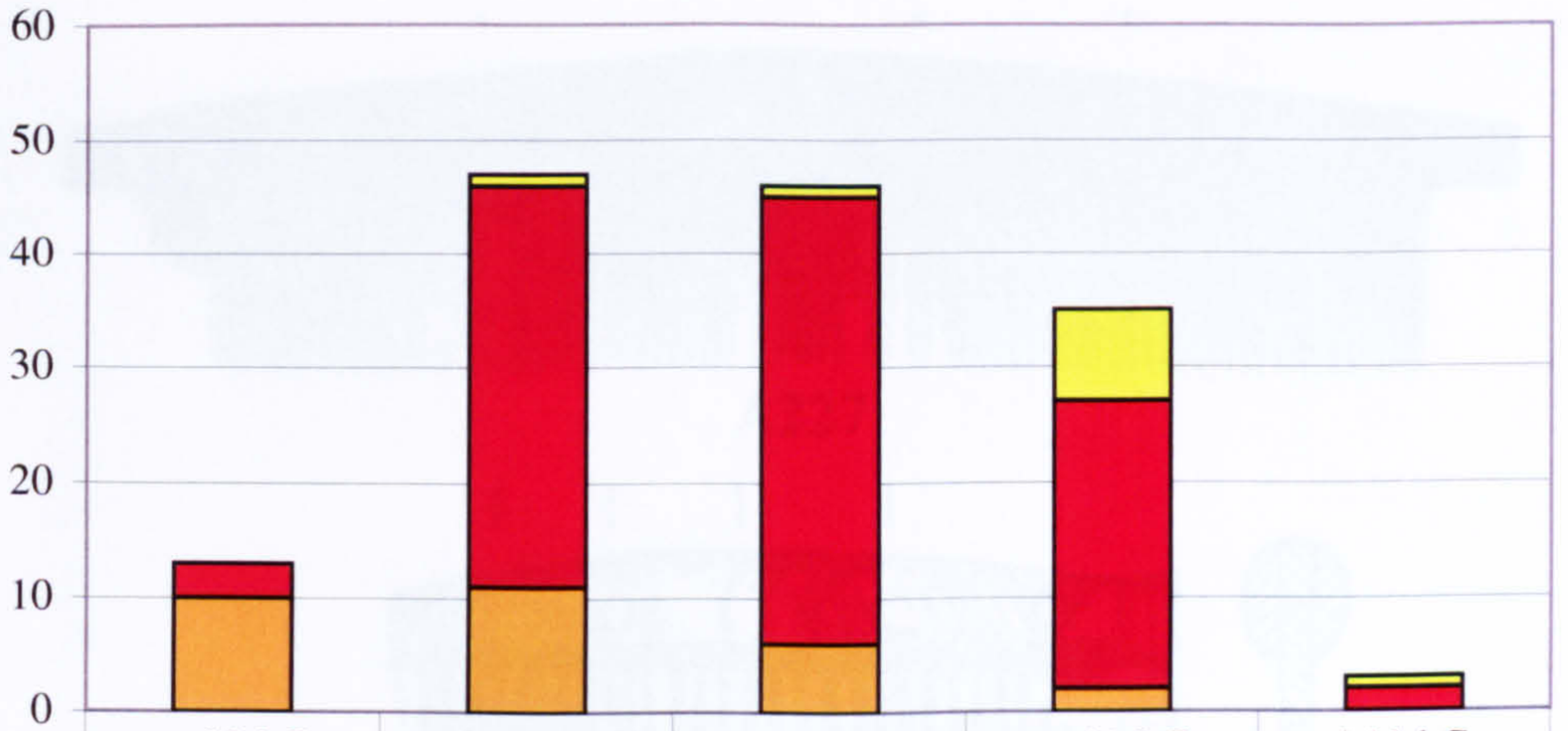
a) Non-cased combs.



	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
reindeer	2	0	3	0	0
red deer	6	2	7	2	0
elk	47	37	14	3	2

Σ 125

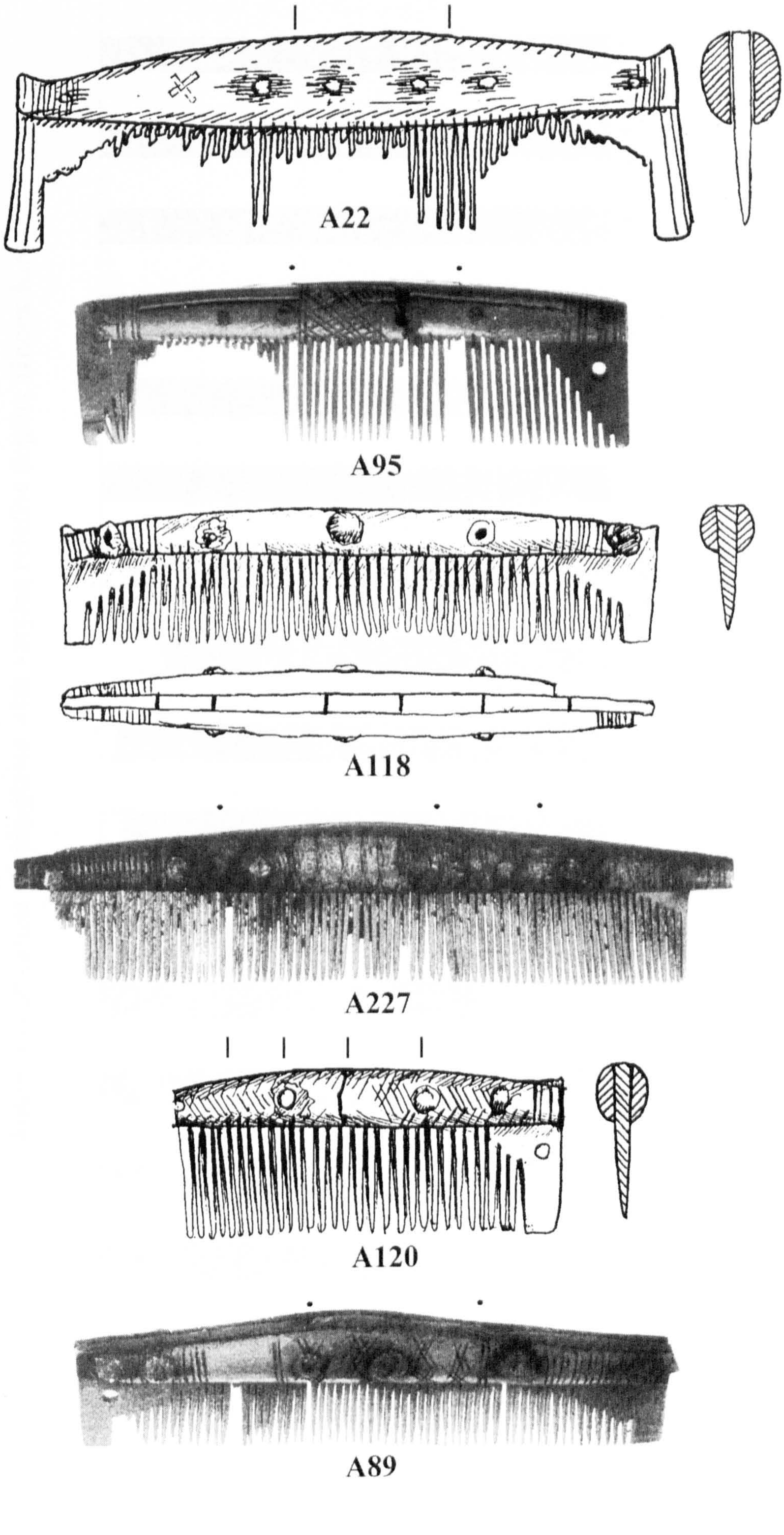
b) Cased combs



	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
reindeer	0	1	1	8	1
red deer	3	35	39	25	2
elk	10	11	6	2	0

Σ 144

Fig. 3.52 10th century combs in elk (A22, A95), red deer (A118, A227) and reindeer (A89, A120) antler



A22

A95

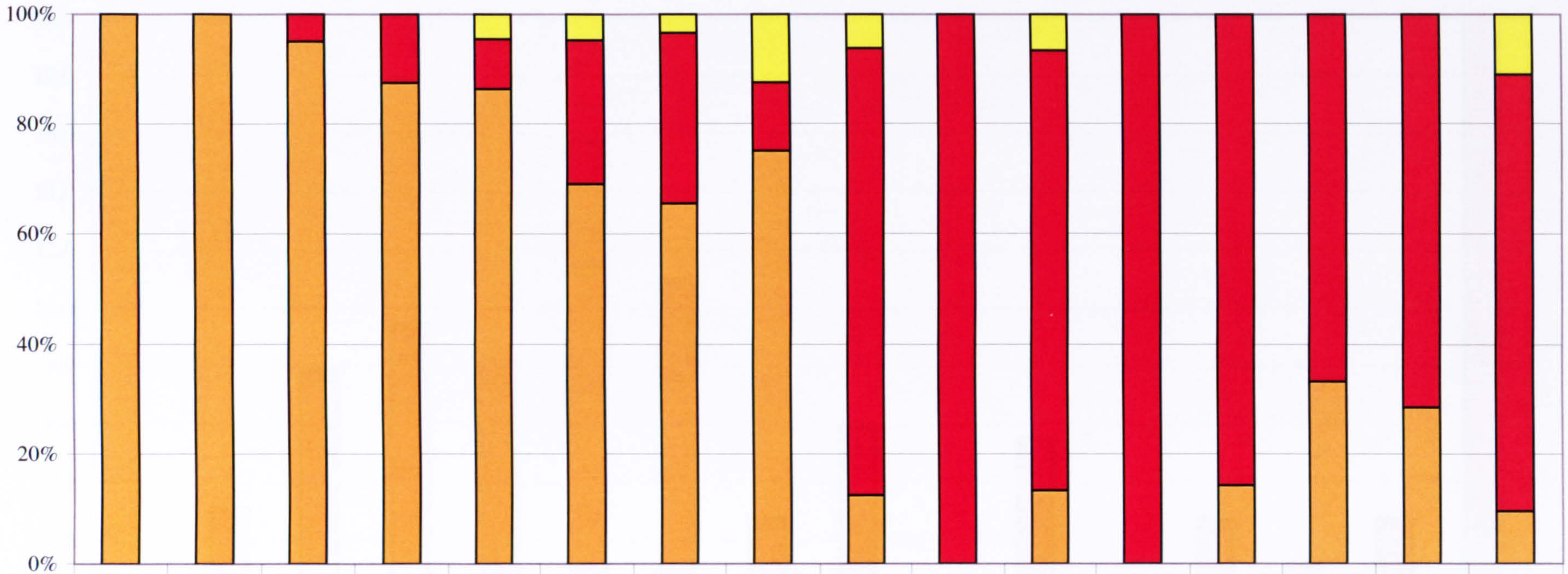
A118

A227

A120

A89

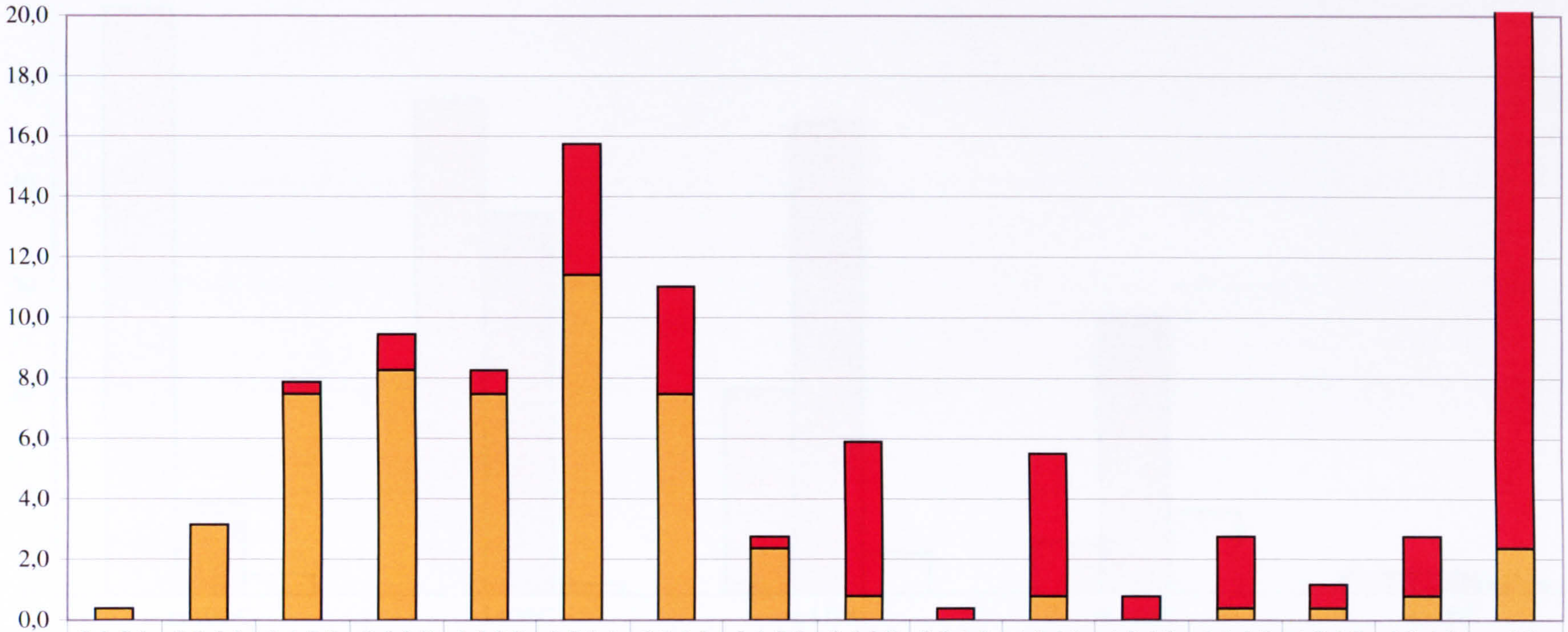
Fig. 3.53
Single-sided composite combs and cases.
Antler identification of side-plates with varying relative depths (Index K.A.)



	2.0-2.1	2.2-2.3	2.4-2.5	2.6-2.7	2.8-2.9	3.0-3.1	3.2-3.3	3.4-3.5	3.6-3.7	3.8-3.9	4.0-4.1	4.2-4.3	4.4-4.5	4.6-4.7	4.8-4.9	>4.9
reindeer	0	0	0	0	1	2	1	1	1	0	1	0	0	0	0	7
red deer	0	0	1	3	2	11	9	1	13	1	12	2	6	2	5	50
elk	1	8	19	21	19	29	19	6	2	0	2	0	1	1	2	6

Σ 268

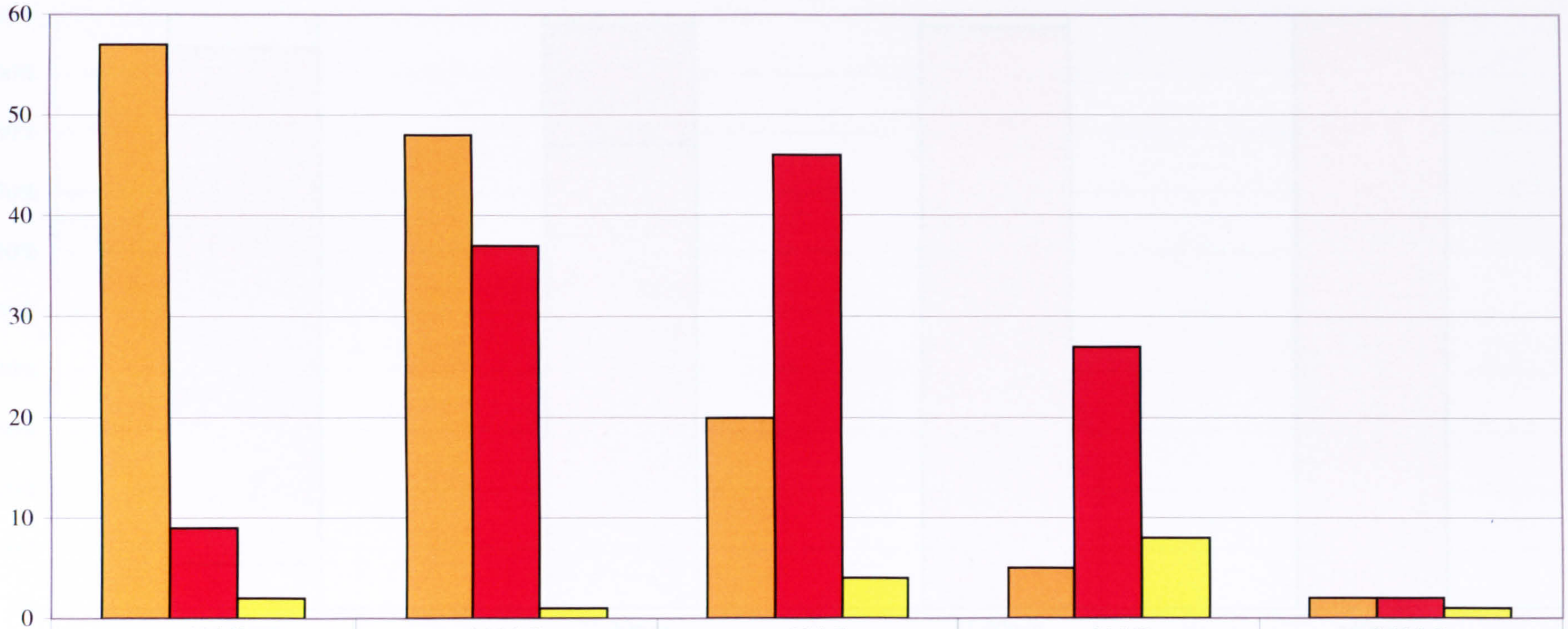
Fig. 3.54
Single-sided composite combs and cases.
Elk and red deer antler use in side-plates with varying relative depths (Index K.A.)



	2.0-2.1	2.2-2.3	2.4-2.5	2.6-2.7	2.8-2.9	3.0-3.1	3.2-3.3	3.4-3.5	3.6-3.7	3.8-3.9	4.0-4.1	4.2-4.3	4.4-4.5	4.6-4.7	4.8-4.9	>4.9
red deer %	0,0	0,0	0,4	1,2	0,8	4,3	3,5	0,4	5,1	0,4	4,7	0,8	2,4	0,8	2,0	19,7
elk %	0,4	3,1	7,5	8,3	7,5	11,4	7,5	2,4	0,8	0,0	0,8	0,0	0,4	0,4	0,8	2,4

Σ 254 = 100%

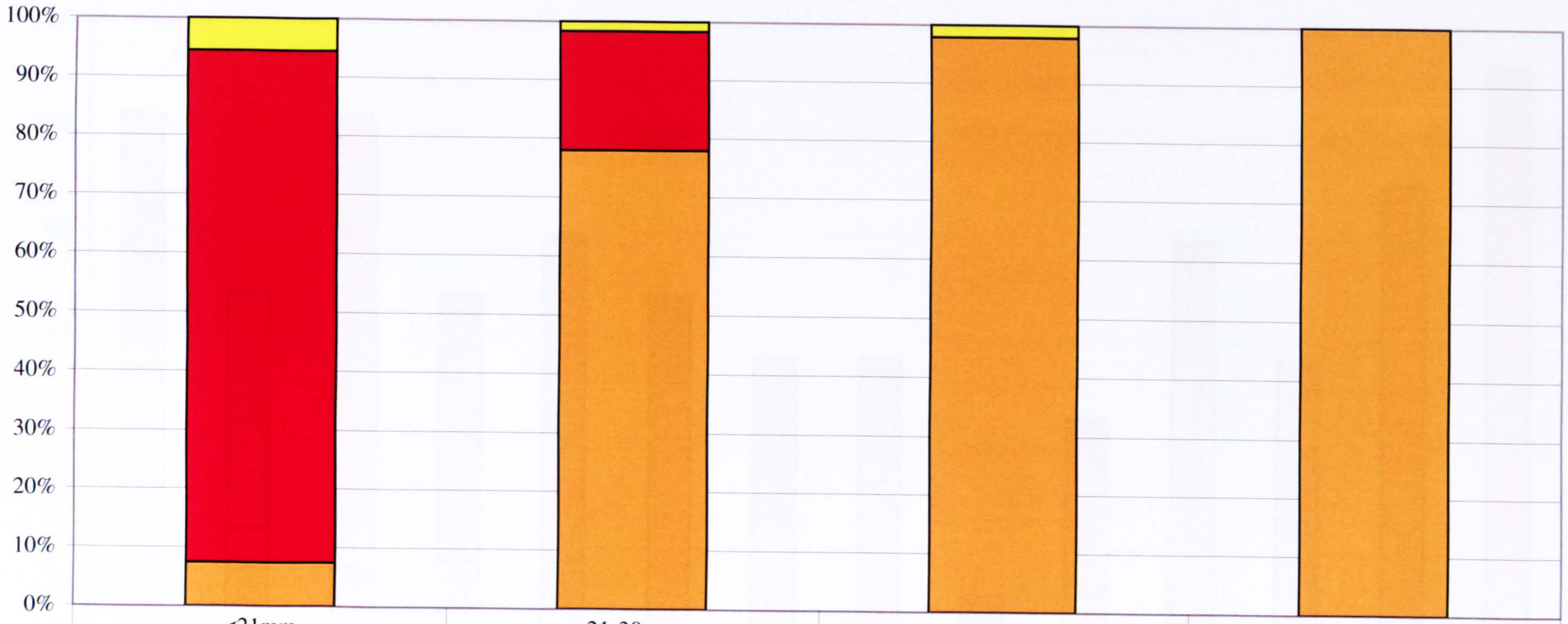
Fig. 3.55 Single-sided composite combs and cases.
Dynamics of chronological changes in the use of antler raw material



	m.10thC	l.10thC	e.11thC	m.11thC	l.11thC
elk	57	48	20	5	2
red deer	9	37	46	27	2
reindeer	2	1	4	8	1

Σ 269

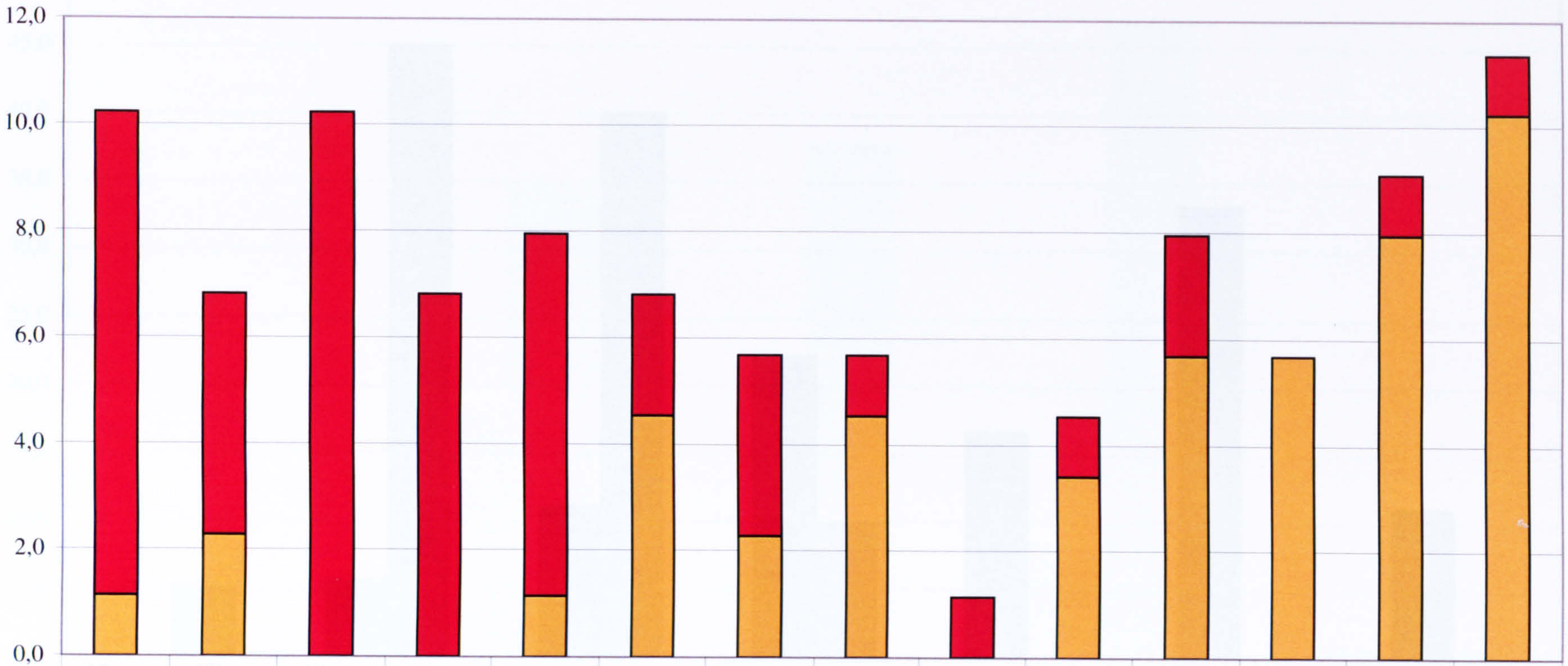
Fig. 3.56
Single-sided composite combs. Average width of billets



	<21mm	21-30mm	31-40mm	>40mm
reindeer	3	1	1	0
red deer	47	12	0	0
elk	4	46	46	23

Σ 183

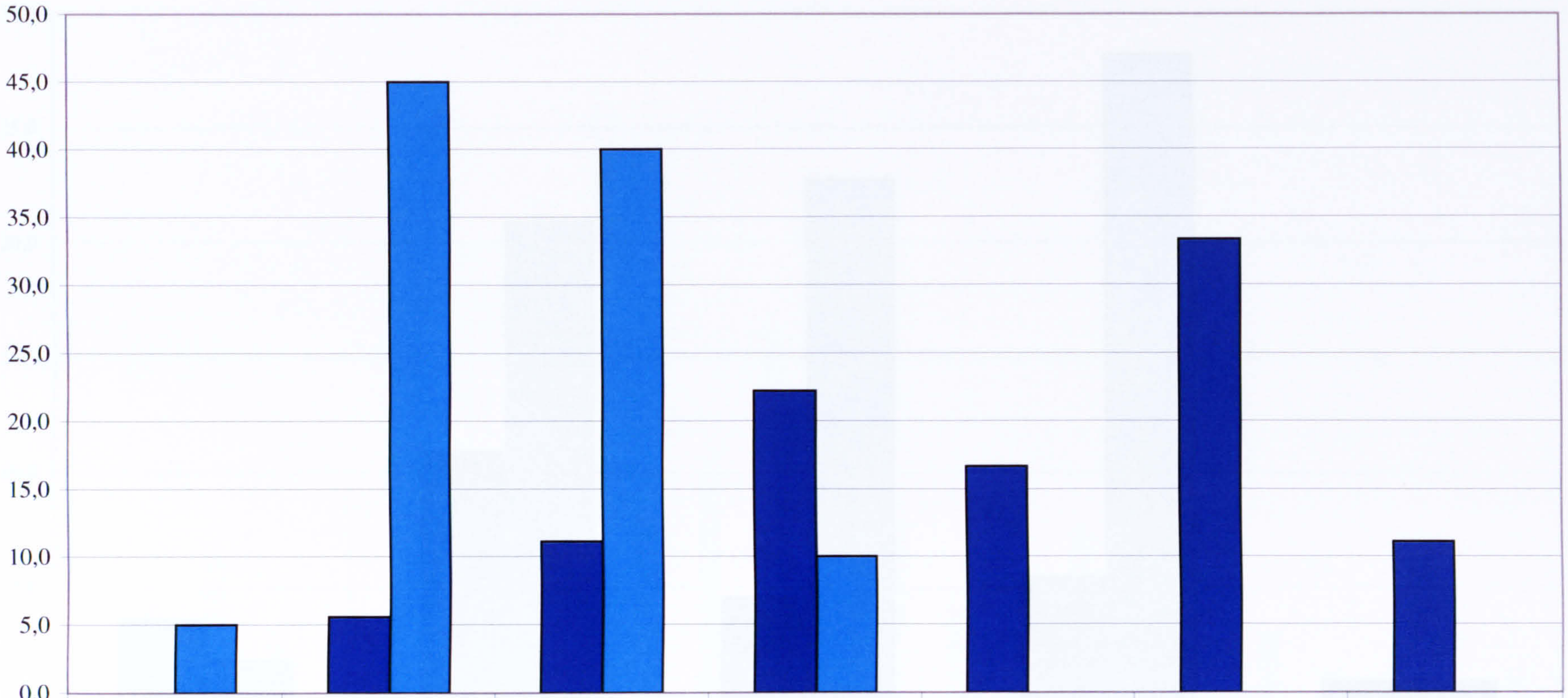
Fig. 3.57
Single-sided composite combs. Average width of billets of elk and red deer antler



	16mm	17mm	18mm	19mm	20mm	21mm	22mm	23mm	24mm	25mm	26mm	27mm	28mm	29mm
red deer %	9,1	4,5	10,2	6,8	6,8	2,3	3,4	1,1	1,1	1,1	2,3	0,0	1,1	1,1
elk %	1,1	2,3	0,0	0,0	1,1	4,5	2,3	4,5	0,0	3,4	5,7	5,7	8,0	10,2

Σ 88 =100%

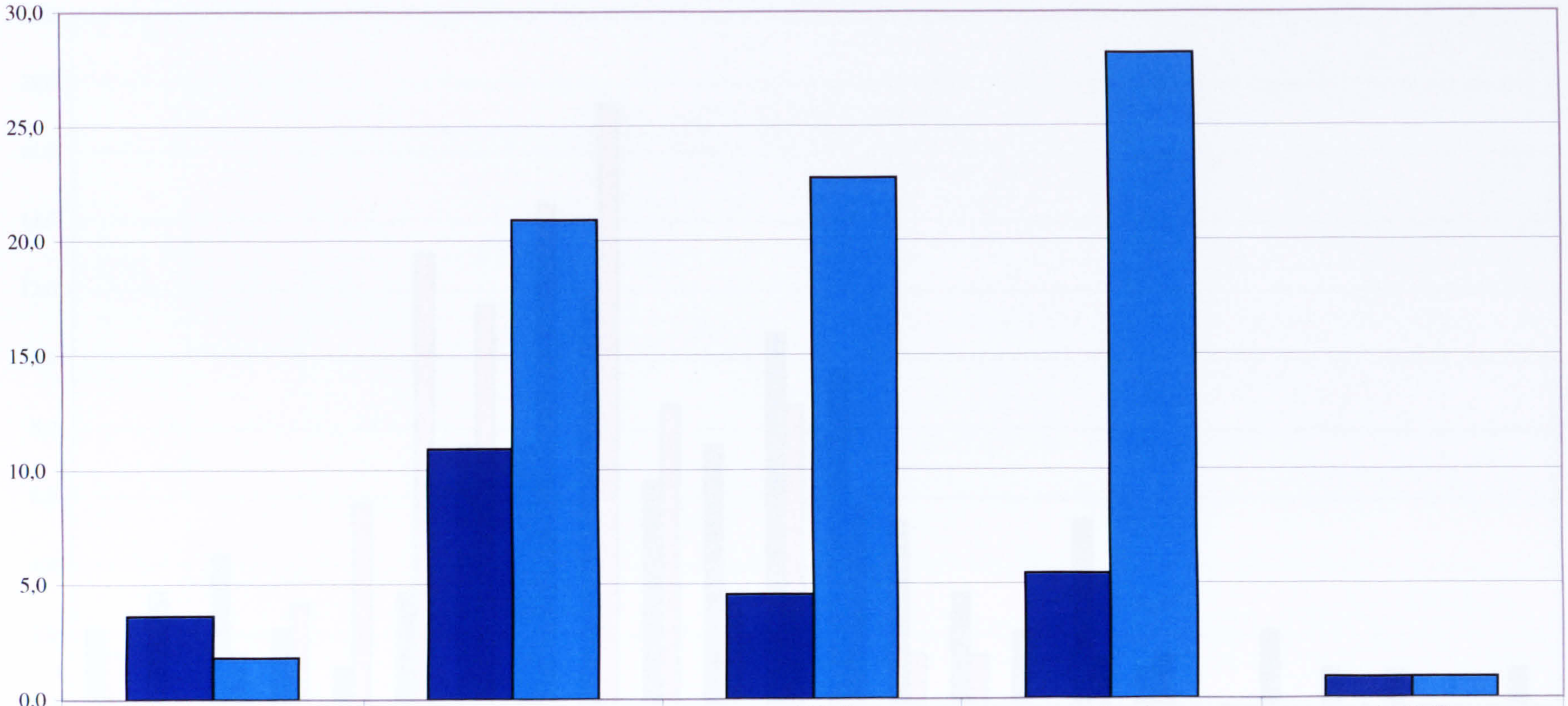
Fig. 3.58 Single-sided composite cases. Proportions of the main groups



	0.11-0.12	0.13-0.14	0.15-0.16	0.17-0.18	0.19-0.20	0.21-0.22	0.23-0.24
2-paired %	0,0	5,6	11,1	22,2	16,7	33,3	11,1
1-paired %	5,0	45,0	40,0	10,0	0,0	0,0	0,0

Σ (2paired/1paired) 18/40 = 100%/100%

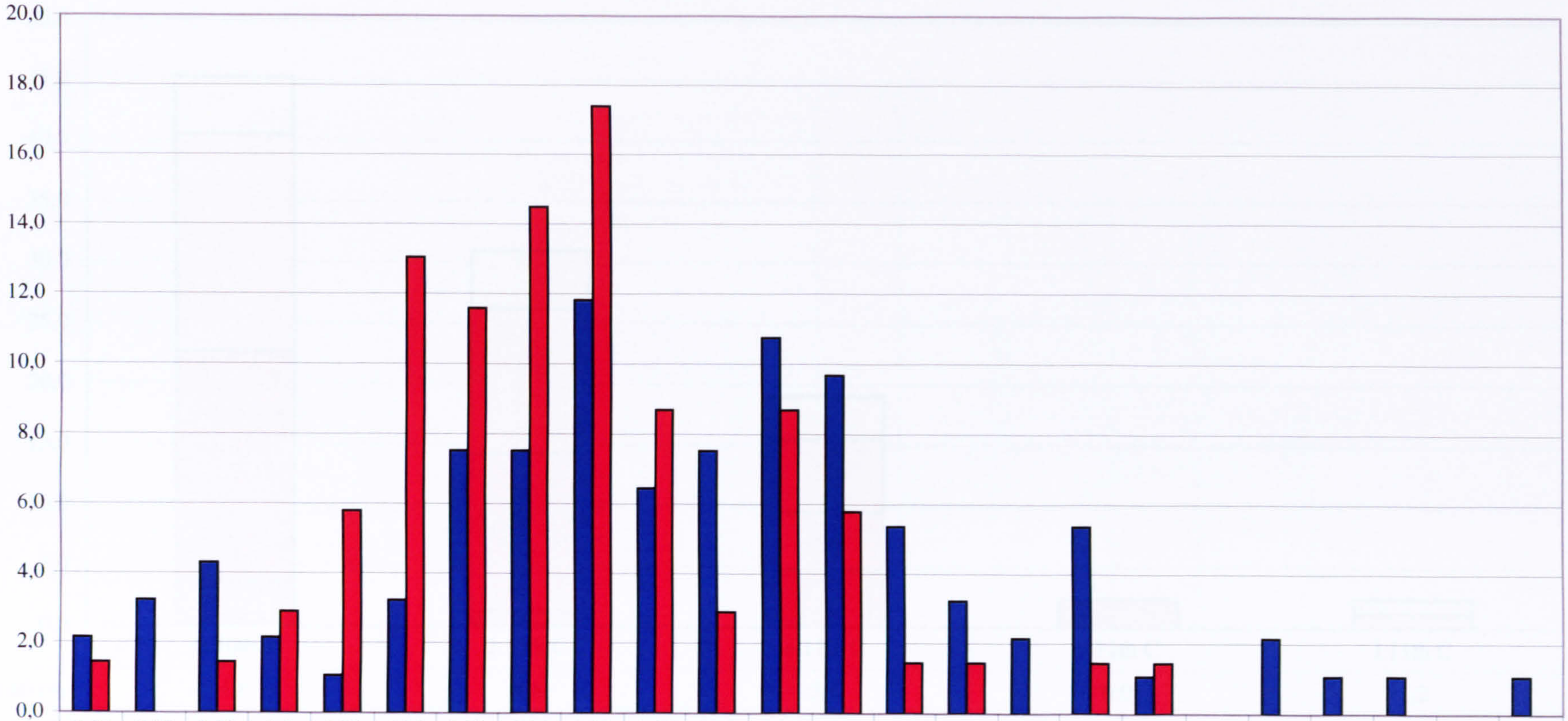
Fig. 3.59 Chronological distribution of cases with one and two pairs of side-plates



	m.10th C	l.10th C	e.11th C	m11th C	l.11th C
2-paired %	3,6	10,9	4,5	5,5	0,9
1-paired %	1,8	20,9	22,7	28,2	0,9

Σ 110 = 100%

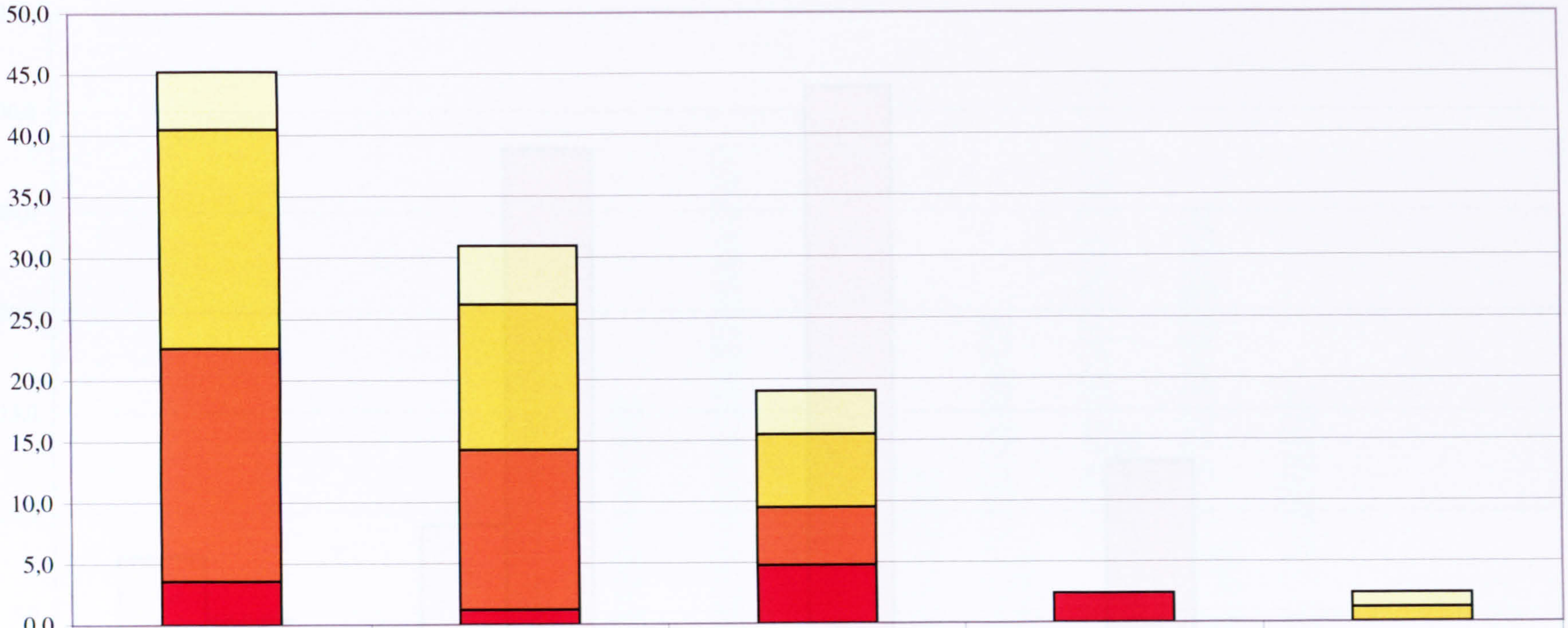
Fig. 3.60 Proportions of non-cased and cased combs



	0,17	0,18	0,19	0,2	0,21	0,22	0,23	0,24	0,25	0,26	0,27	0,28	0,29	0,3	0,31	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39	0,4
non-cased %	2,2	3,2	4,3	2,2	1,1	3,2	7,5	7,5	11,8	6,5	7,5	10,8	9,7	5,4	3,2	2,2	5,4	1,1	0,0	2,2	1,1	1,1	0,0	1,1
cased %	1,4	0,0	1,4	2,9	5,8	13,0	11,6	14,5	17,4	8,7	2,9	8,7	5,8	1,4	1,4	0,0	1,4	1,4	0,0	0,0	0,0	0,0	0,0	0,0

Σ (non-cased/cased) 93/69 = 100%/100%

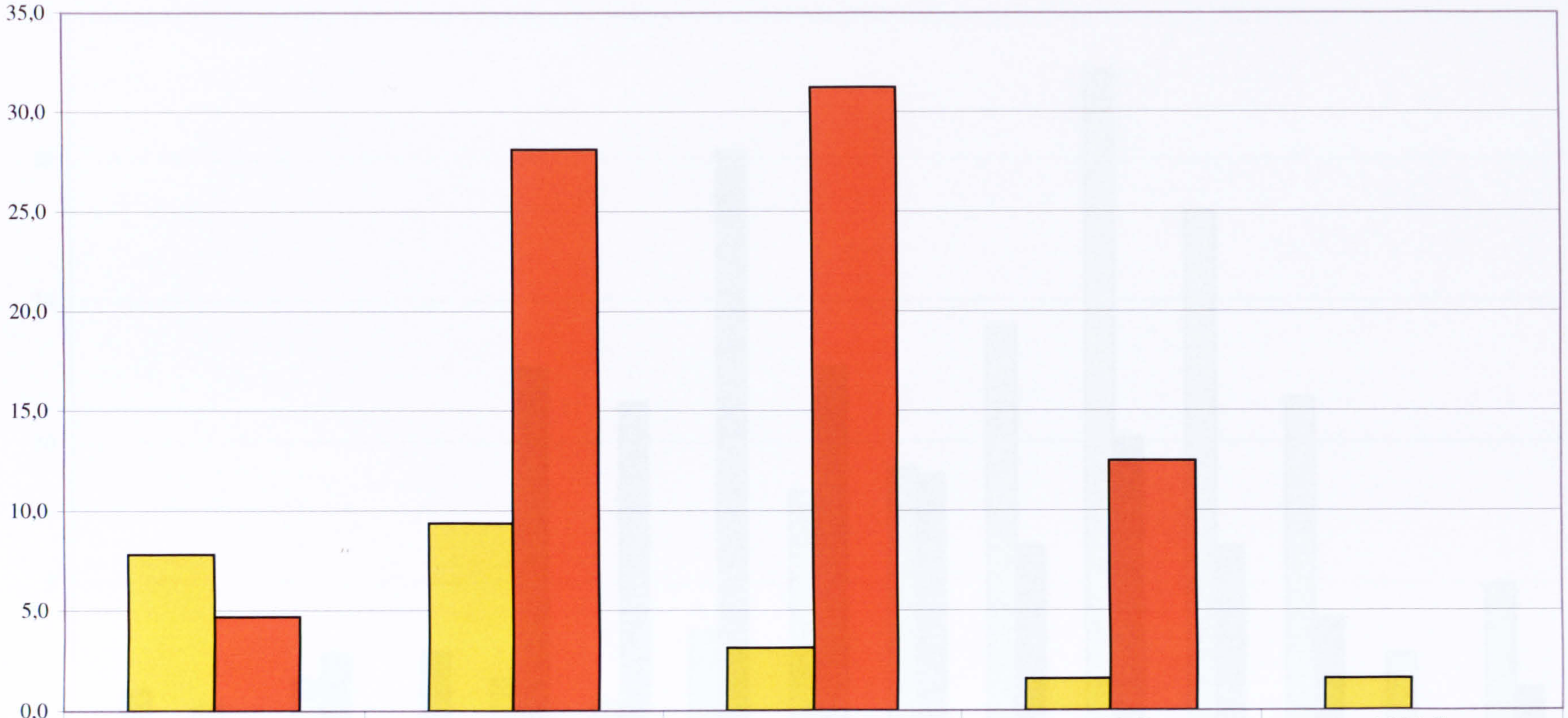
Fig. 3.61 Dynamics of chronological changes in proportions of non-cased combs



	m.10th C	l.10th C	e.11th C	m11th C	l.11th C
0,32-0.40 (%)	4,8	4,8	3,6	0,0	1,2
0.27-0.31 (%)	17,9	11,9	6,0	0,0	1,2
0.22-0.26 (%)	19,0	13,1	4,8	0,0	0,0
0.17-0.21 (%)	3,6	1,2	4,8	2,4	0,0

Σ 84 = 100%

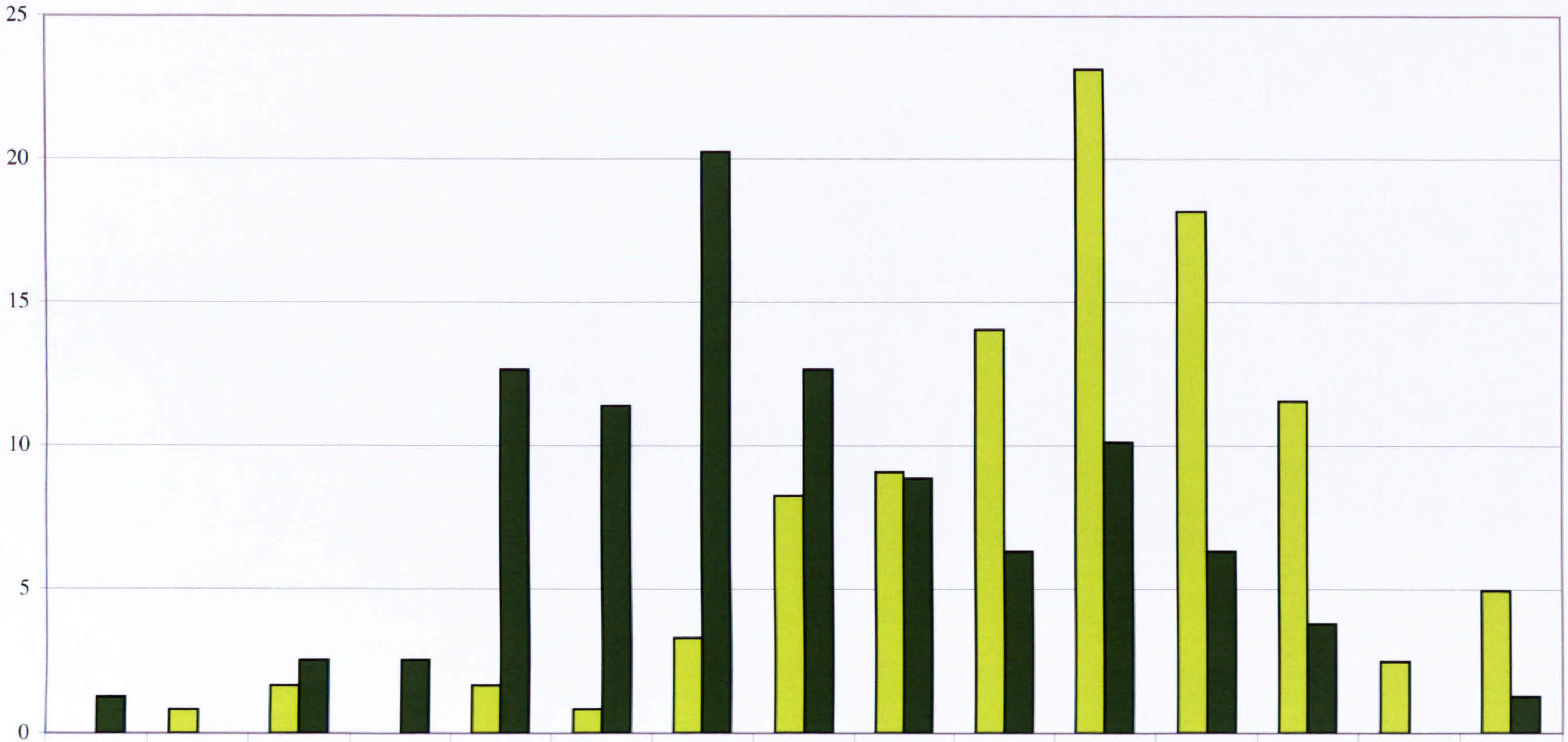
Fig. 3.62 Dynamics of chronological changes in proportions of cased combs



	m.10th C	l.10th C	e.11th C	m11th C	l.11th C
0.27-0.34 (%)	7,8	9,4	3,1	1,6	1,6
0.17-0.26 (%)	4,7	28,1	31,3	12,5	0,0

Σ 64 = 100%

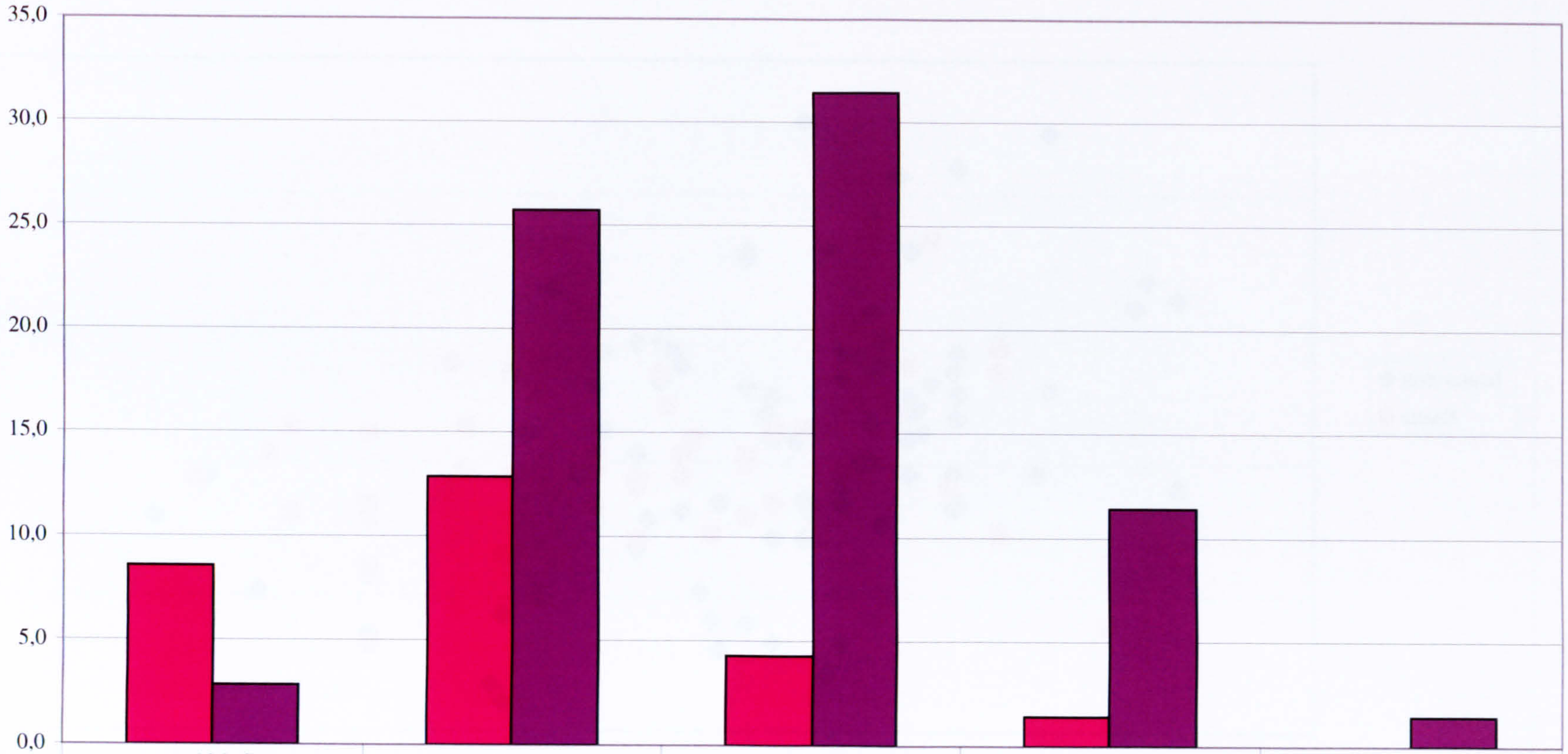
Fig. 3.63 Height of teeth relative to comb height in non-cased and cased combs



	<0.44	0.44-0.45	0.46-0.47	0.48-0.49	0.50-0.51	0.52-0.53	0.54-0.55	0.56-0.57	0.58-0.59	0.60-0.61	0.62-0.63	0.64-0.65	0.66-0.67	0.68-0.69	0.70-0.71
non-cased (%)	0	0,8264463	1,6528926	0	1,6528926	0,8264463	3,3057851	8,2644628	9,0909091	14,049587	23,140496	18,181818	11,570248	2,4793388	4,9586777
cased (%)	1,2658228	0	2,5316456	2,5316456	12,658228	11,392405	20,253165	12,658228	8,8607595	6,3291139	10,126582	6,3291139	3,7974684	0	1,2658228

Σ (non-cased/cased) 121/79 = 100%/100%

Fig. 3.64 Dynamics of chronological changes in the relative height of teeth on cased combs



	m.10th C	l.10th C	e.11th C	m11th C	l.11th C
rel.height>0.59 (%)	8,6	12,9	4,3	1,4	0,0
rel.height<0.60 (%)	2,9	25,7	31,4	11,4	1,4

Σ 70 = 100%

Fig. 3.65 Forms of non-cased and cased single-sided composite combs

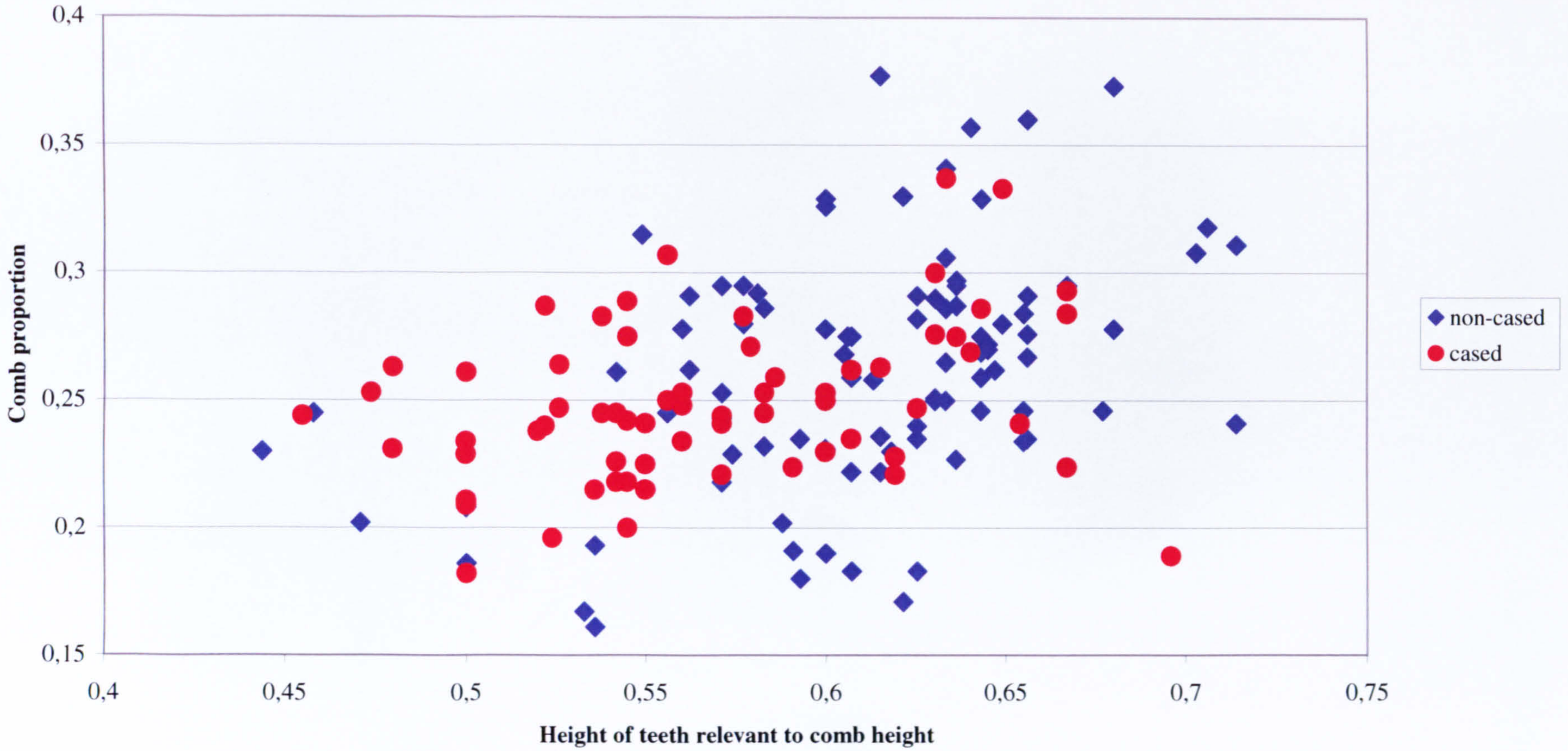
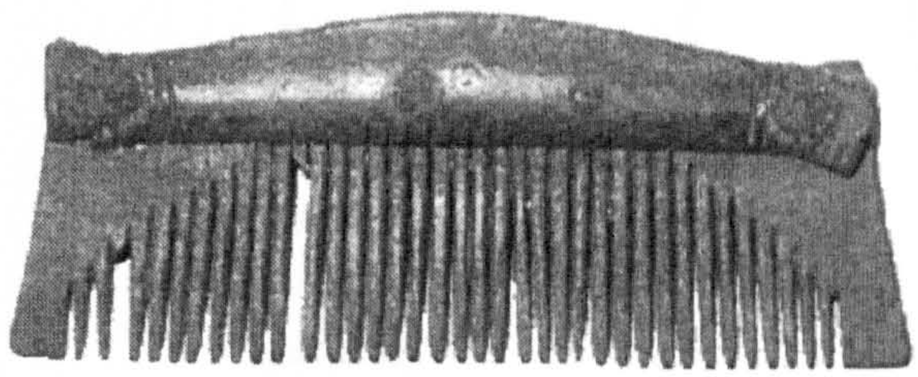
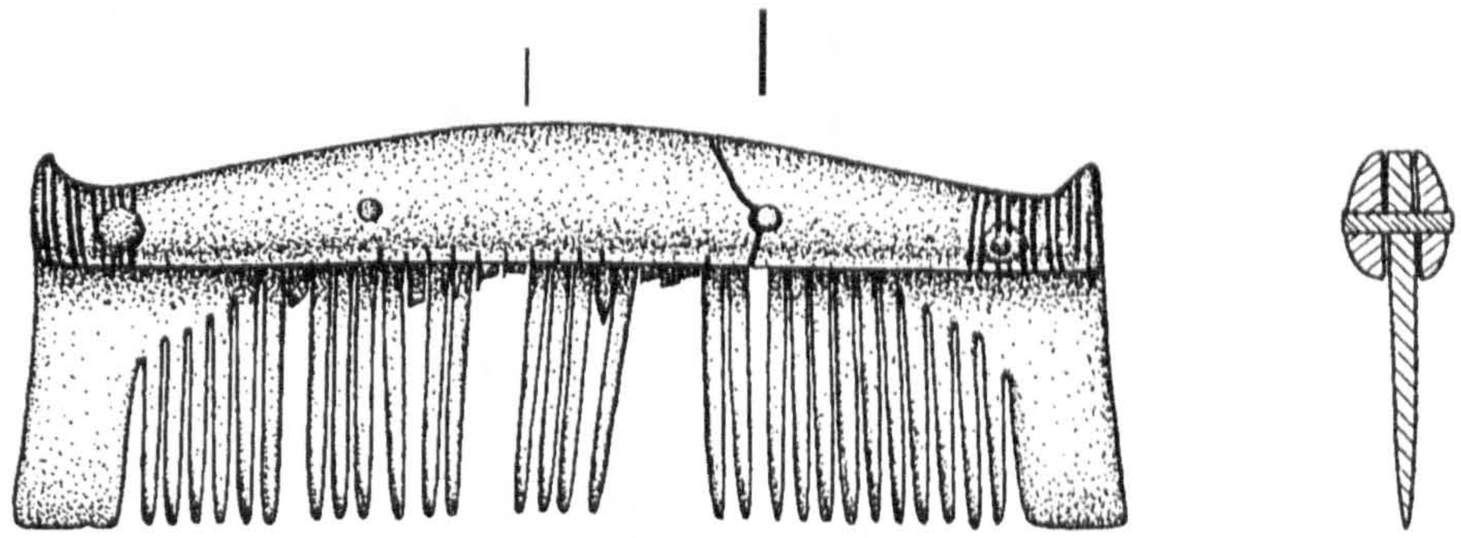


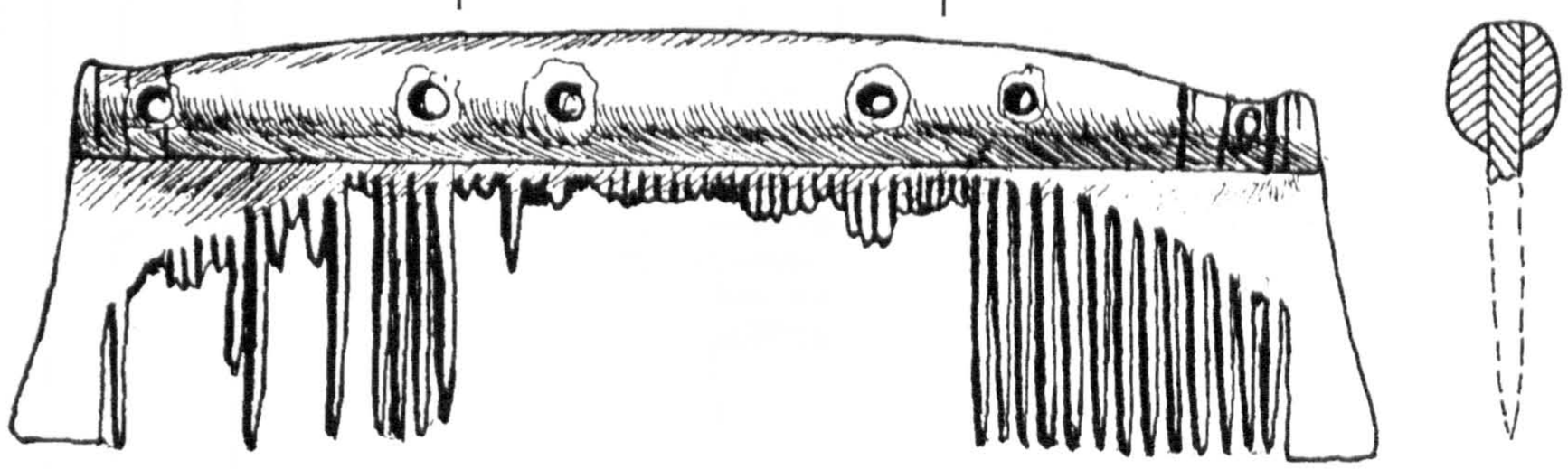
Fig. 3.66 Long toothed, relatively short combs from the mid 10th century contexts



A183



A366



A119

Fig. 3.67 Classification of forms of the side-plates

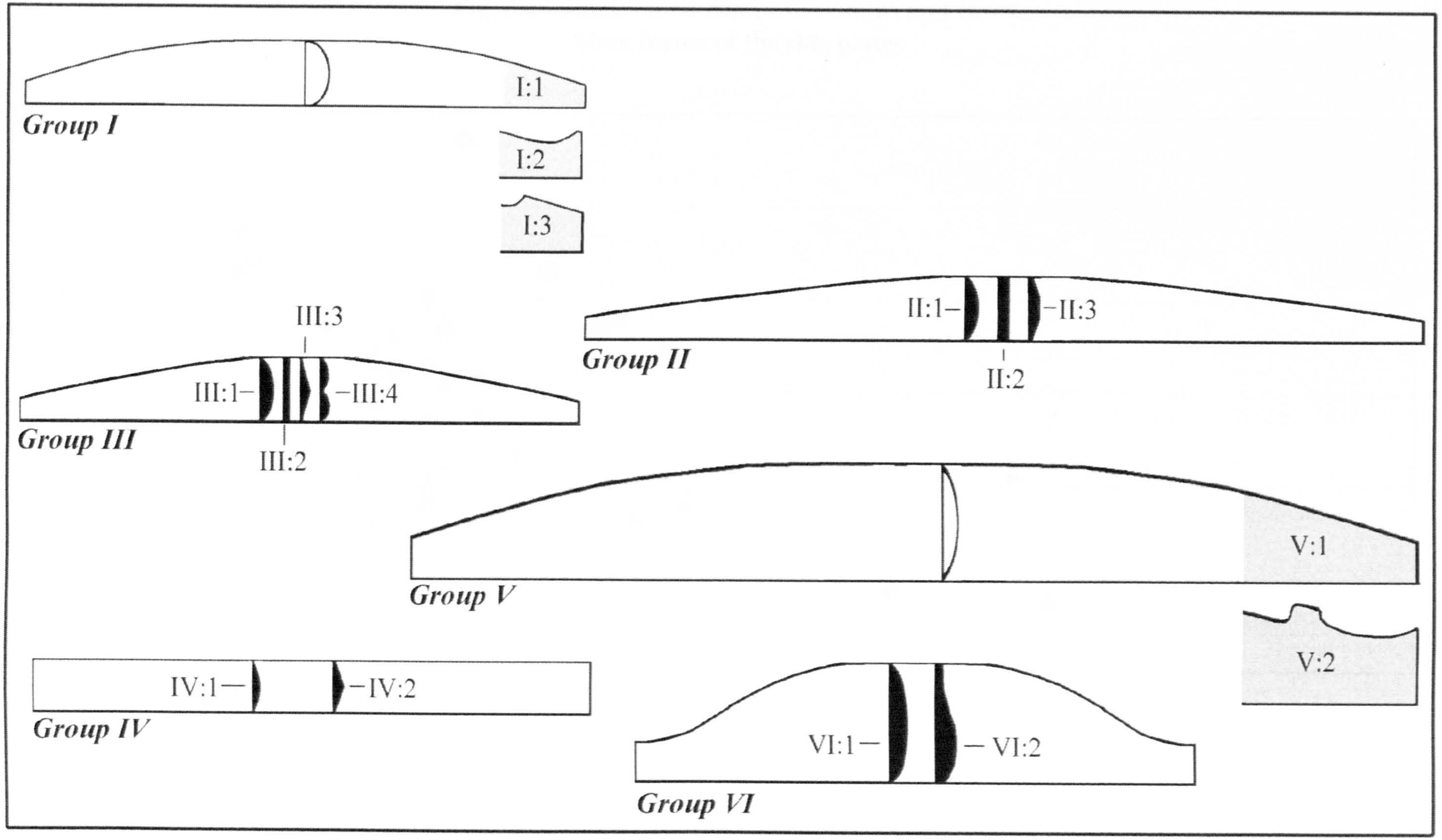


Fig. 3.68 Single-sided composite combs and cases.
Main forms of the side plates

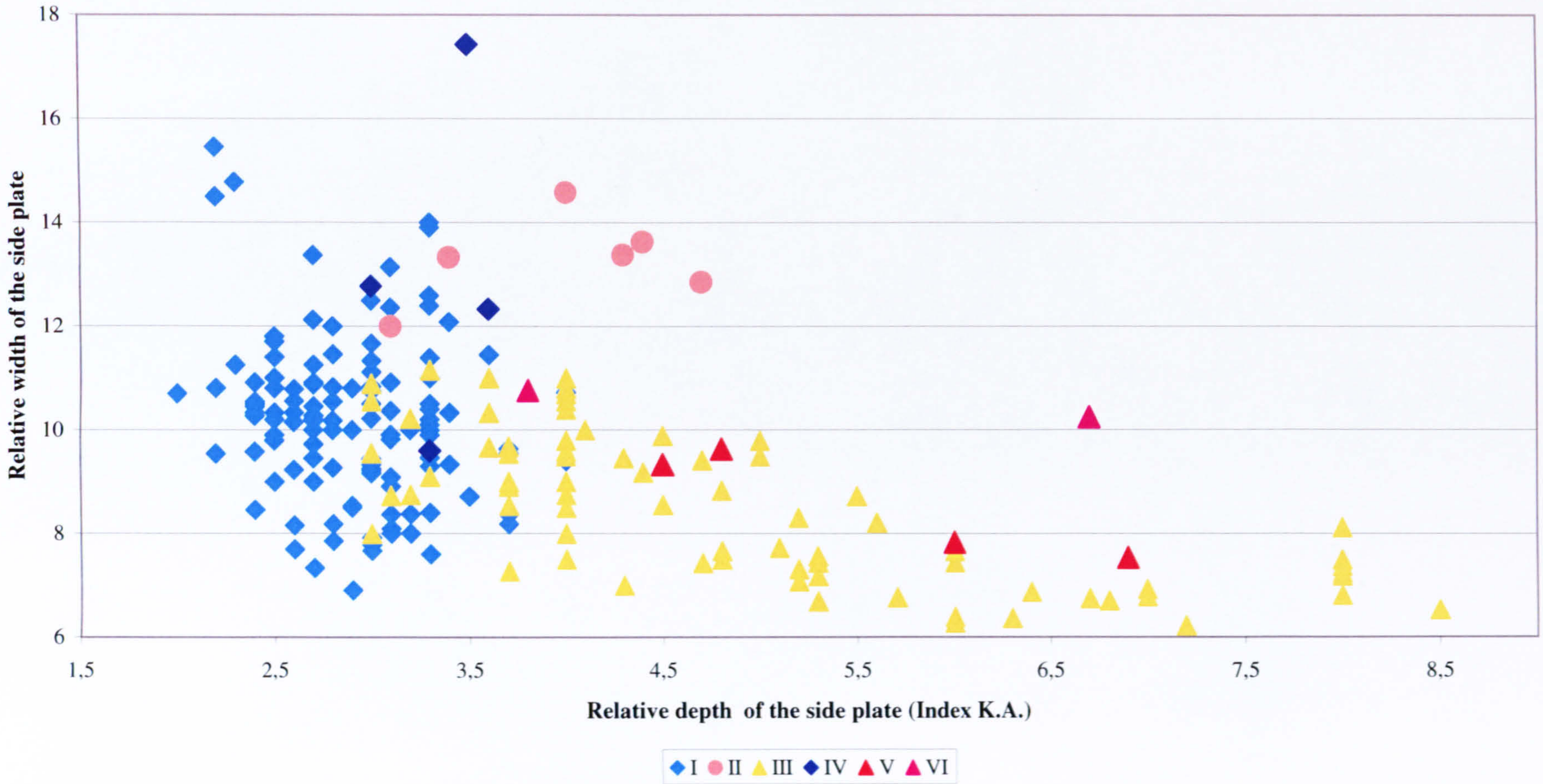


Fig. 3.69 The Rus lands (after Franklin and Shepard 1996)

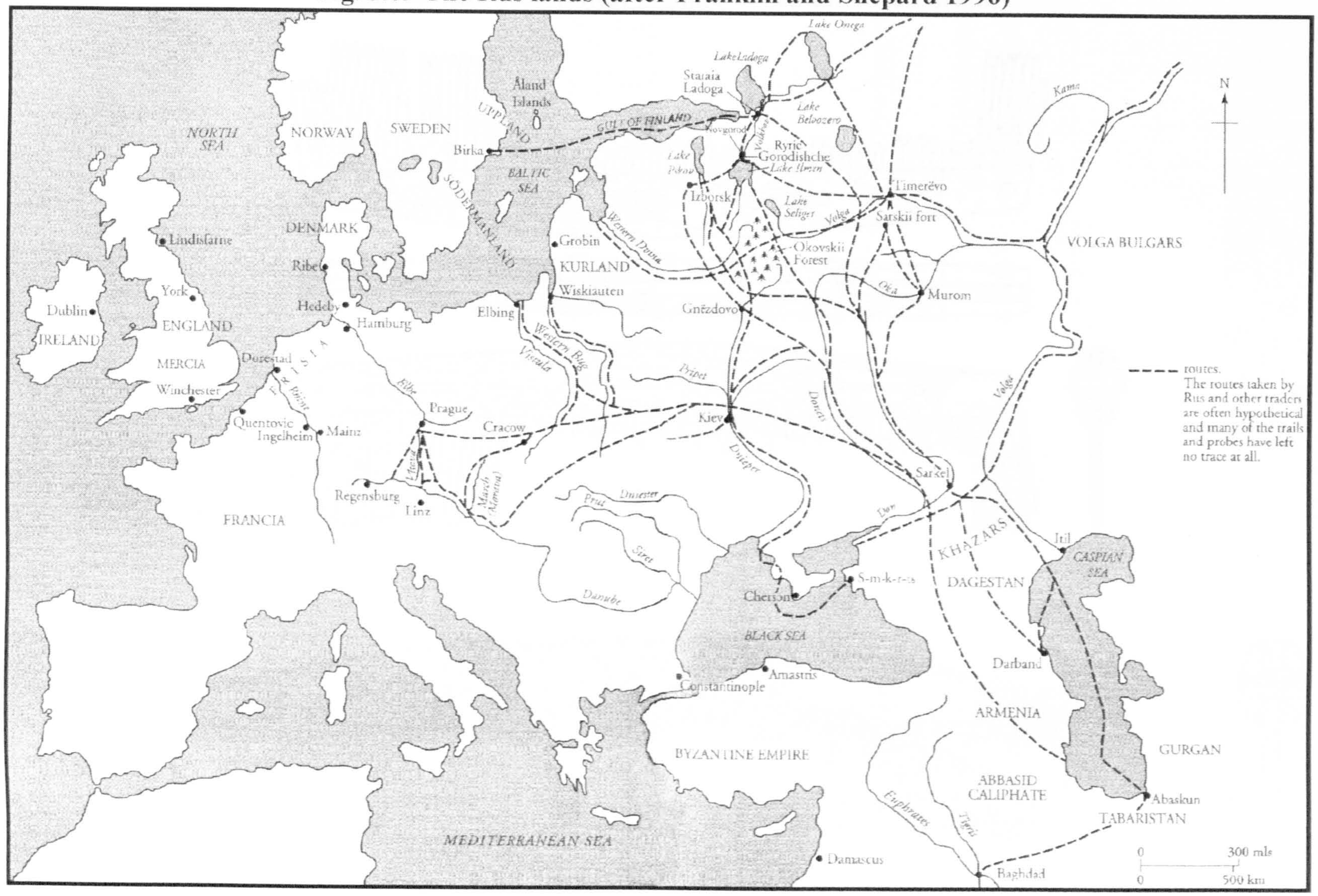
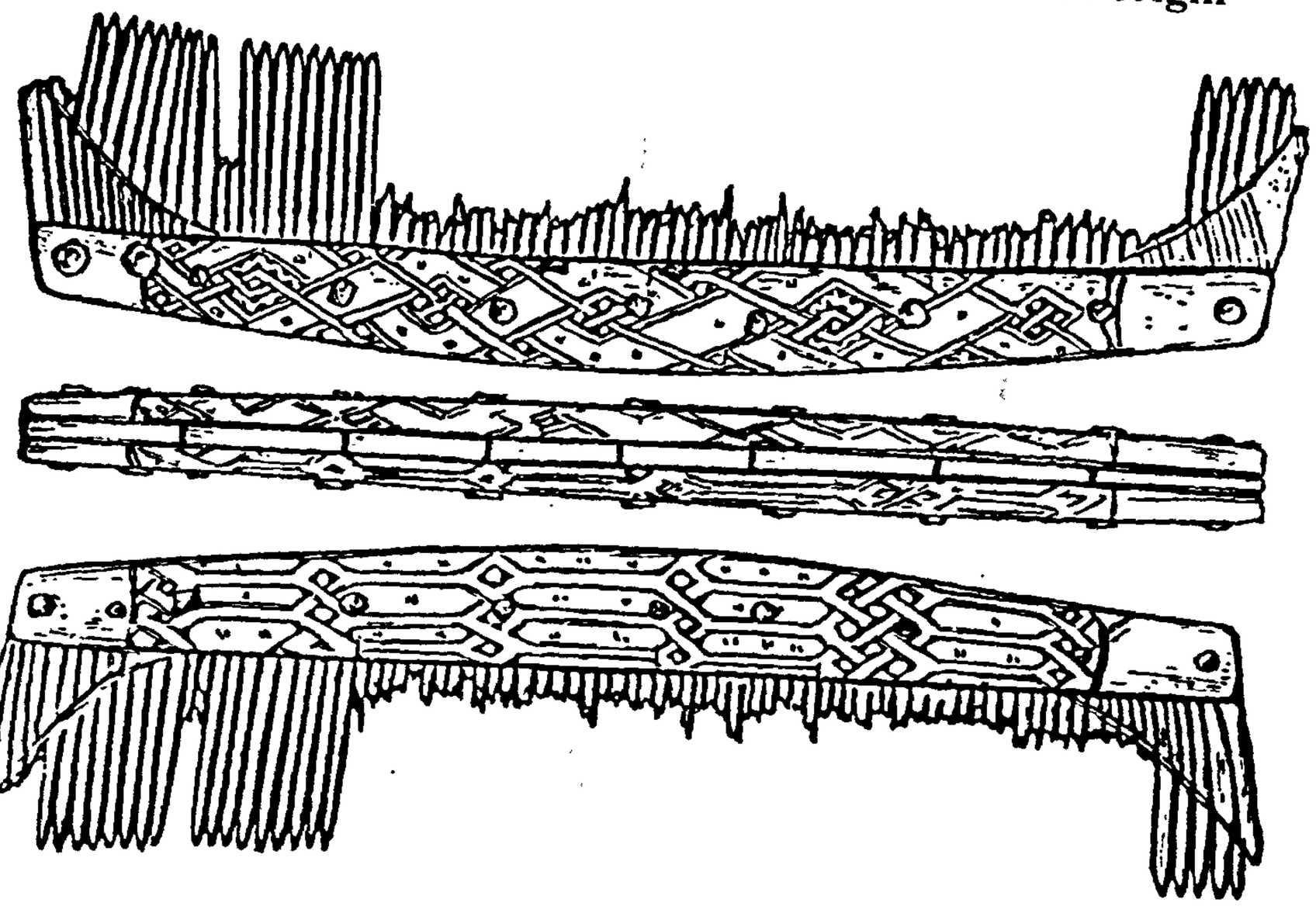
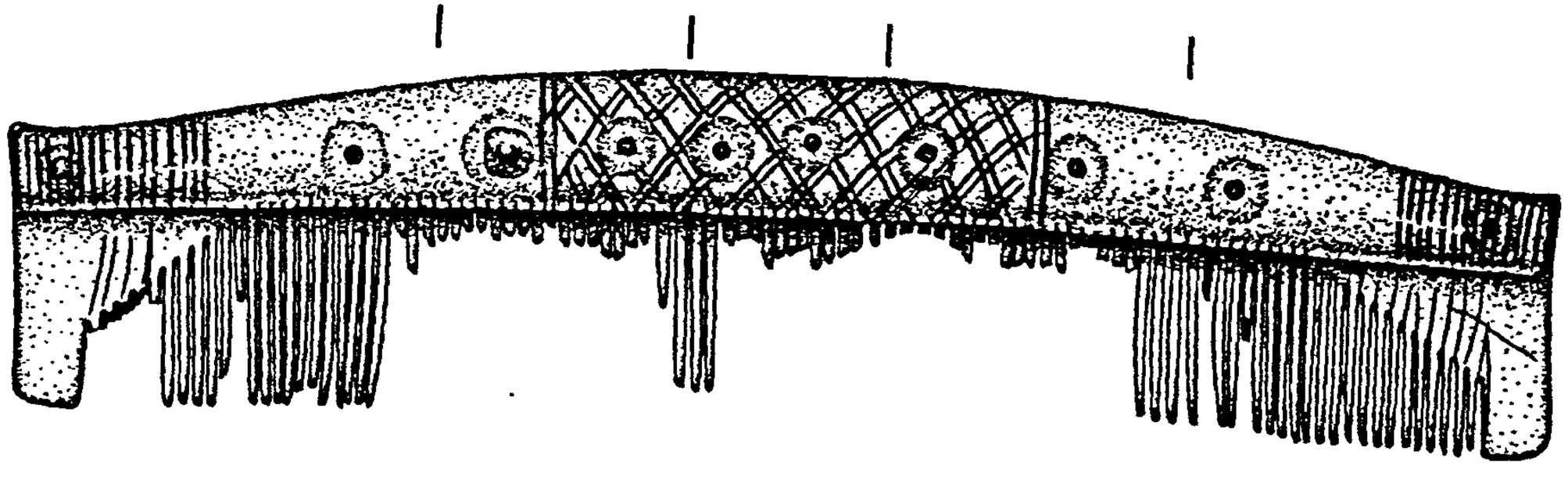


Fig. 3.70 Mid 10th century combs of Scandinavian origin

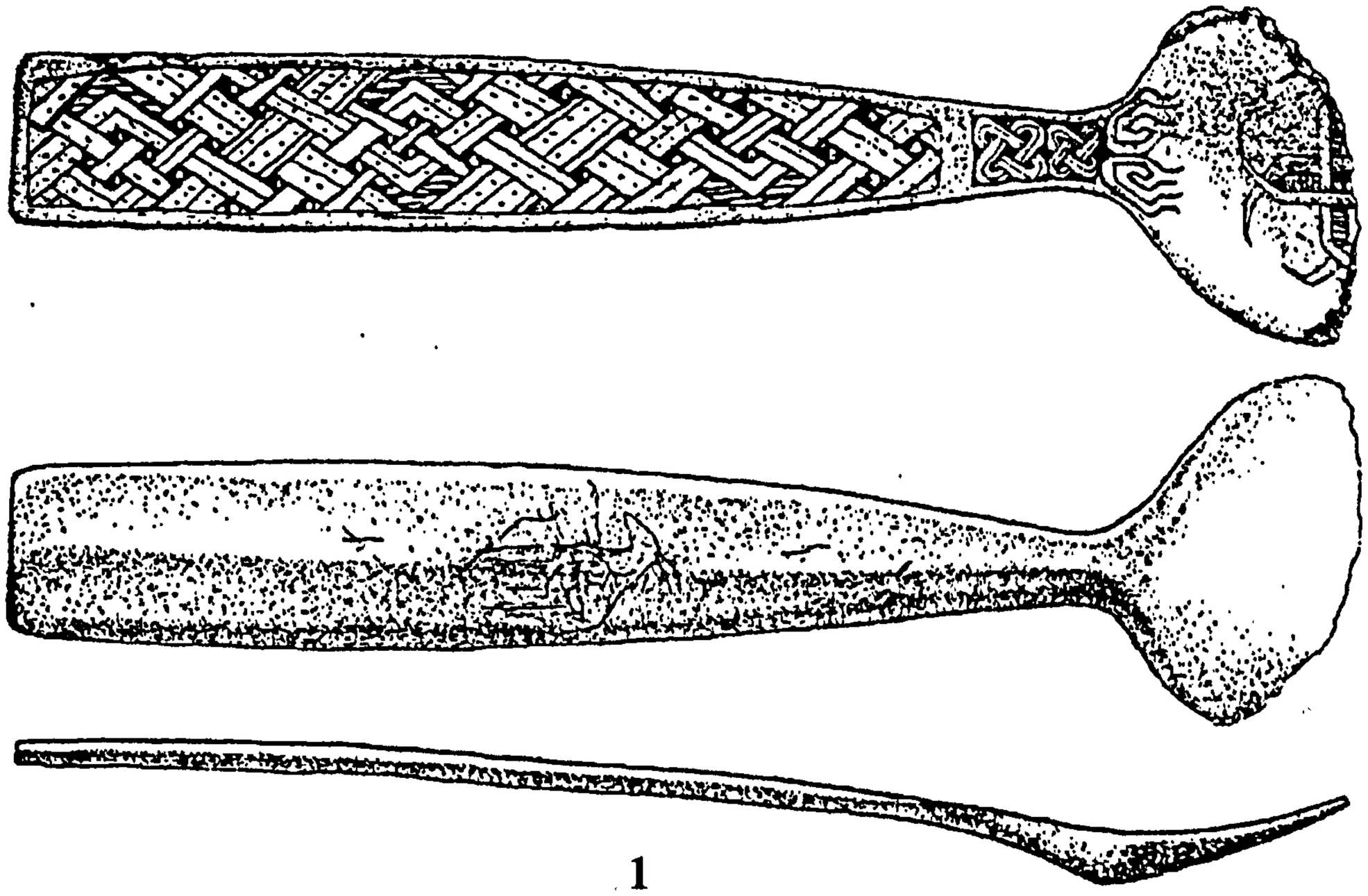


A115

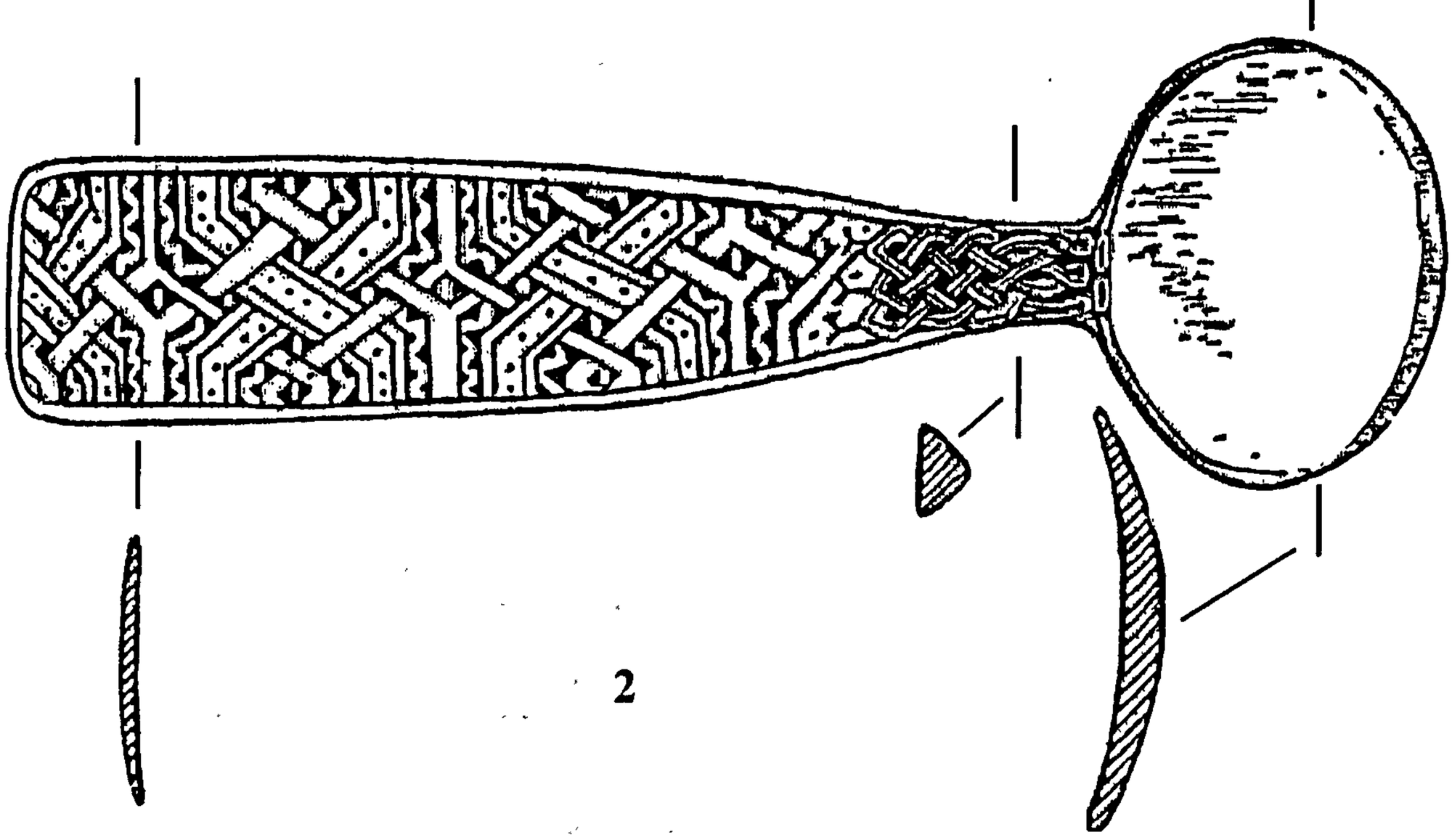


A357

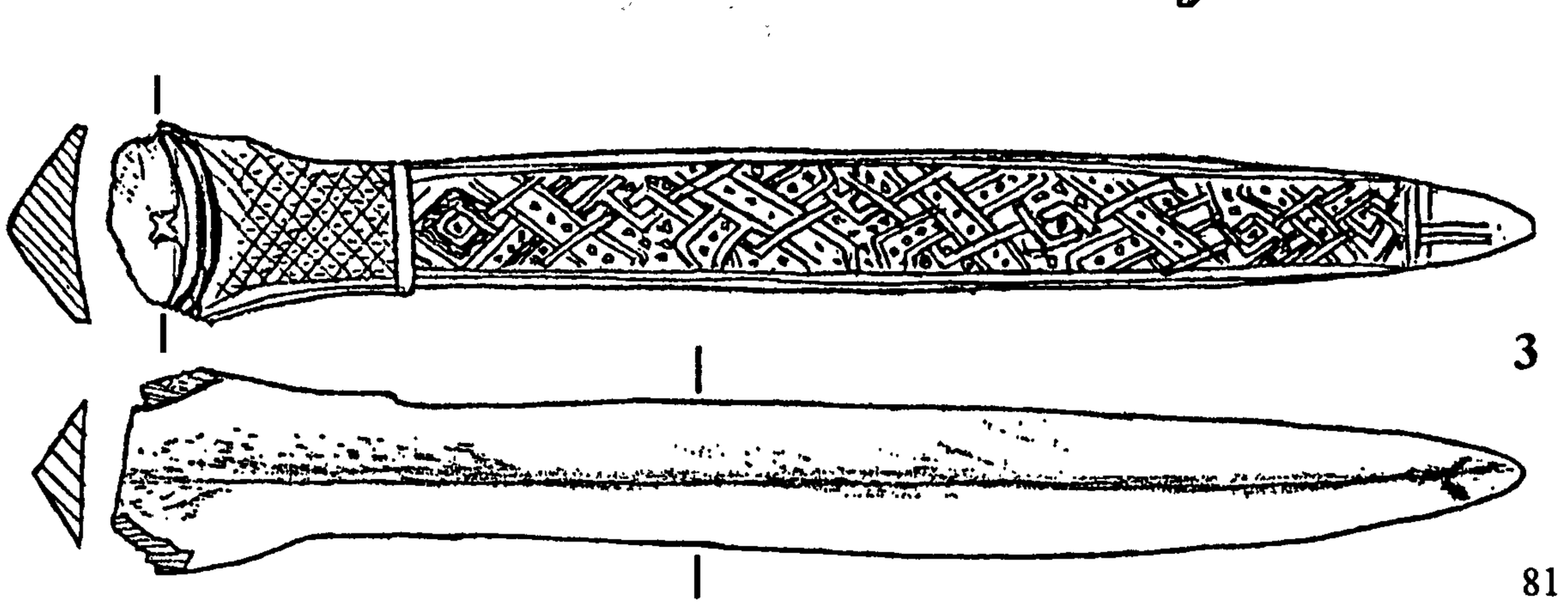
Fig. 3.71 Spoons of Scandinavian origin with interlaced decoration



1



2



3

Fig. 3.72 Distribution of 10th century single-sided composite combs on the properties of the Nerevsky End (Nerevsky site)

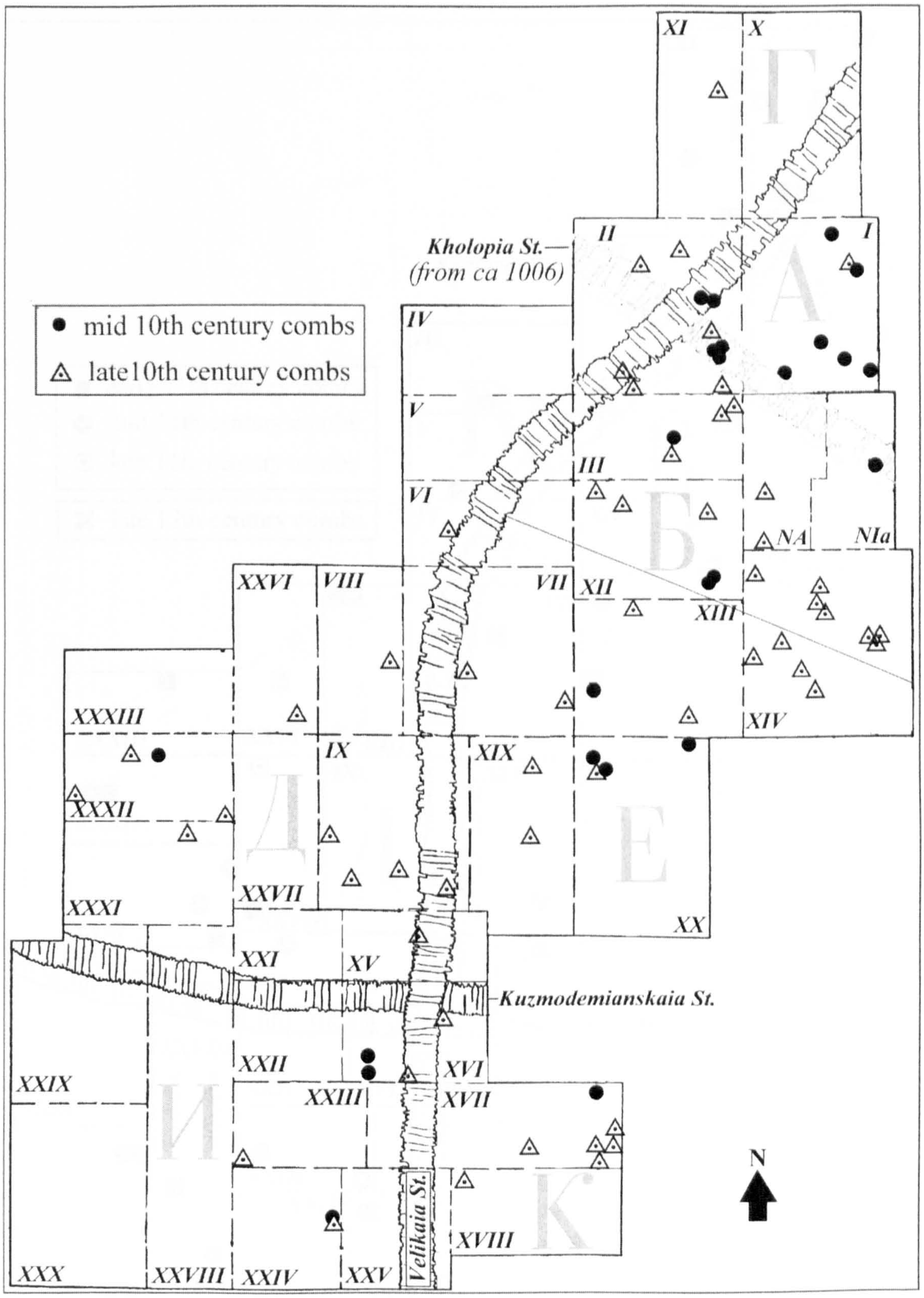


Fig. 3.73 Distribution of the 11th century single-sided composite combs on the properties of the Nerevsky End (Nerevsky site) and the location of the 12th century comb

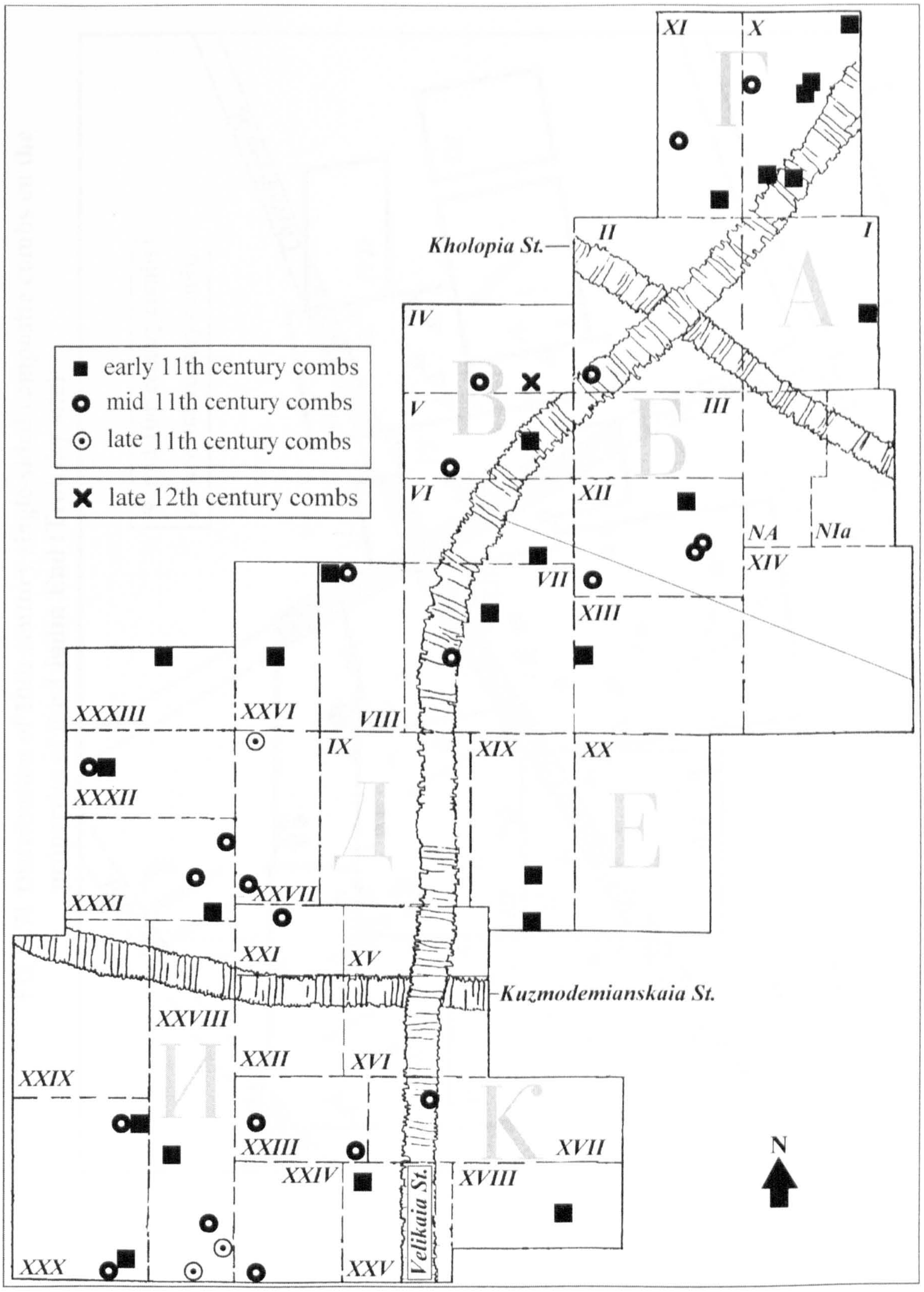


Fig. 3.74 Distribution of 10th century single-sided composite combs on the properties of the Liudin End (Troitsky site)

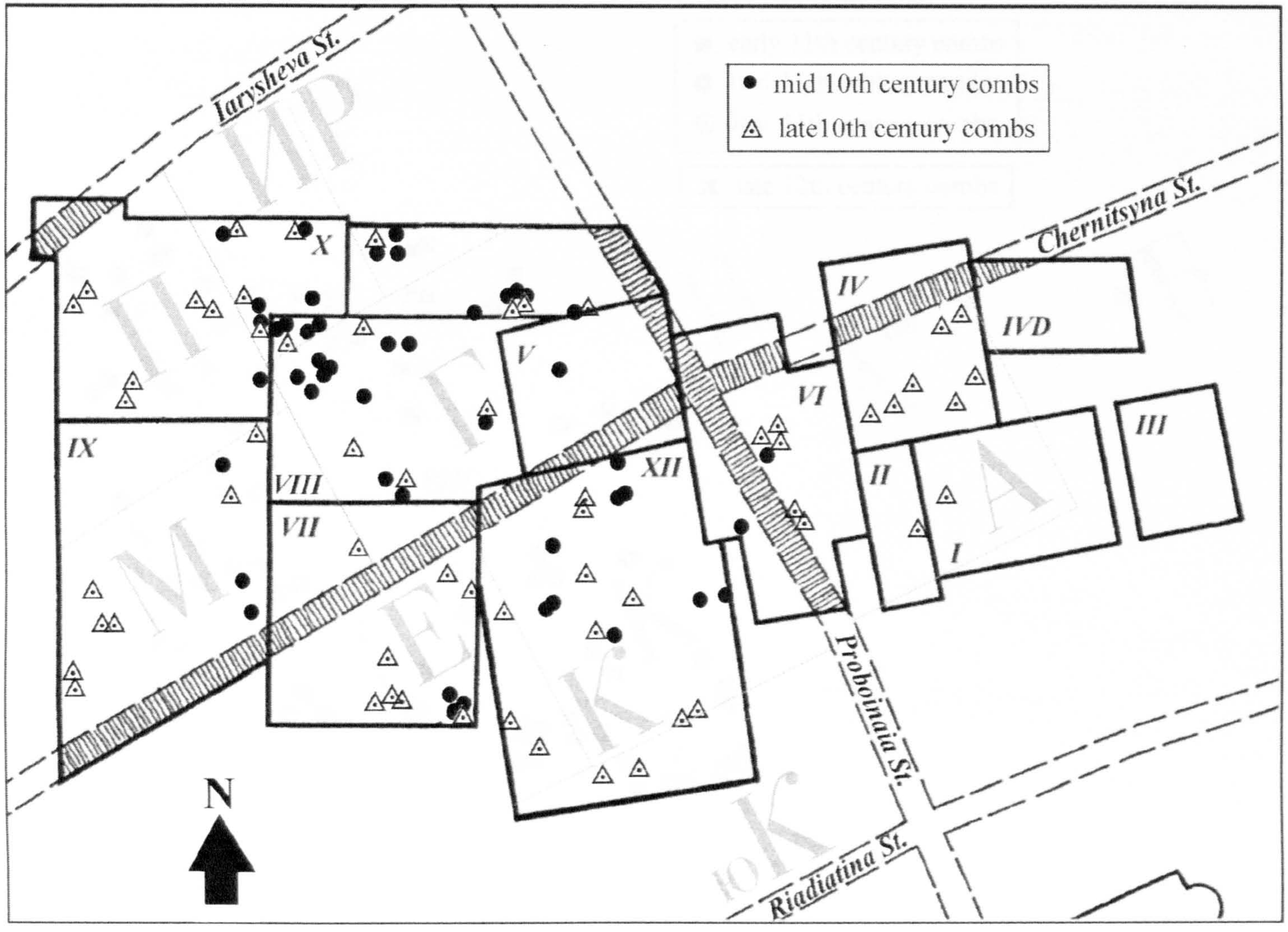


Fig. 3.75 Distribution of the 11th century single-sided composite combs on the properties of the Liudin End (Troitsky site) and the location of the 12th century combs

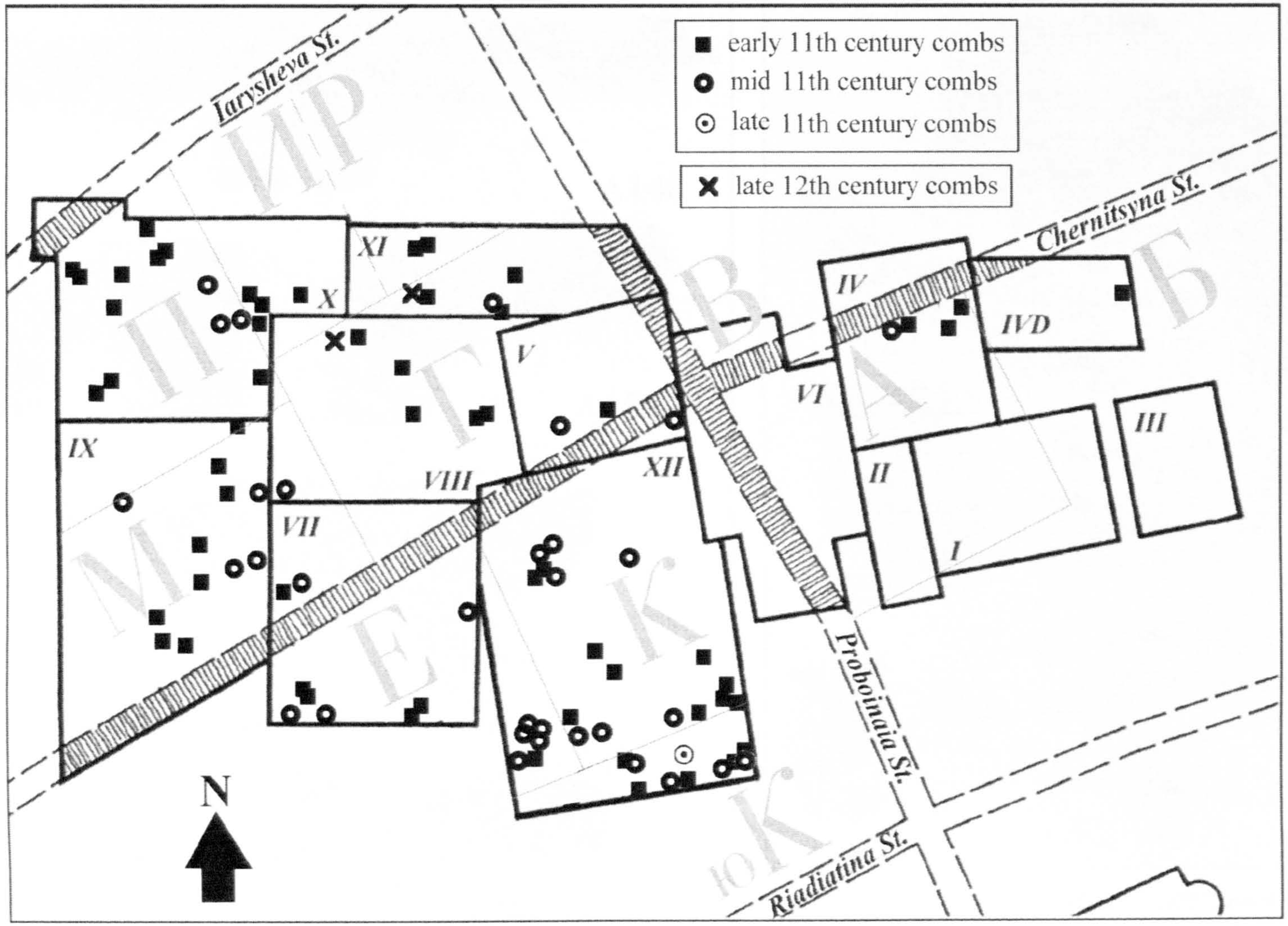
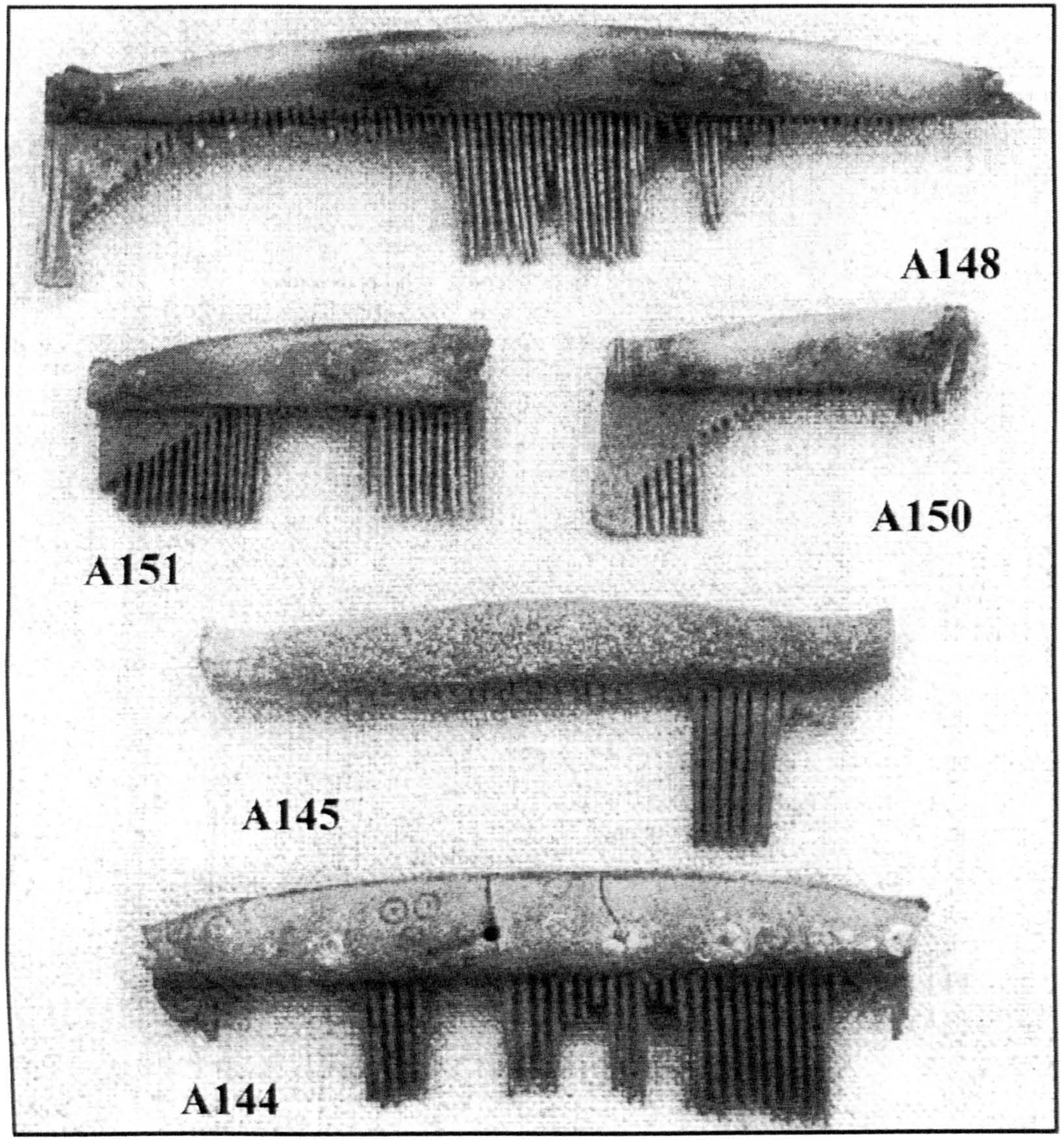


Fig. 3.76 Waste elements from theTroitsky dwelling XI-29-170 (property Γ) and combs deriving from the same context



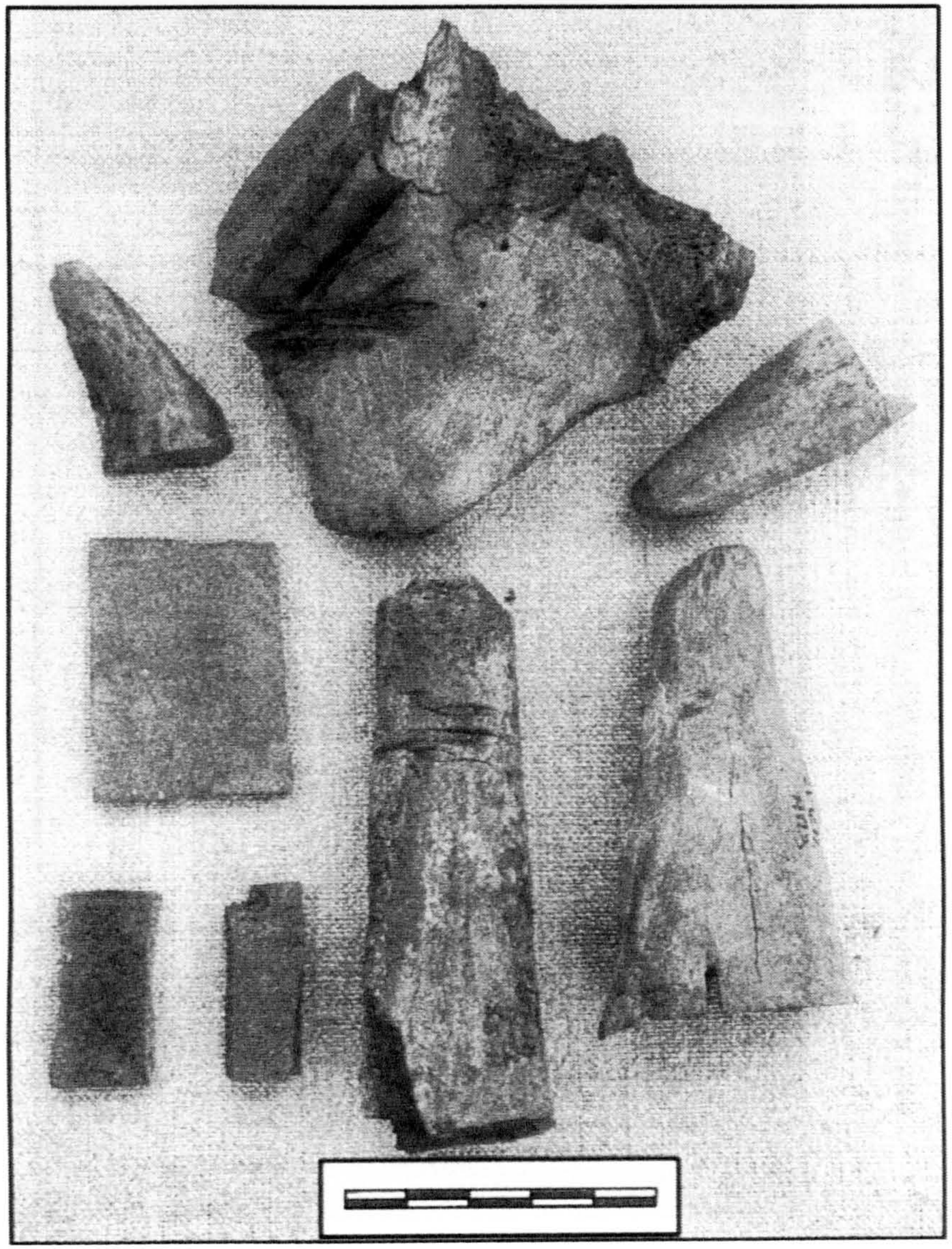


Fig. 3.77 Bone with part of runic alphabet from the Nerevsky site

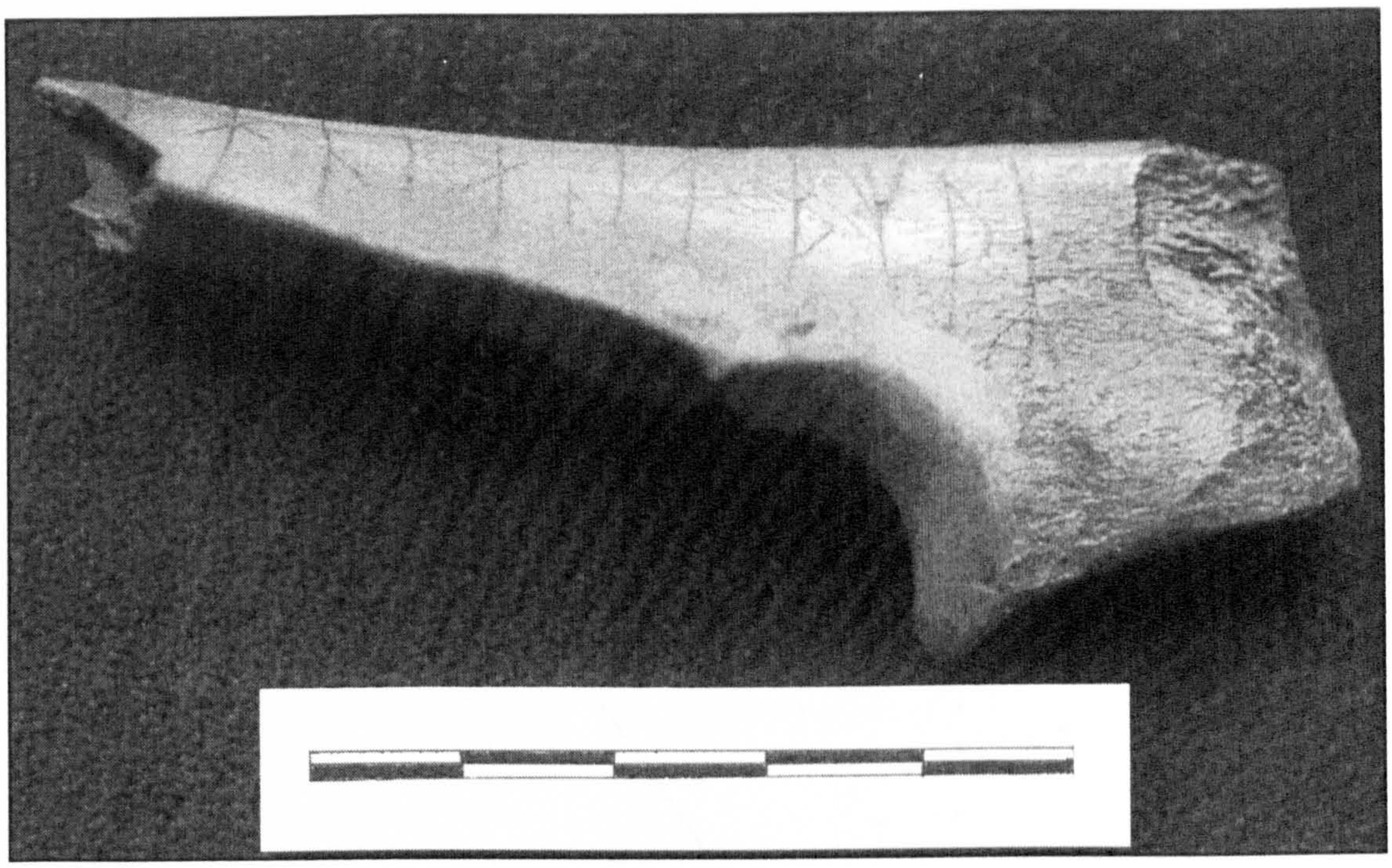
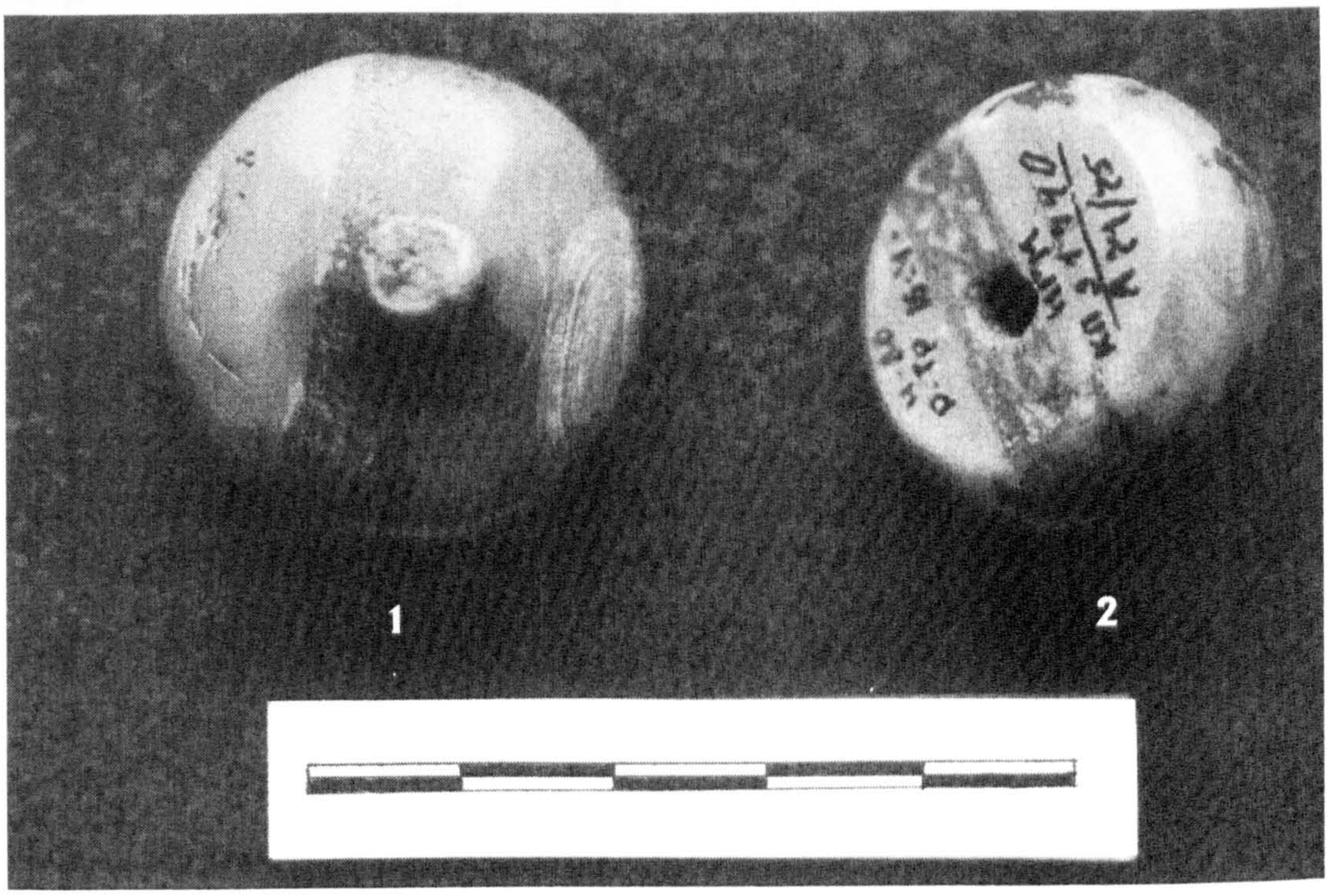


Fig. 3.78 Hemispherical gaming pieces of walrus ivory from the Troitsky site



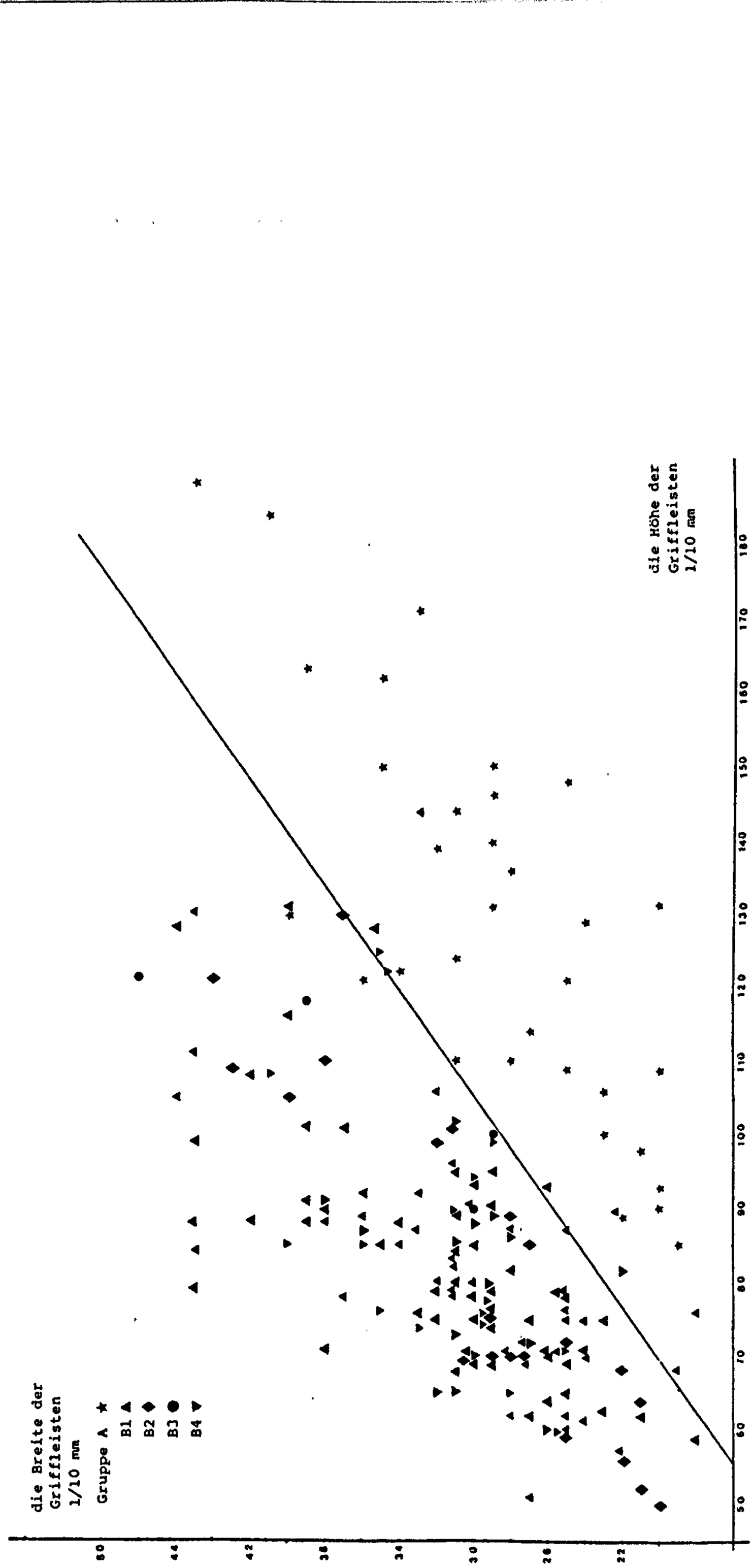
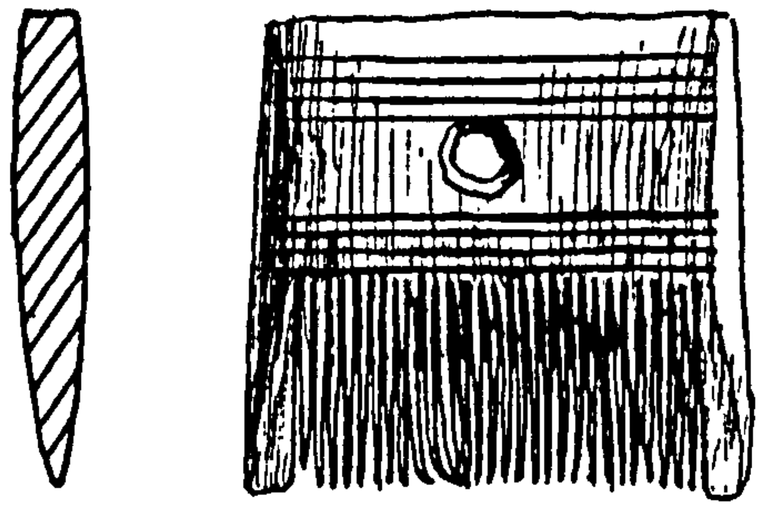
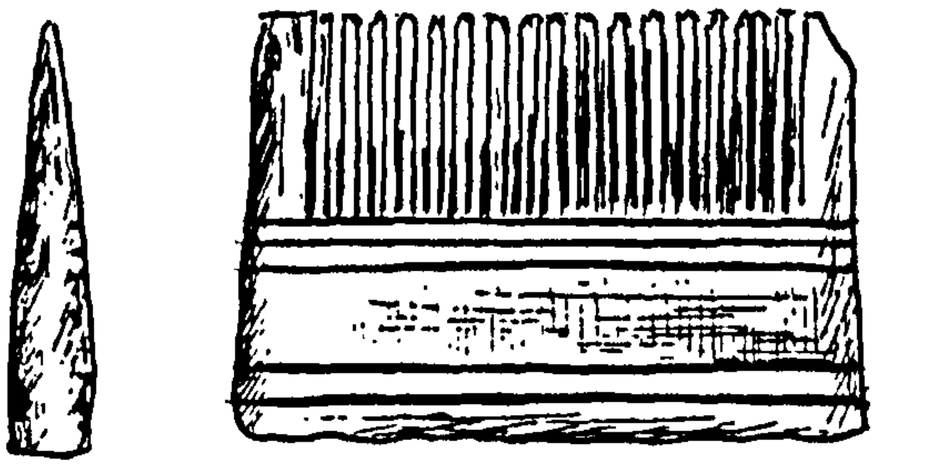


Fig. 3.79 Reproduction of the diagram demonstrating the relative depth of *'A'* combs and *'B'* combs (after Ambrosiani 1981, 71 Fig. 37)

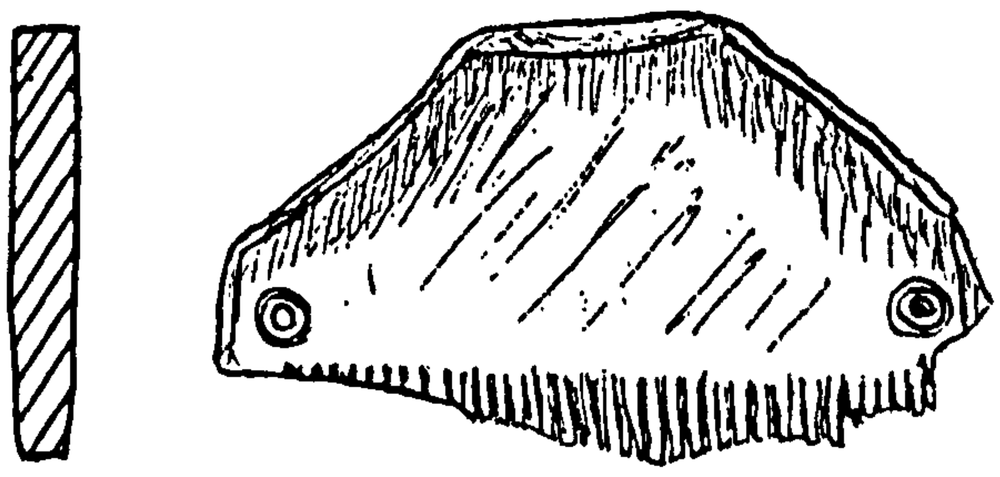
Fig. 4.1 11th century simple double-sided combs trimmed and reused as single-sided



B69



B359



B1042

Fig. 4.2 Antler (B861 and B865) and elephant ivory(B789) double-sided combs trimmed and reused as single-sided

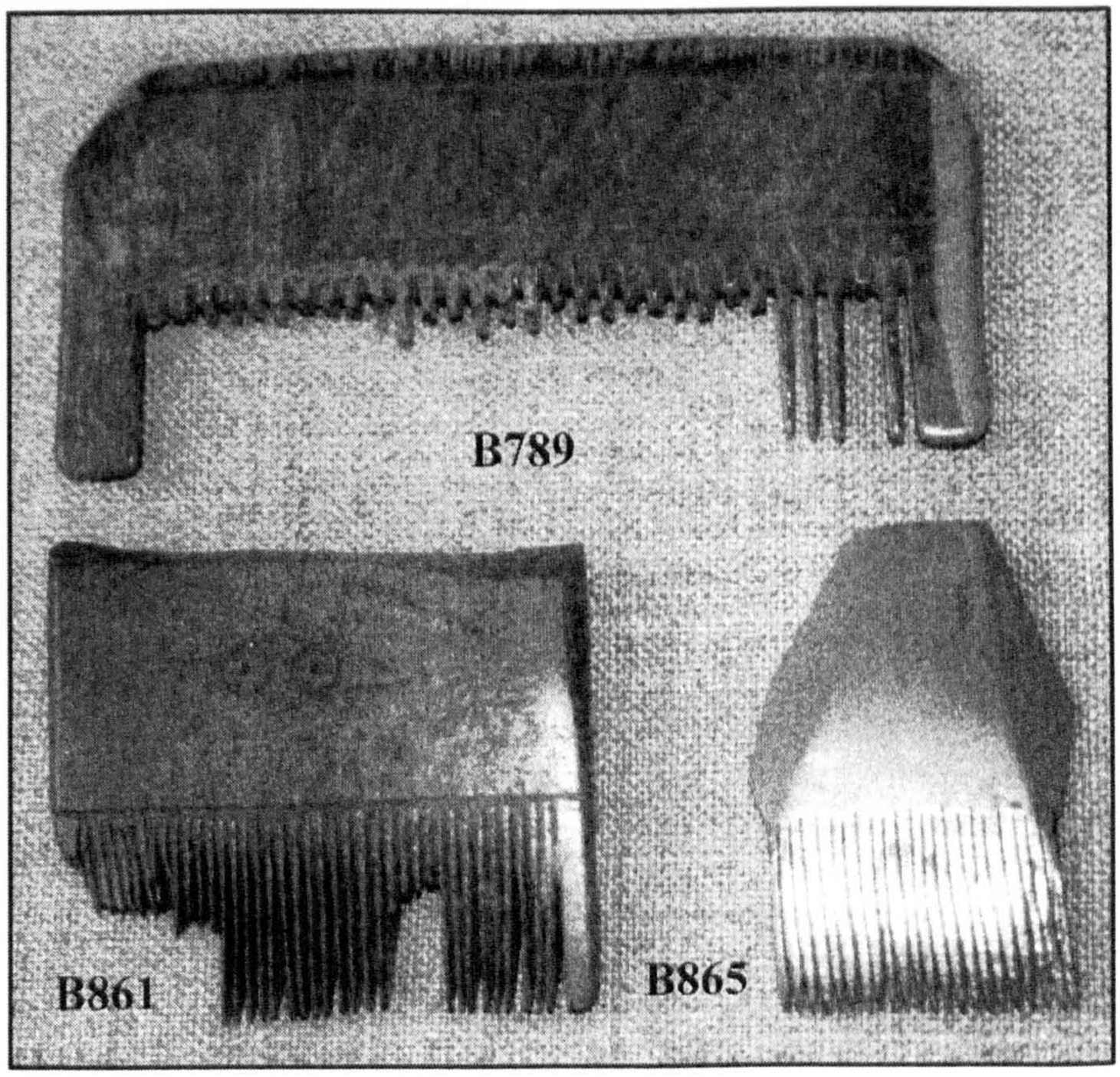
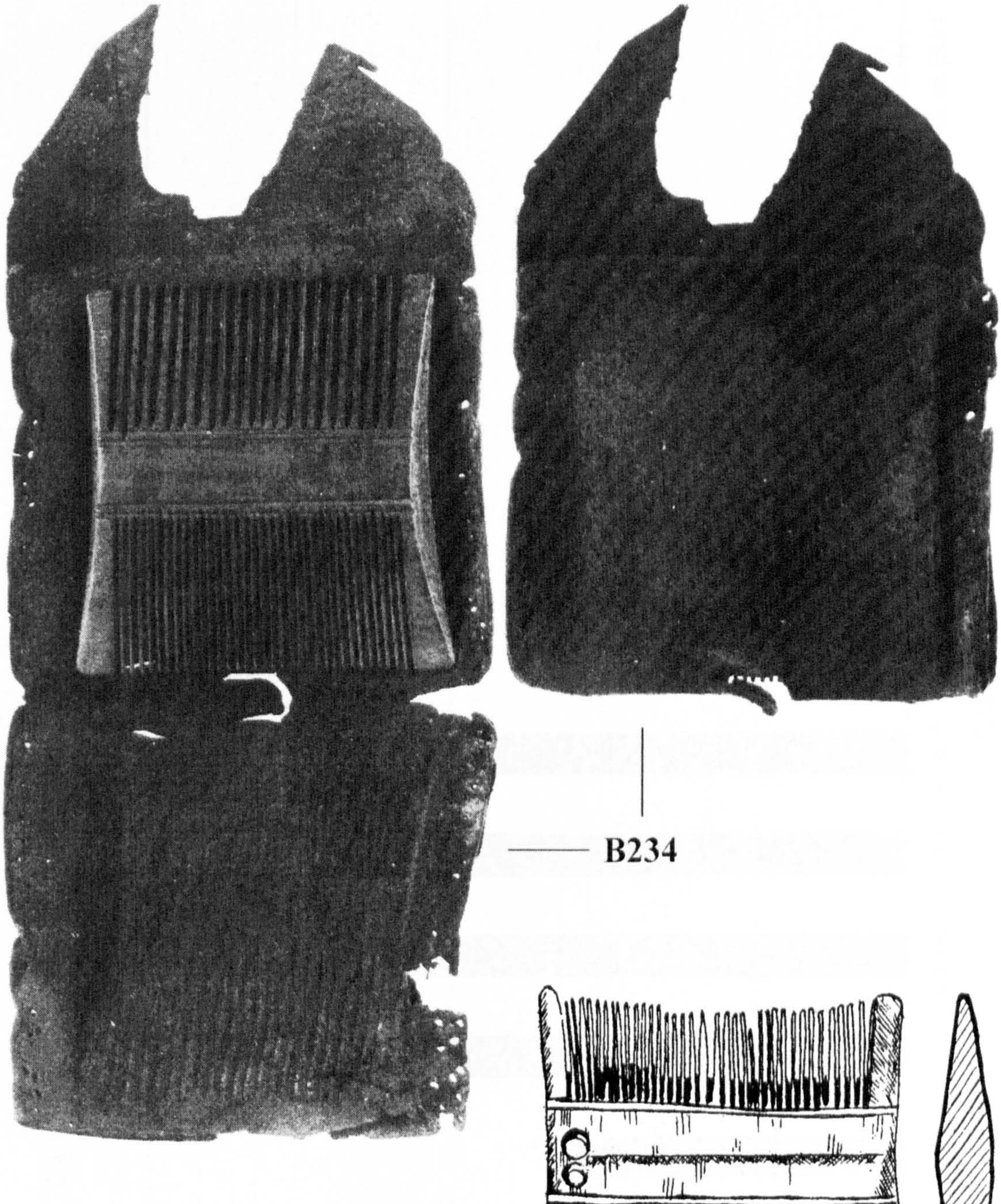
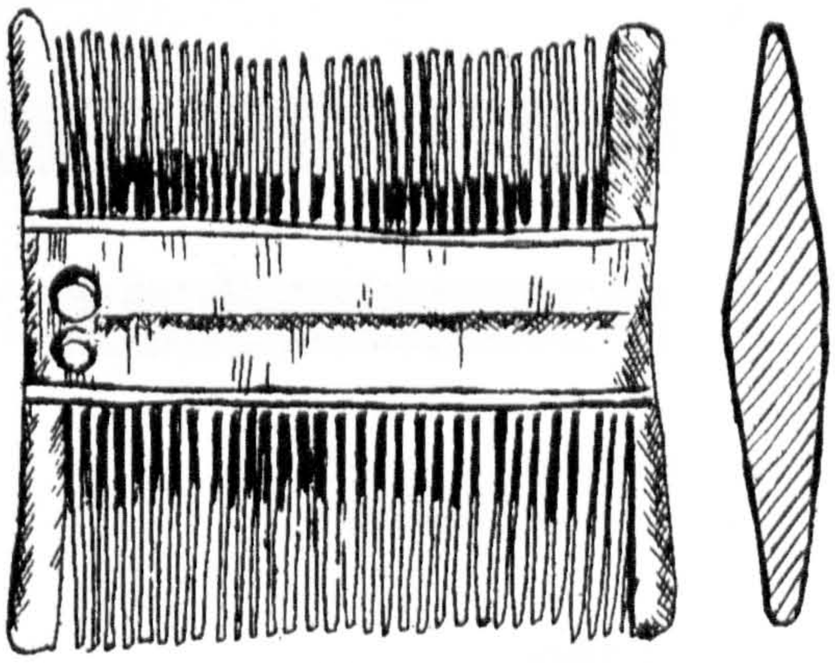


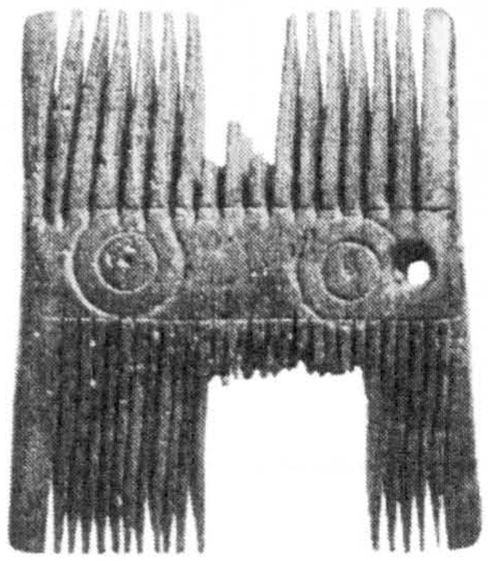
Fig. 4.3 Simple combs featuring suspension holes (B898 and B1040) and comb B234 with surviving leather case



B234

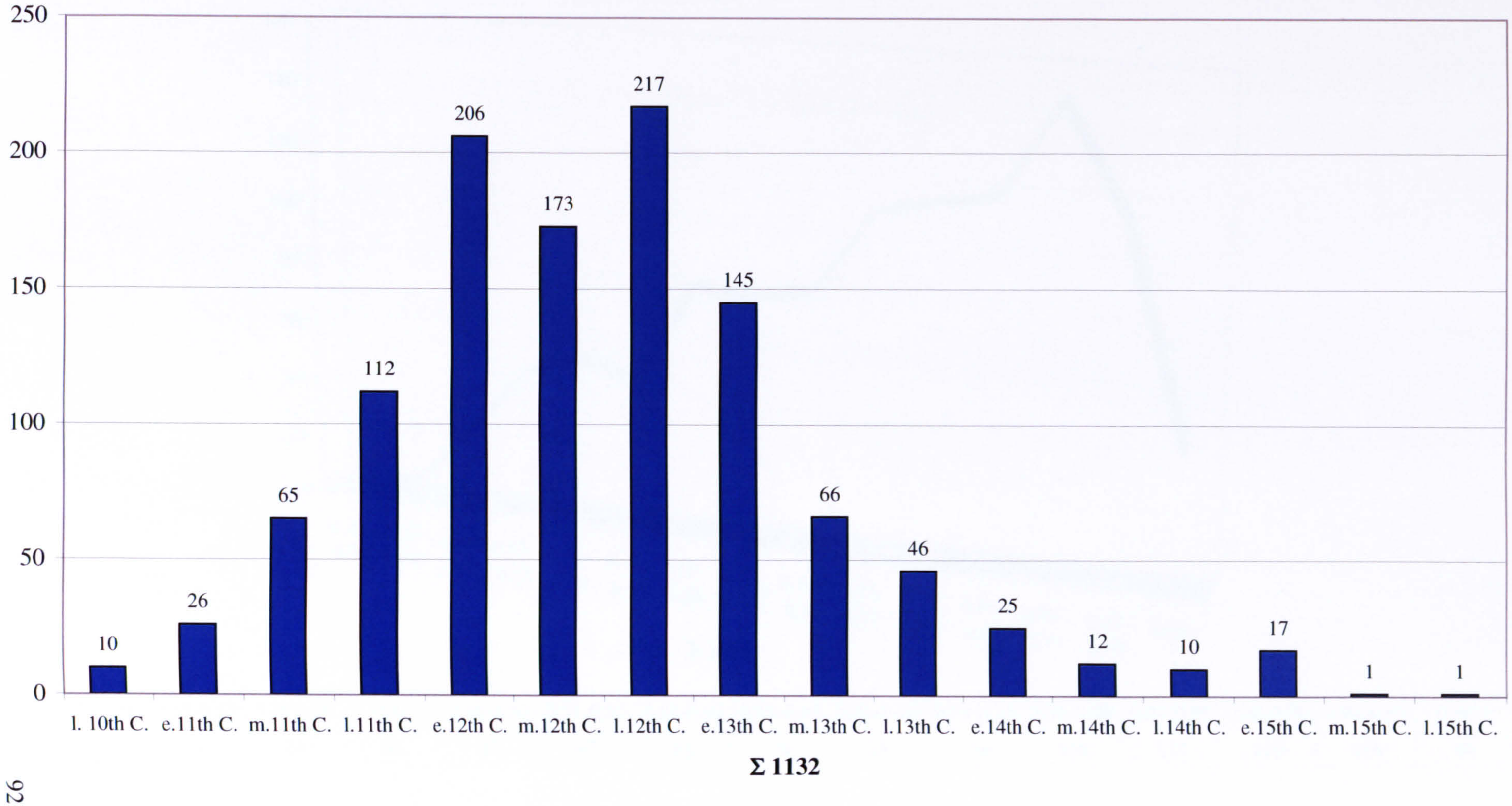


B1040



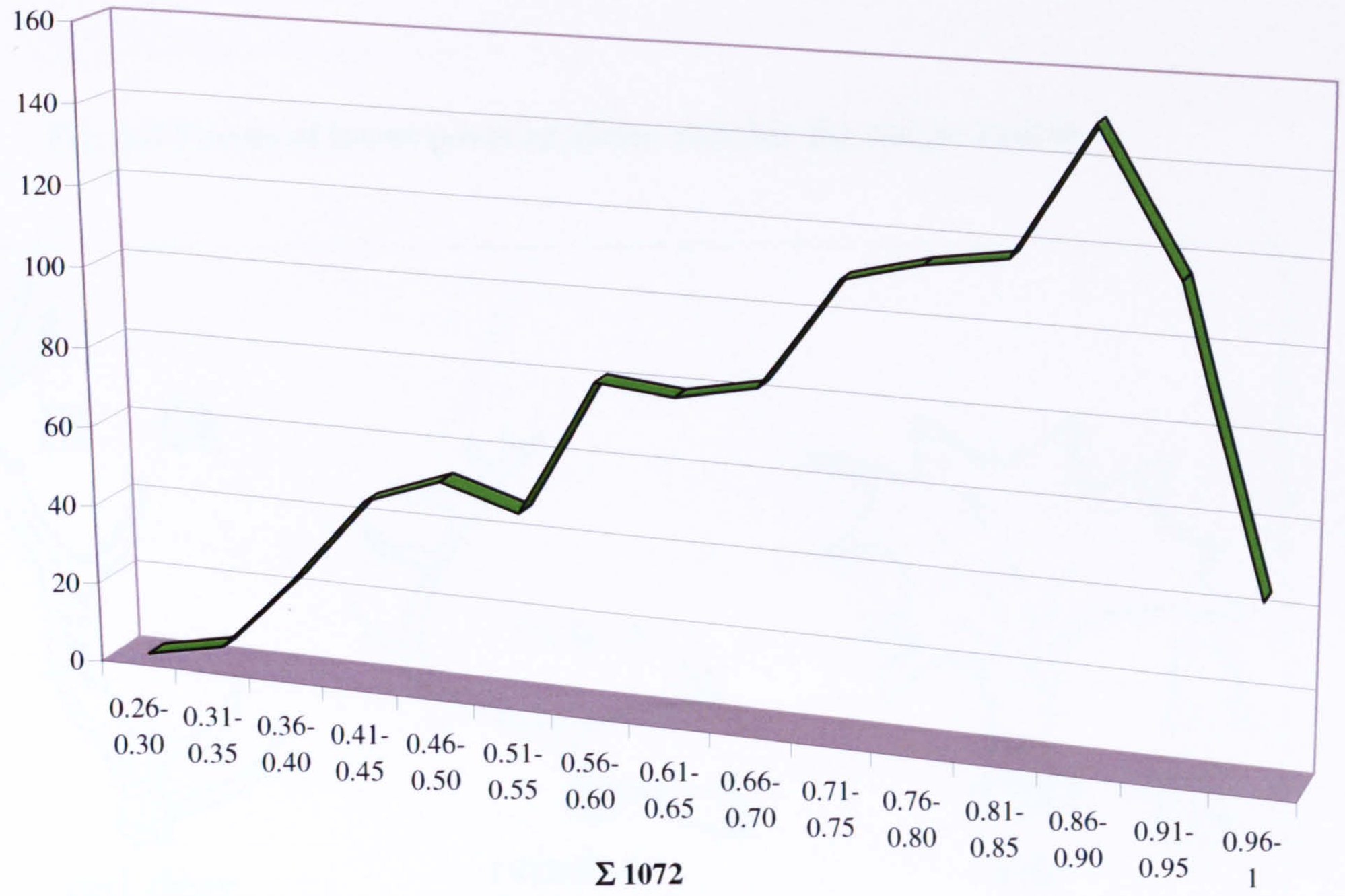
B898

Fig. 4.4 Chronological distribution of simple combs in skeletal materials



Σ 1132

Fig. 4. 5
Simple combs in skeletal materials. Degree of side slope



	0.26-0.30	0.31-0.35	0.36-0.40	0.41-0.45	0.46-0.50	0.51-0.55	0.56-0.60	0.61-0.65	0.66-0.70	0.71-0.75	0.76-0.80	0.81-0.85	0.86-0.90	0.91-0.95	0.96-1
S1072	1	5	24	46	53	47	81	79	83	110	115	118	150	116	44

Fig. 4.6 Forms of lower parts of antler suitable for simple combs

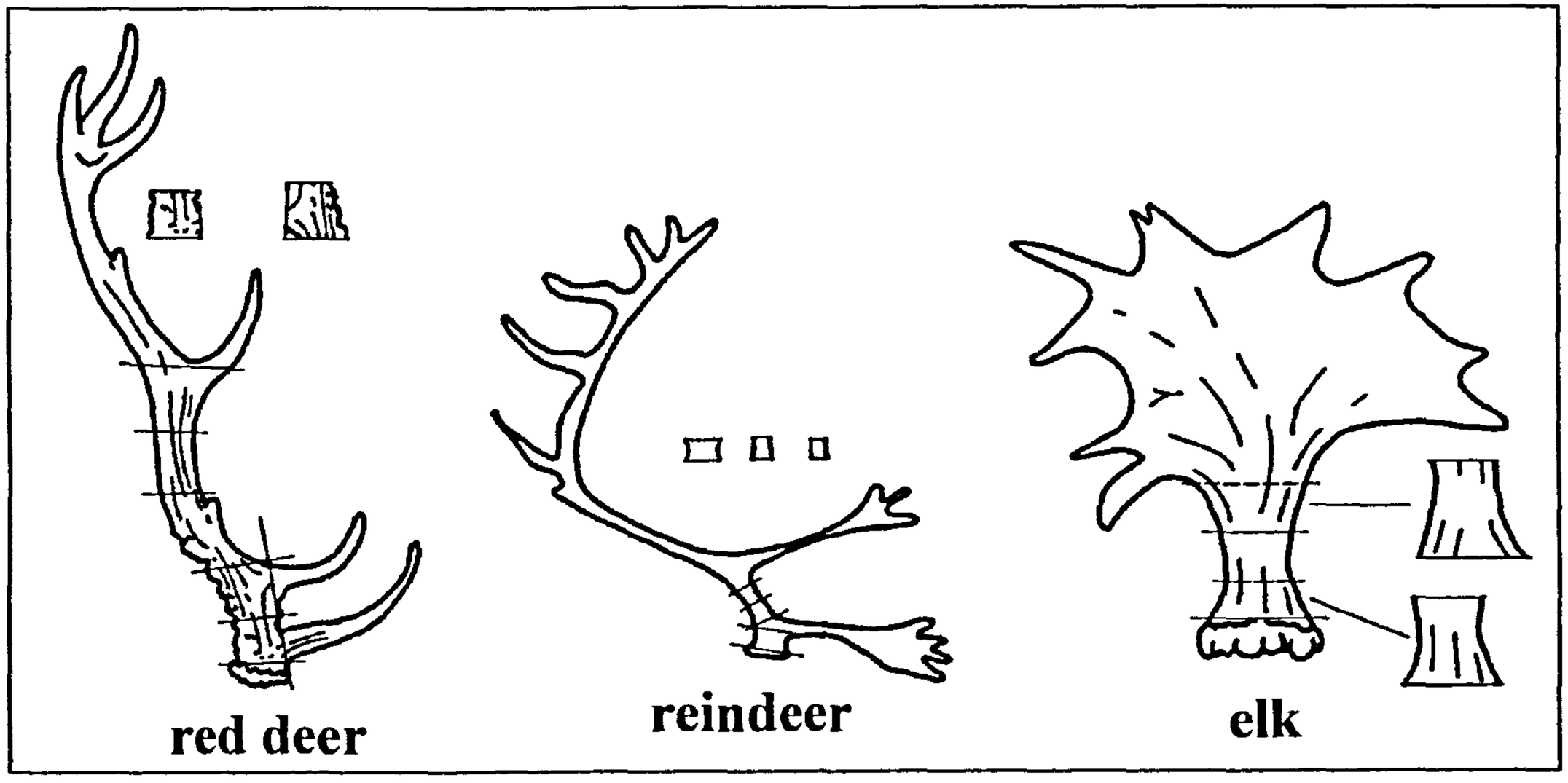
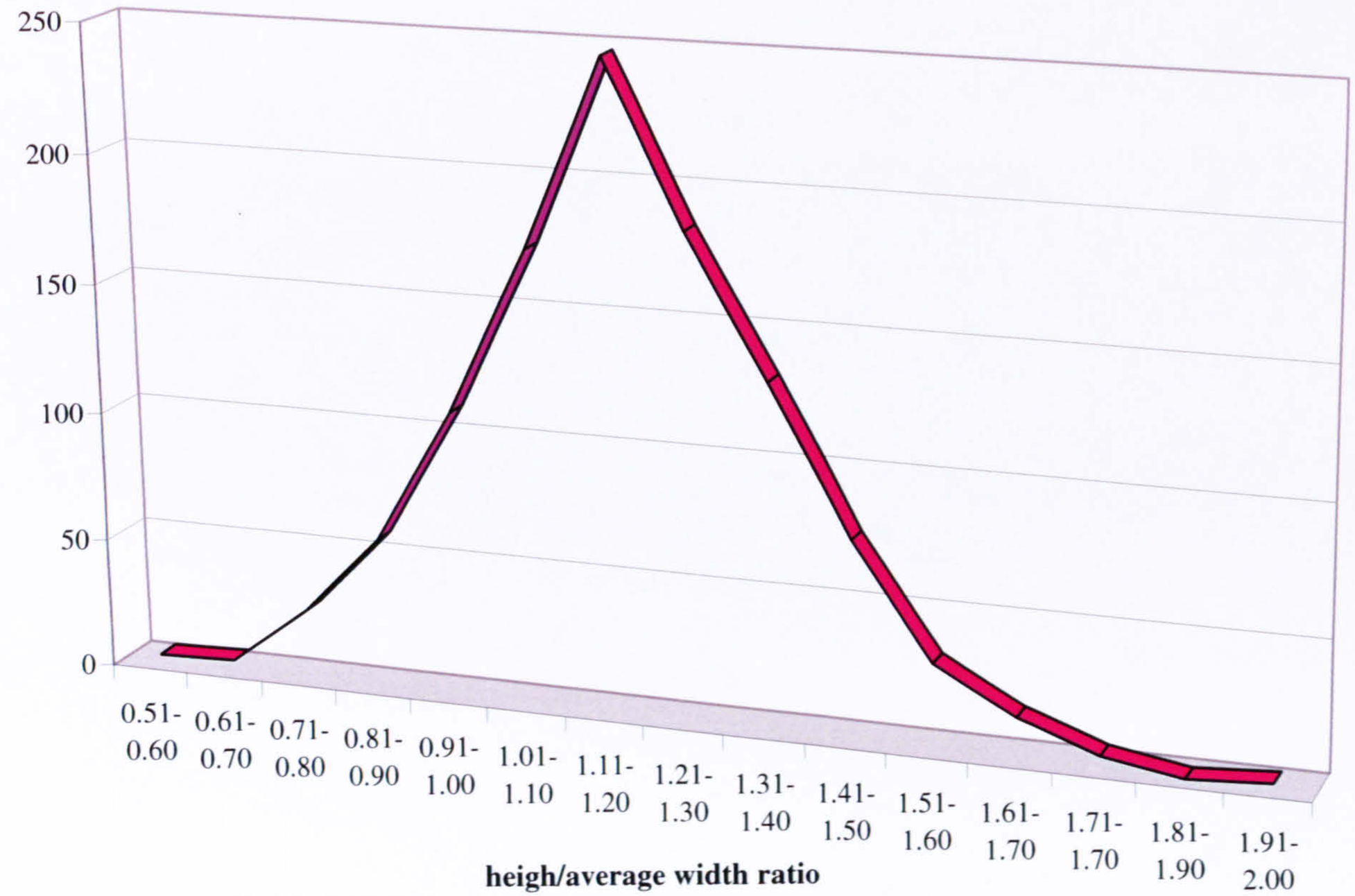


Fig. 4. 7
Simple combs in skeletal materials. Proportions



	0.51–0.60	0.61–0.70	0.71–0.80	0.81–0.90	0.91–1.00	1.01–1.10	1.11–1.20	1.21–1.30	1.31–1.40	1.41–1.50	1.51–1.60	1.61–1.70	1.71–1.70	1.81–1.90	1.91–2.00
Σ1072	3	4	27	58	110	174	247	185	132	76	33	16	5	0	2

Fig. 4.8 Simple combs in skeletal materials. Basic forms

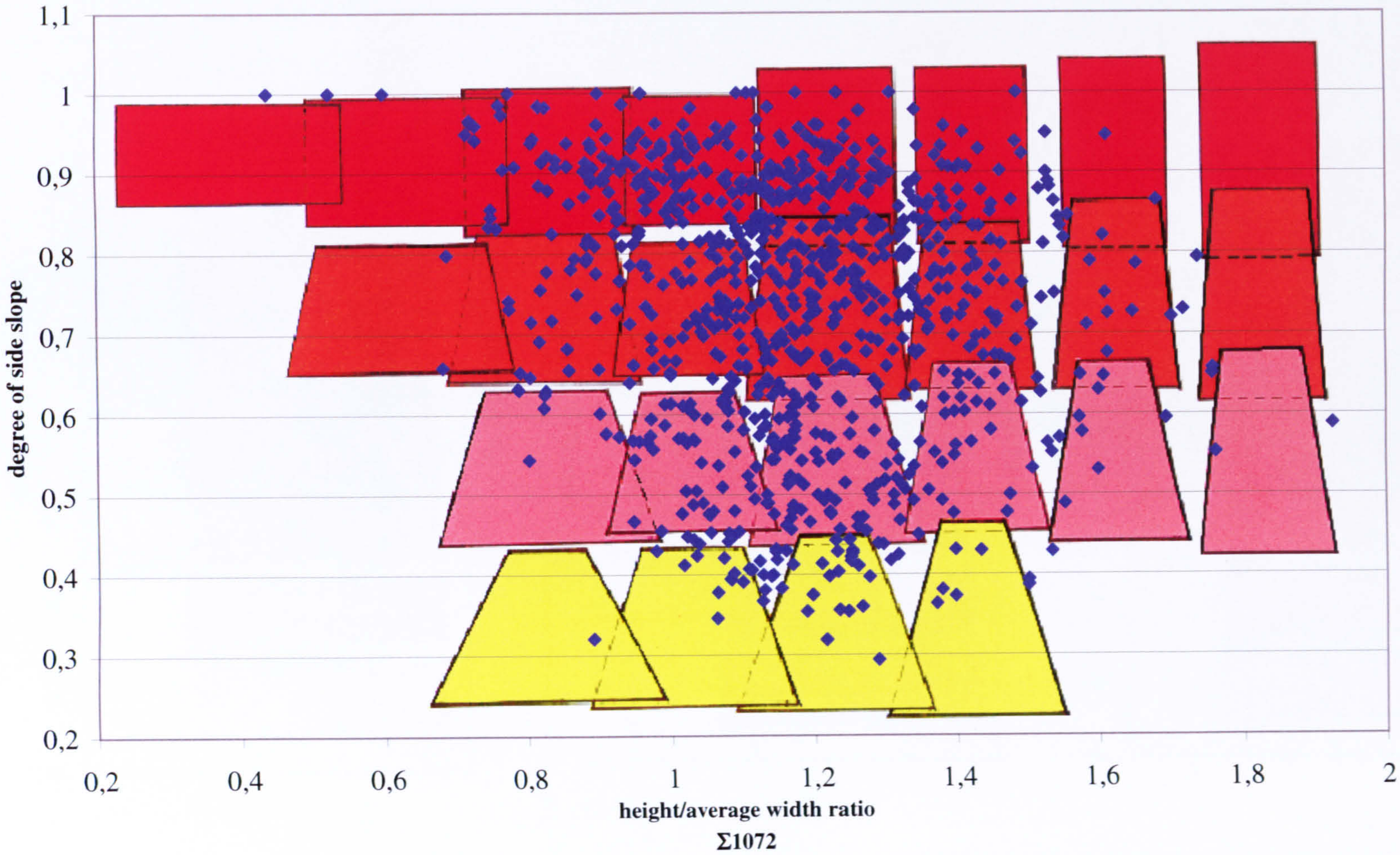
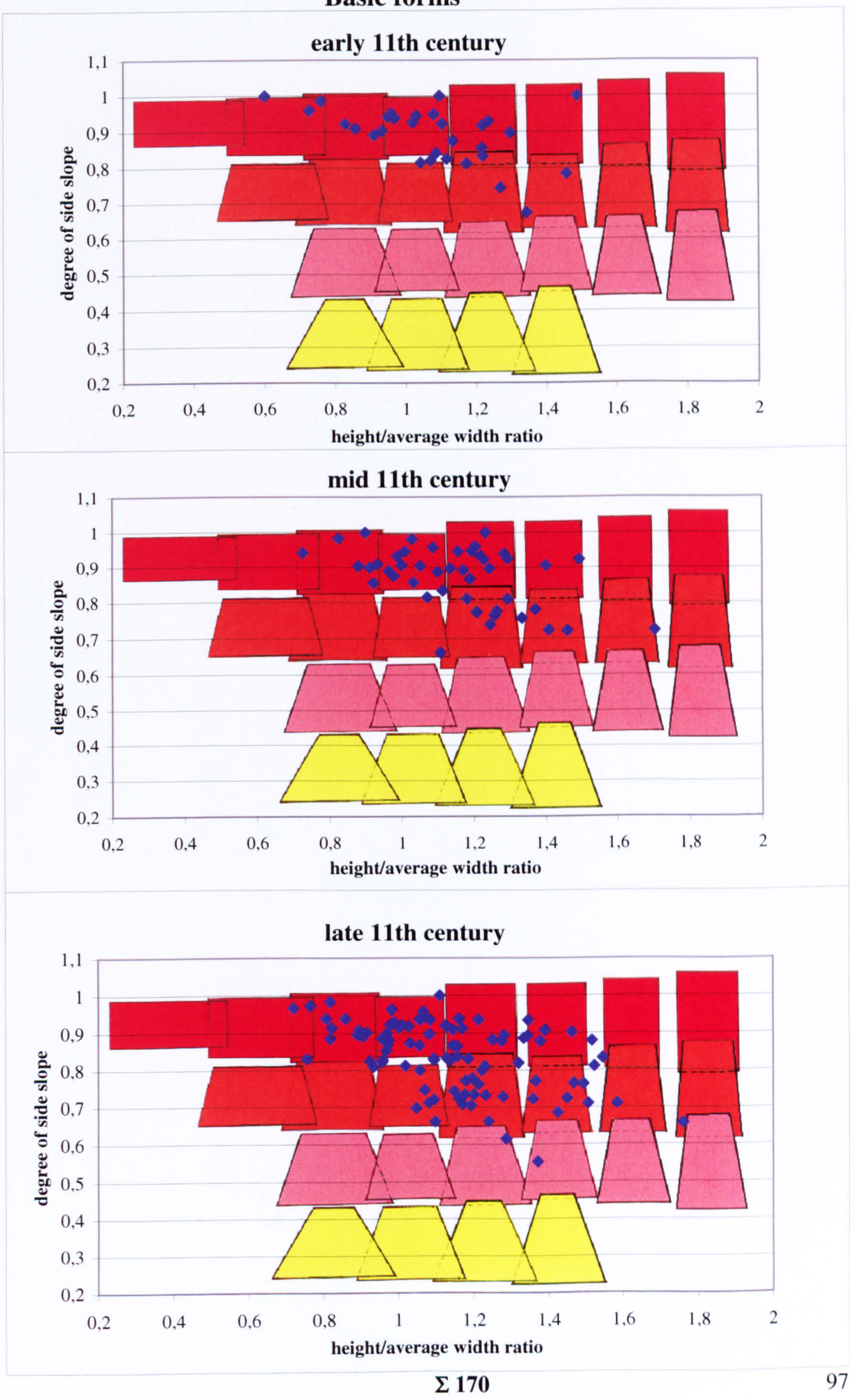
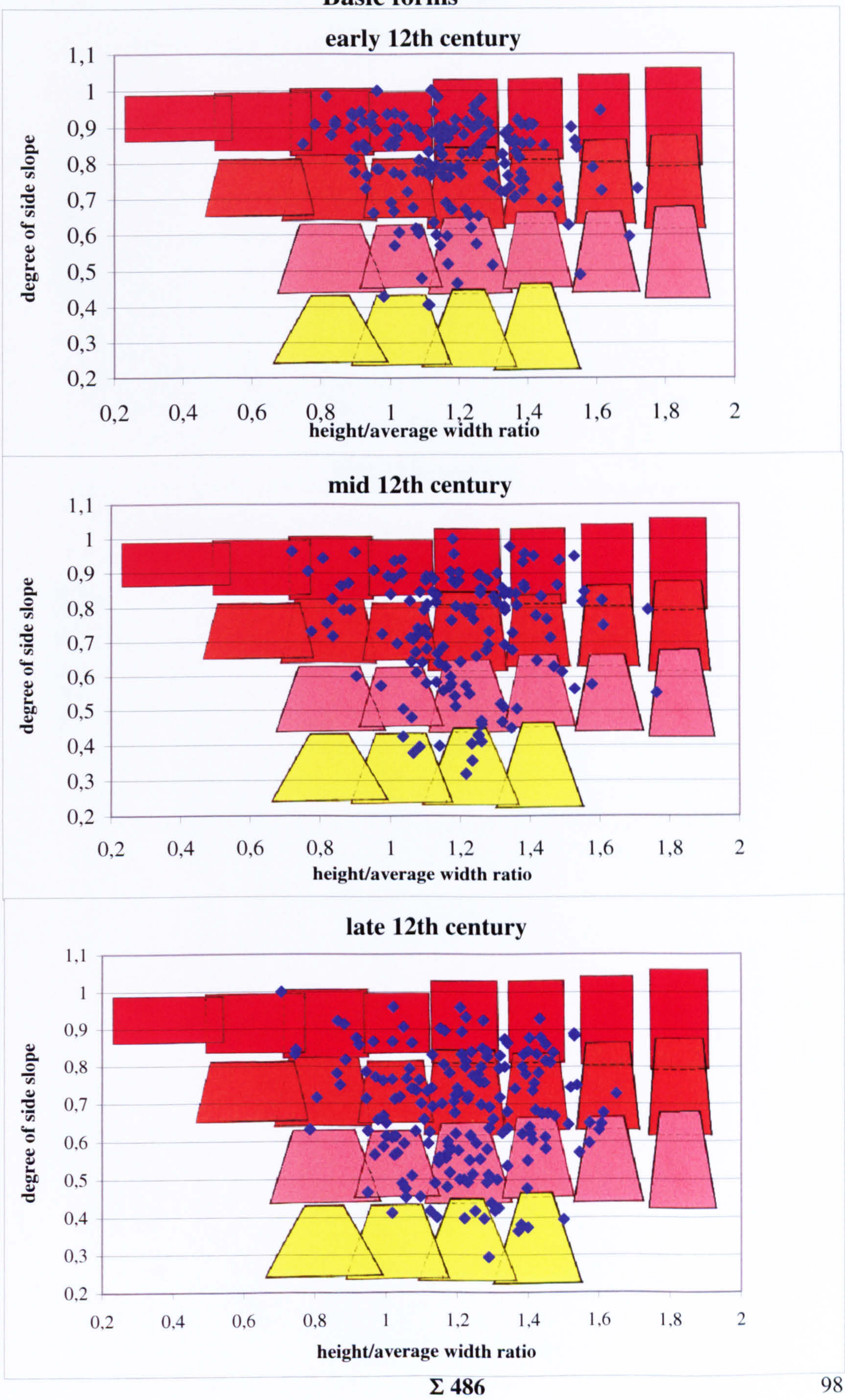


Fig. 4.9 11th century simple combs in skeletal materials
Basic forms



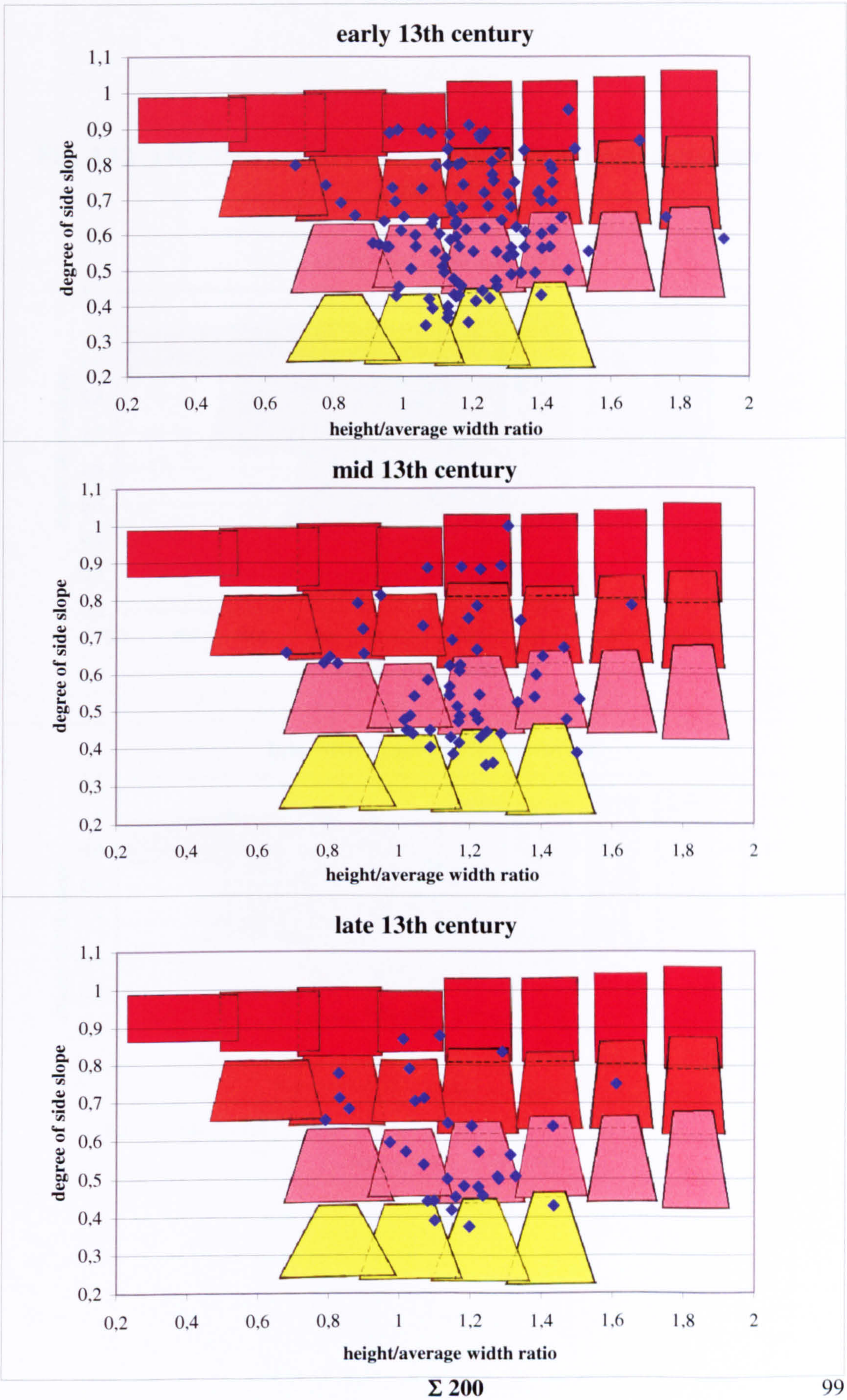
Σ 170

Fig. 4.10 12th century simple combs in skeletal materials
Basic forms



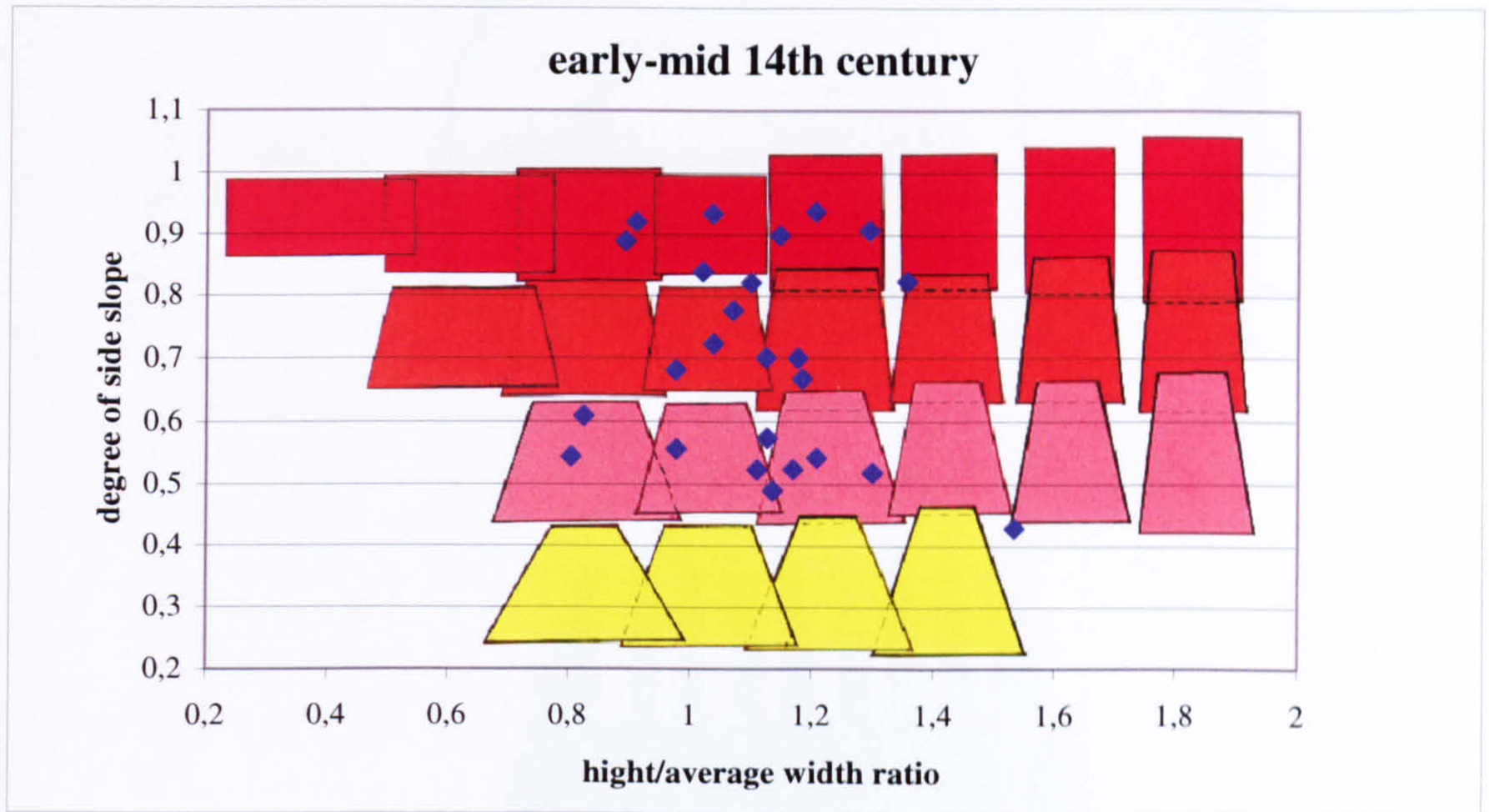
Σ 486

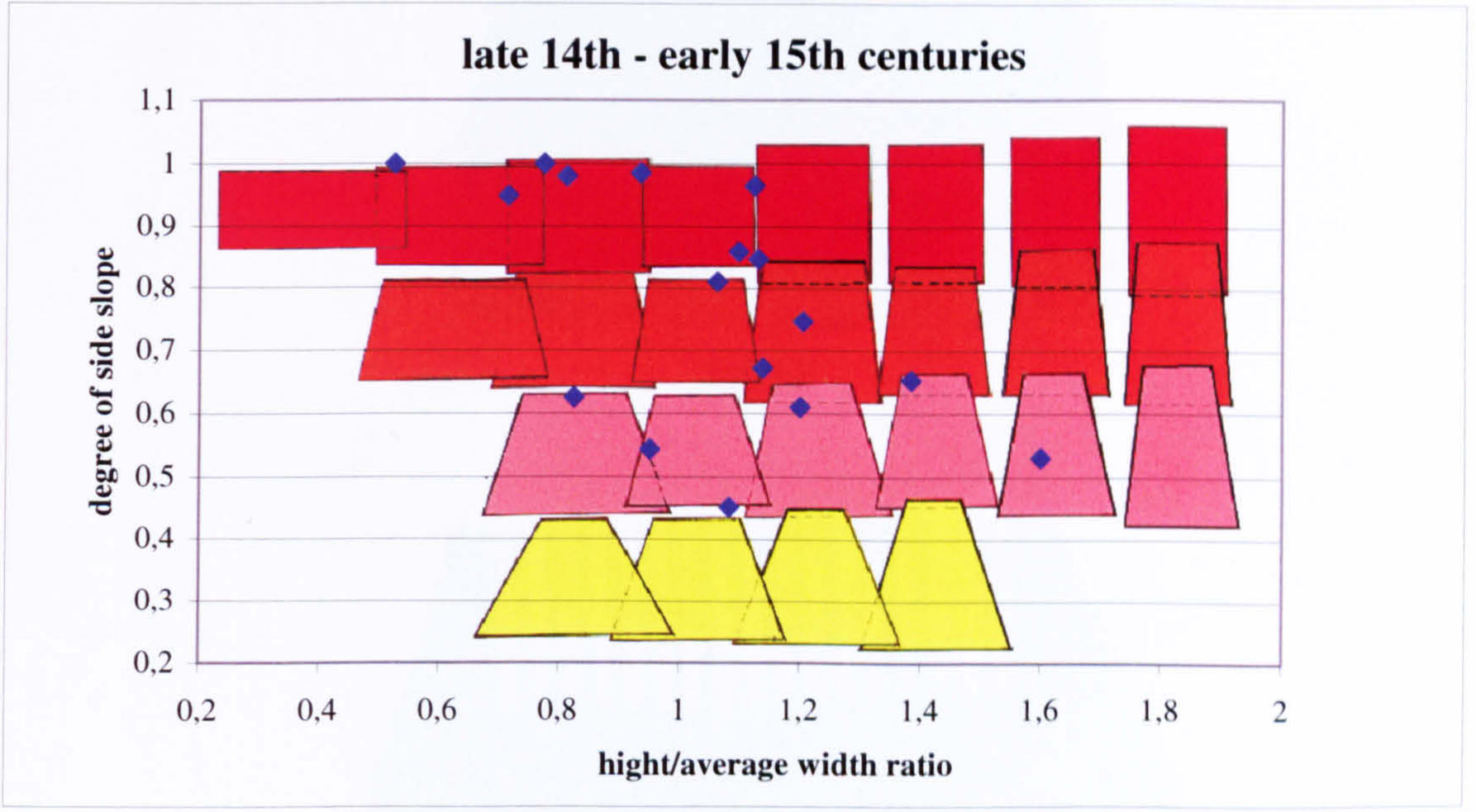
Fig. 4.11 13th century simple combs in skeletal materials
Basic forms



Σ 200

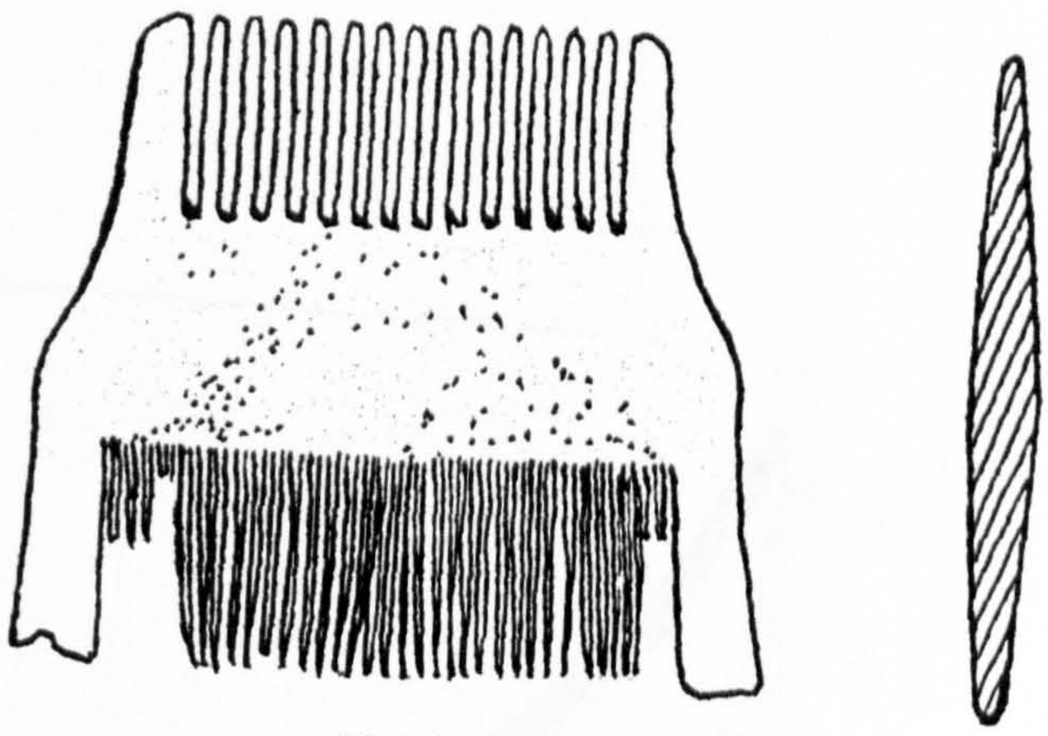
Fig. 4.12 14th-15th century simple combs in skeletal materials
Basic forms





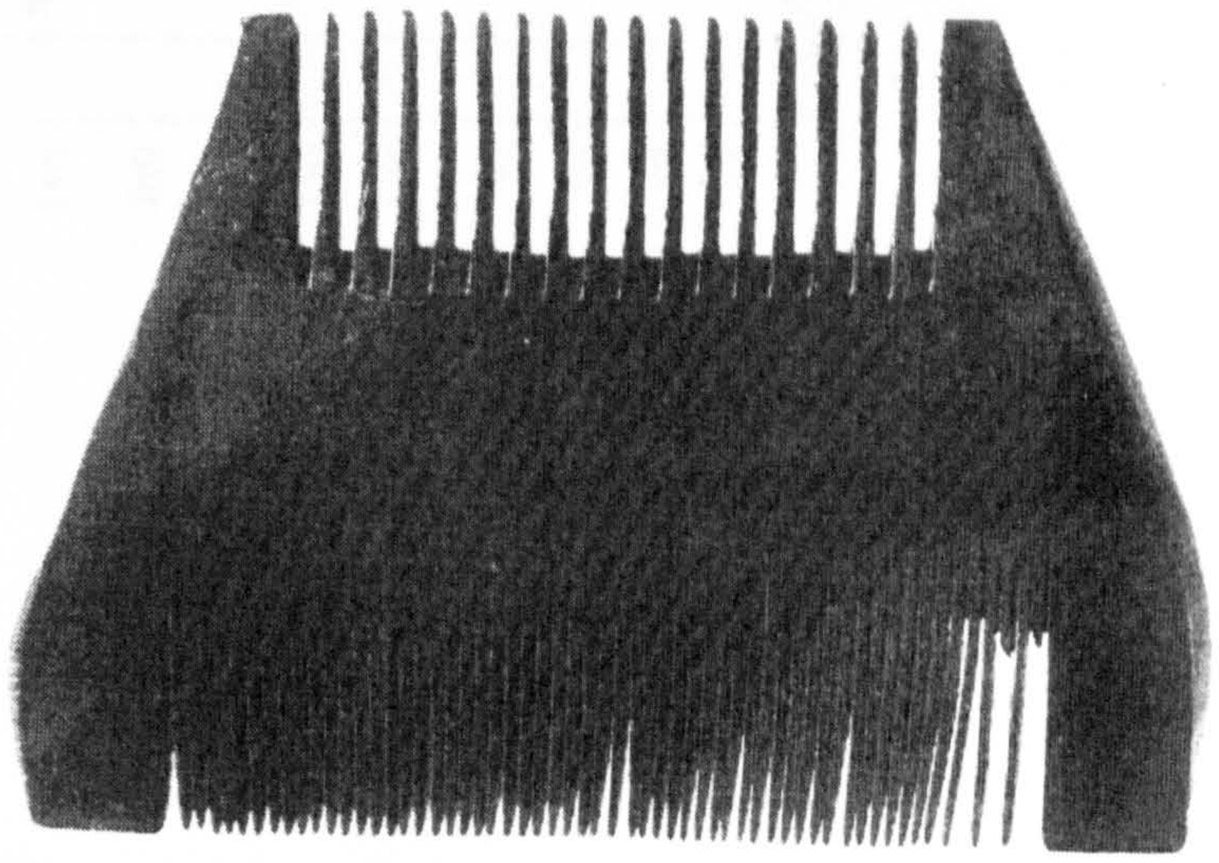
Σ 42

Fig. 4.13 Simple combs with convex sides



B1041

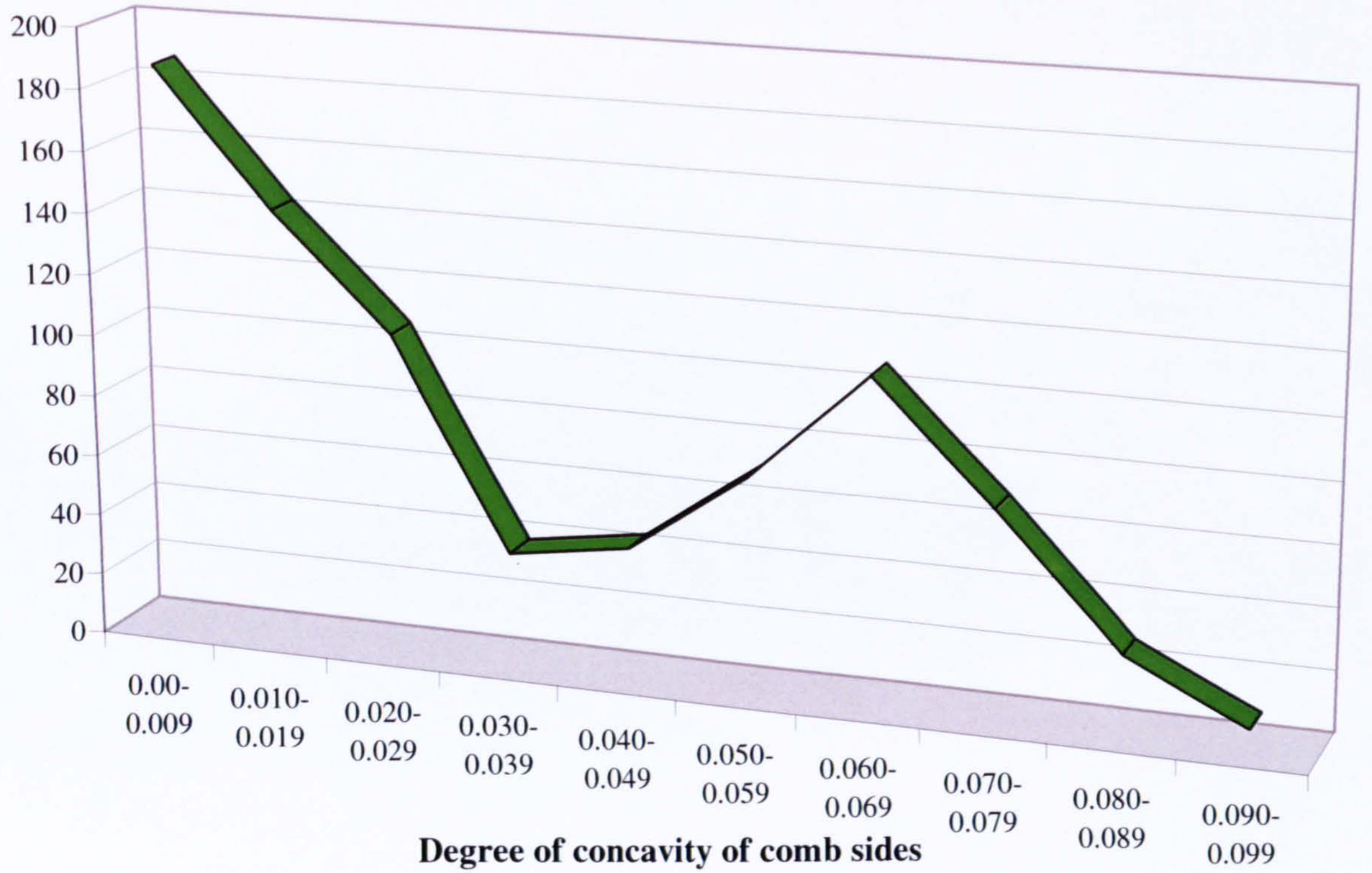
B920



B916

Fig. 4.14

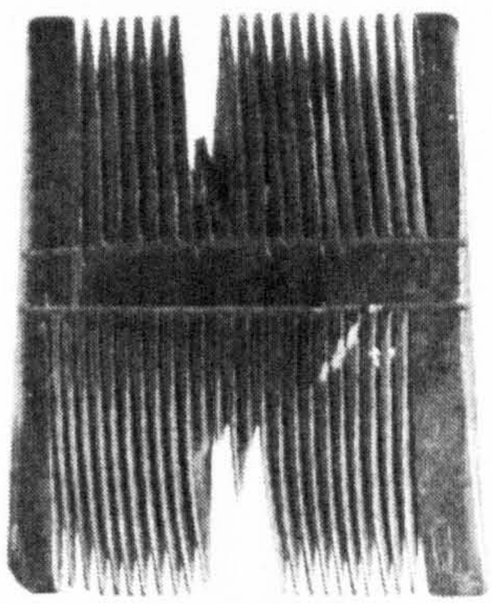
Simple combs in skeletal materials. The degree of concavity of comb sides



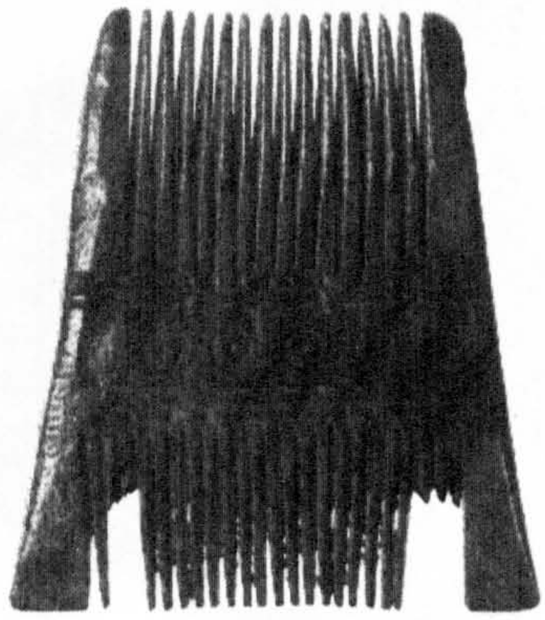
Σ 800

	0.00-0.009	0.010-0.019	0.020-0.029	0.030-0.039	0.040-0.049	0.050-0.059	0.060-0.069	0.070-0.079	0.080-0.089	0.090-0.099
800	187	143	106	38	44	71	107	69	27	8

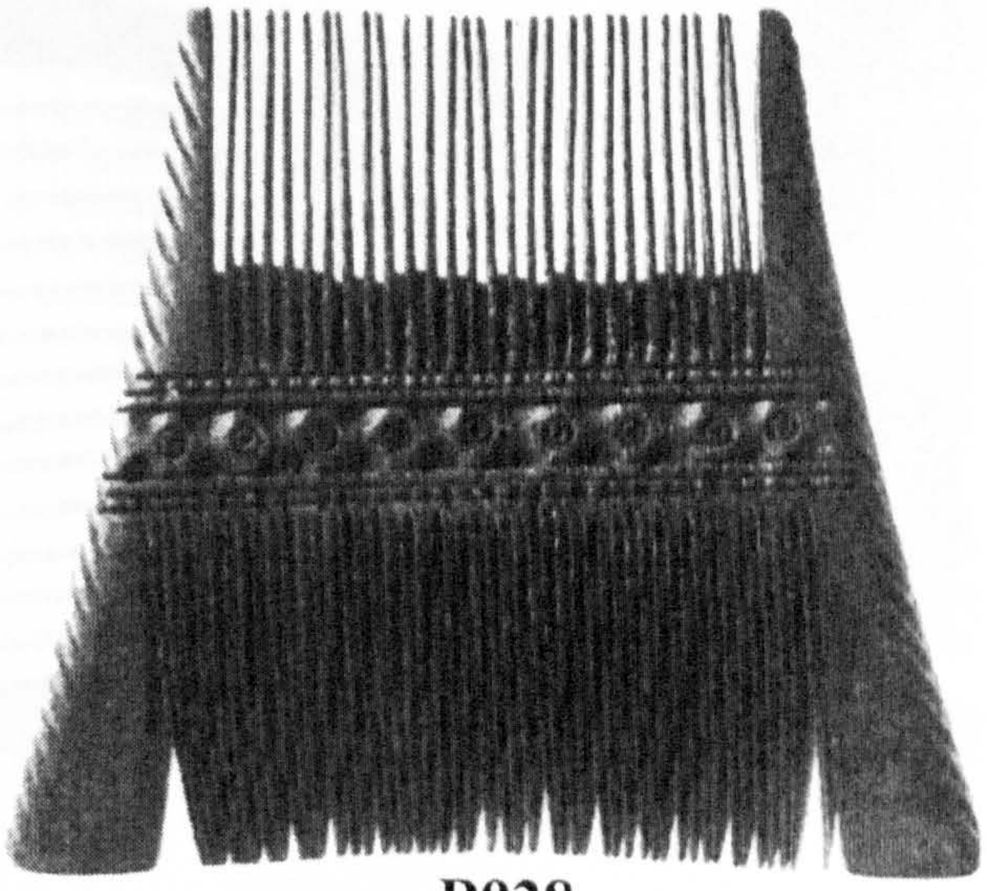
Fig. 4.15 Simple combs with straight sides



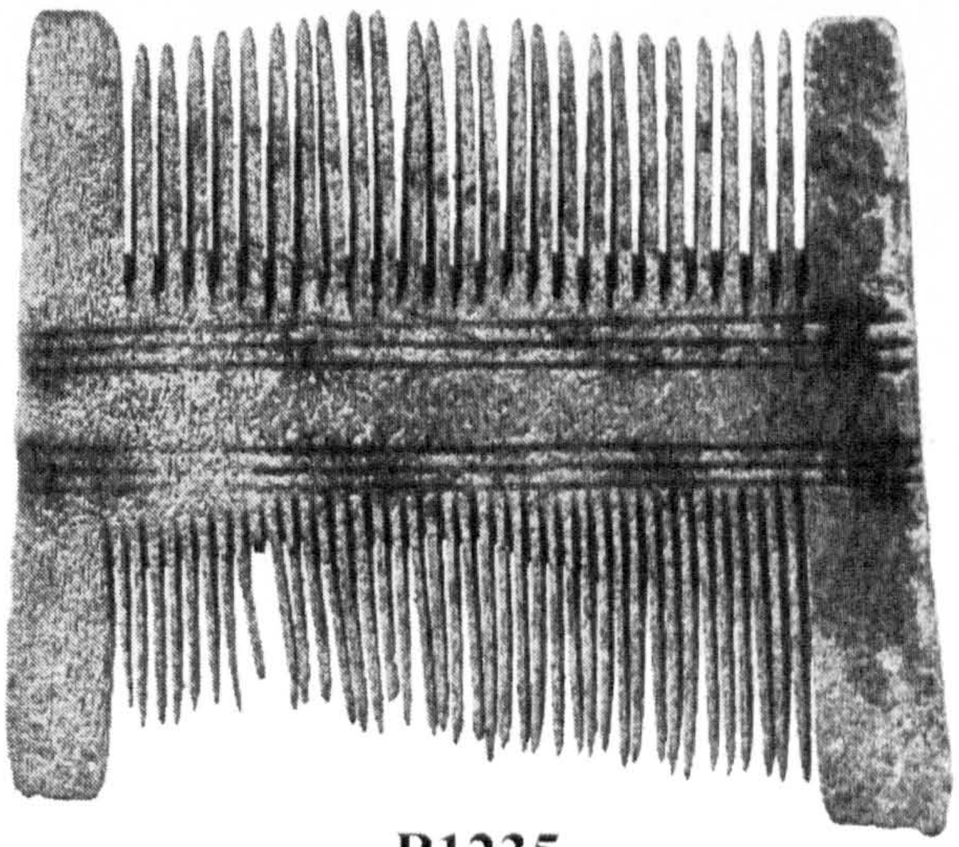
B92



B717

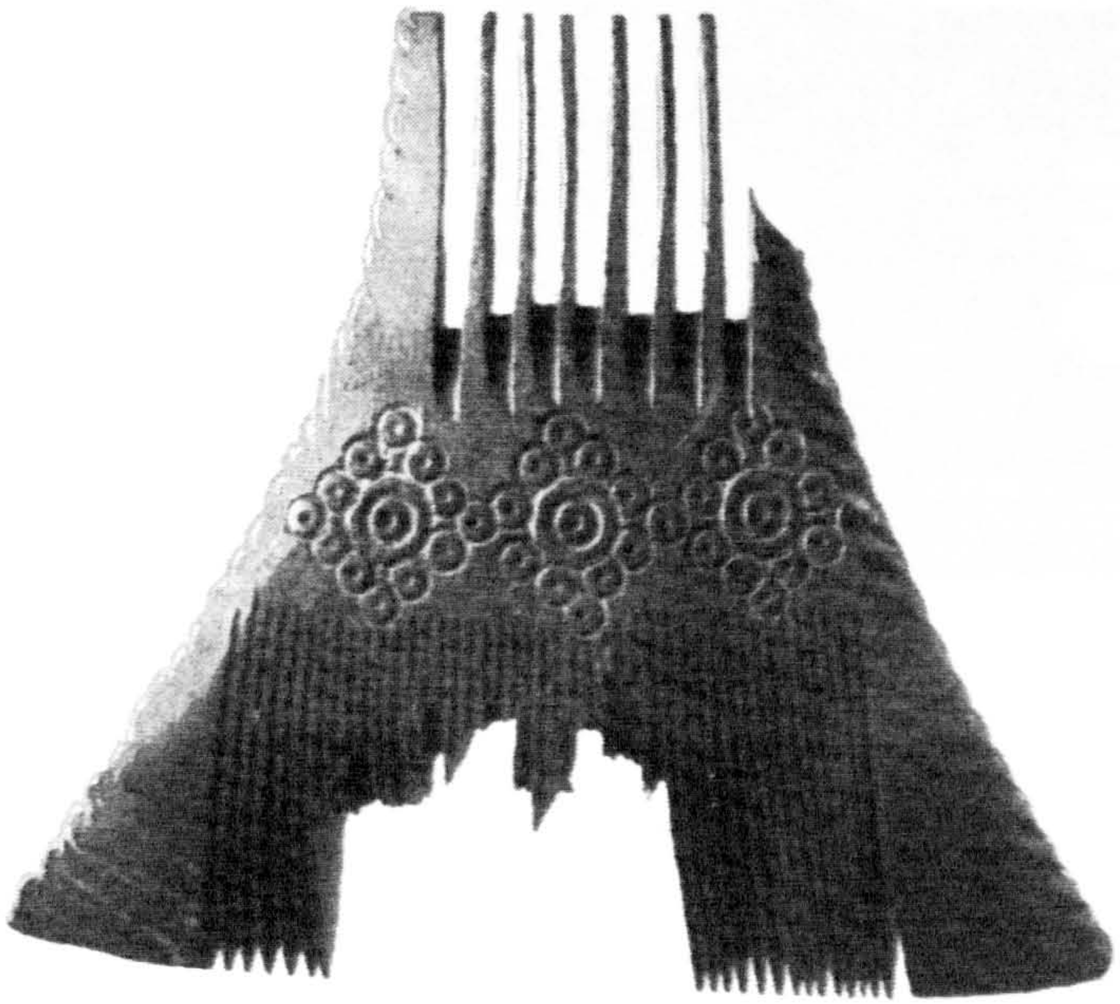


B928

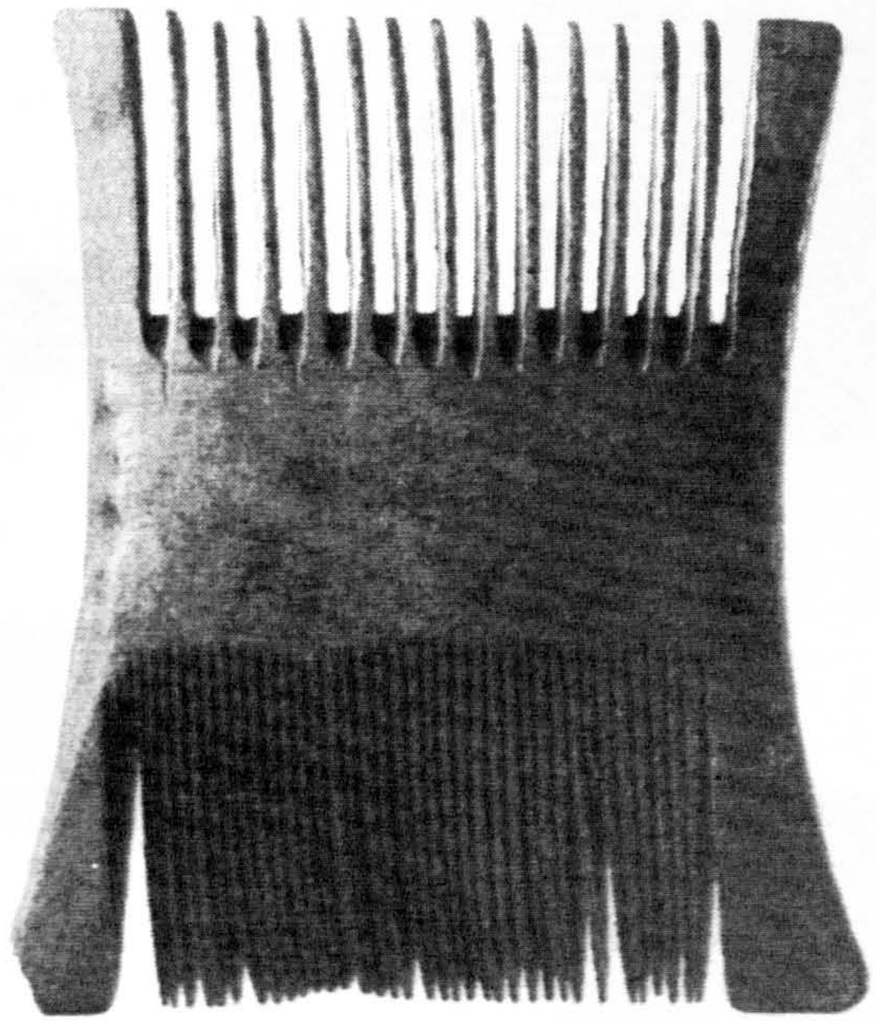


B1235

Fig. 4.16 Simple combs with concave sides



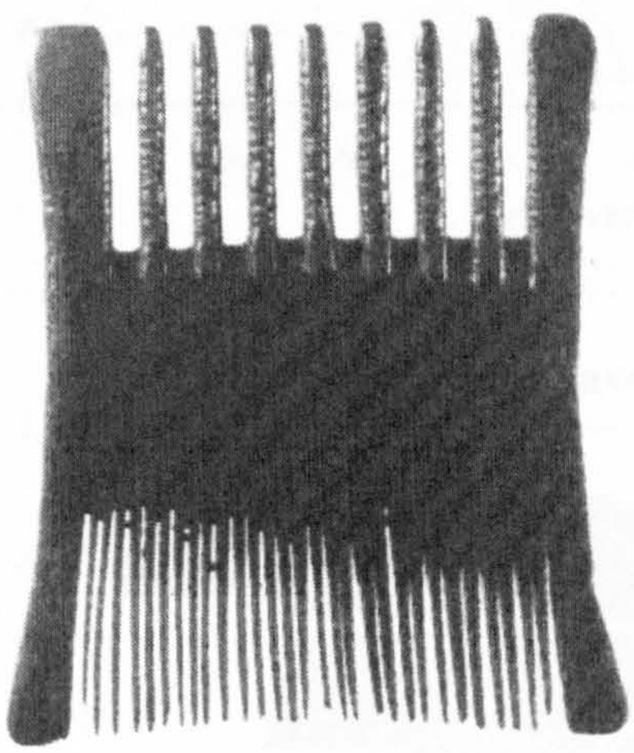
B931



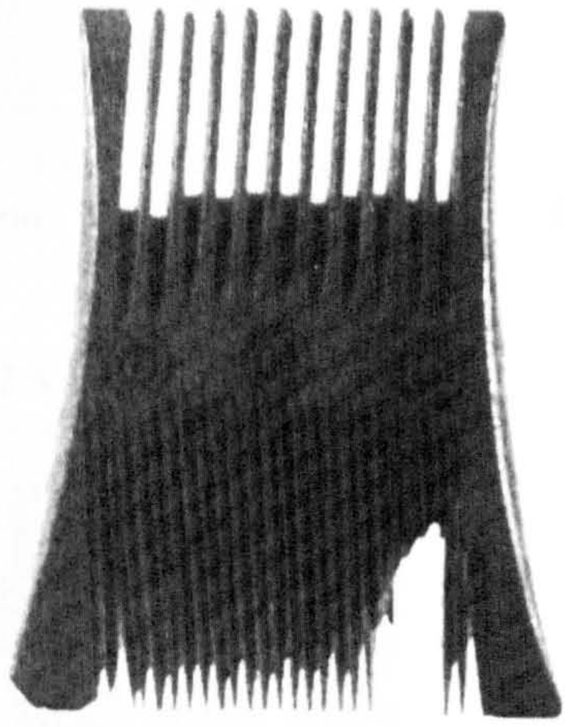
B913

B73

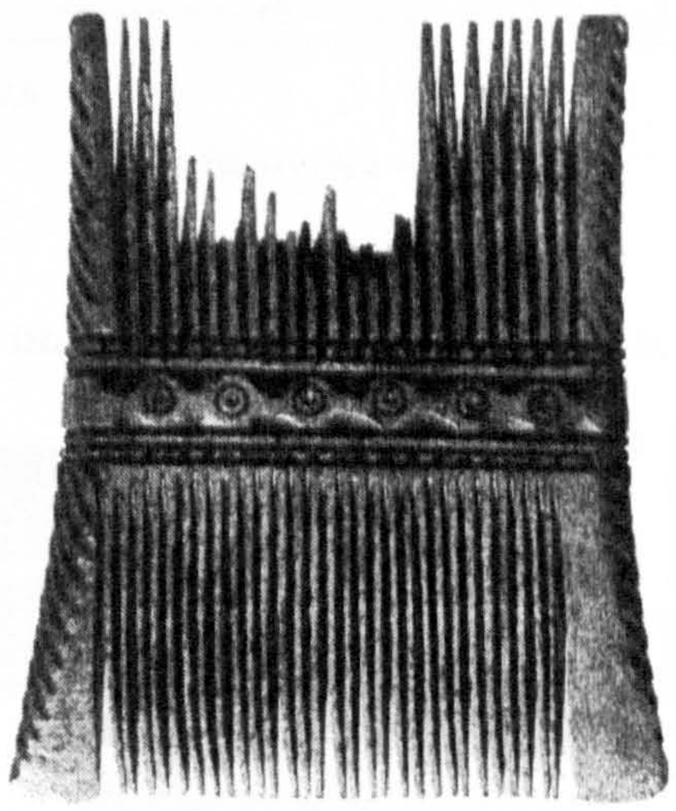
Fig. 4.17 Simple combs with sides slightly curved inwards ($0.02 \leqslant dsc < 0.04$)



B914



B14



B950

Fig. 4.17a Forms of simple combs featuring sides with different degrees of concavity

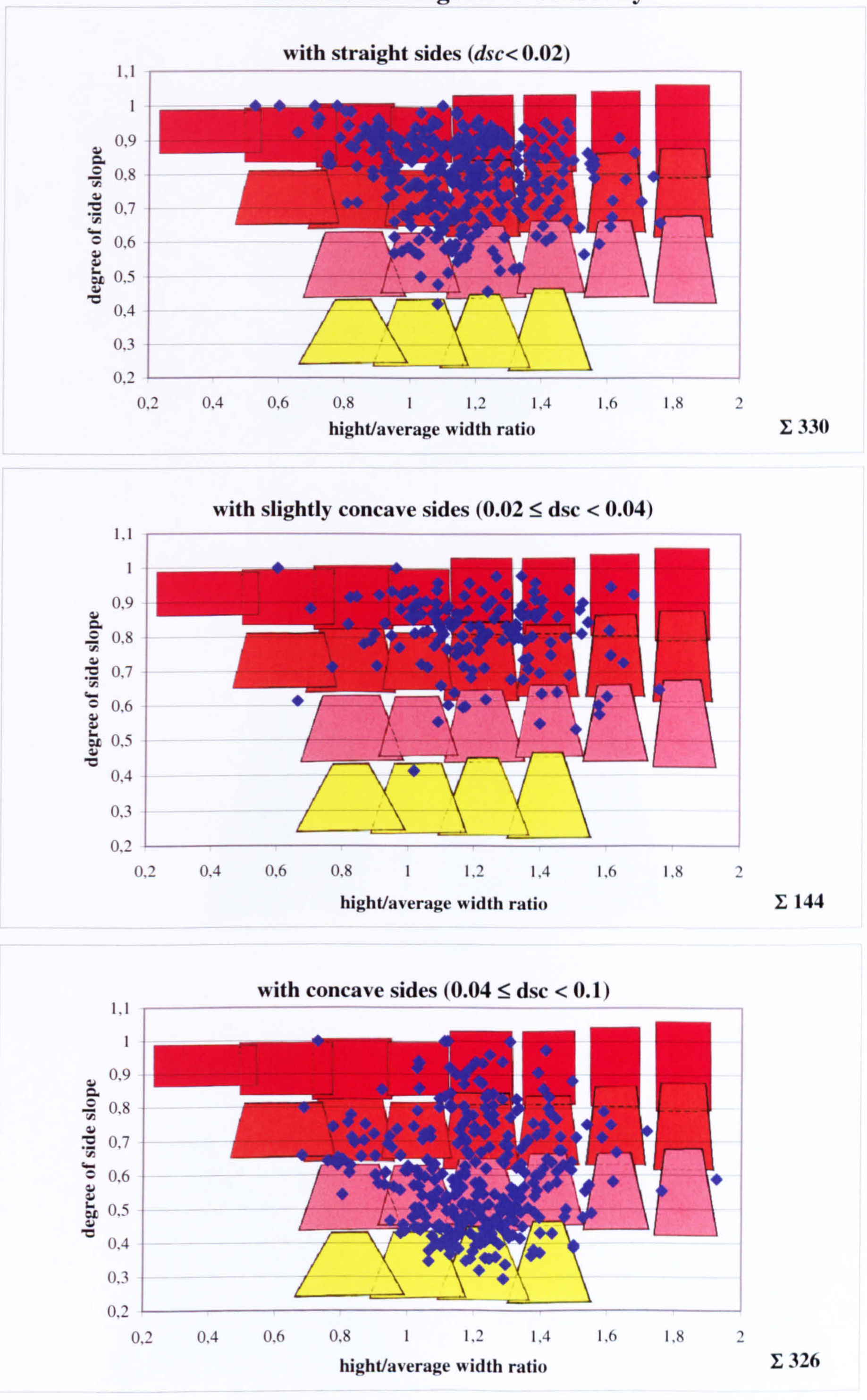
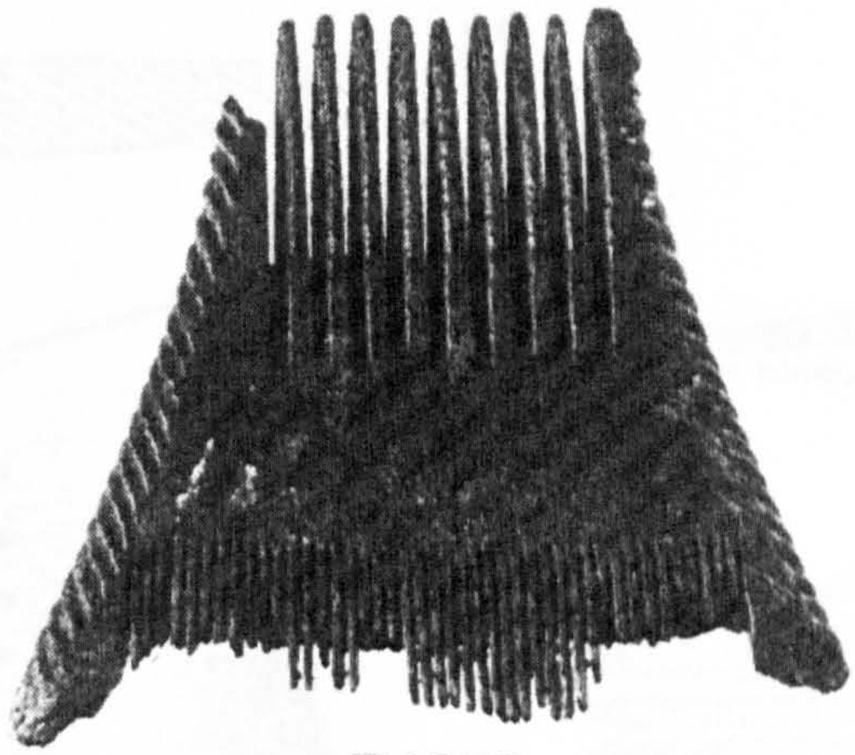
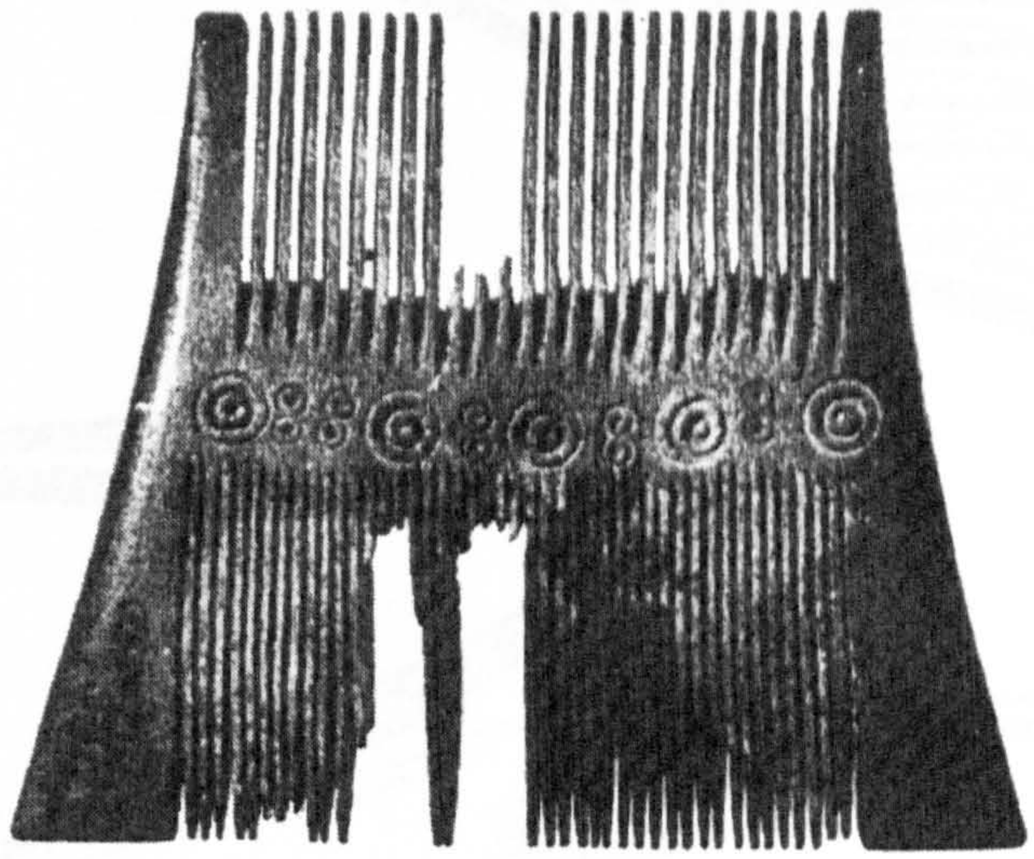


Fig. 4.18 12th century combs with concave sides

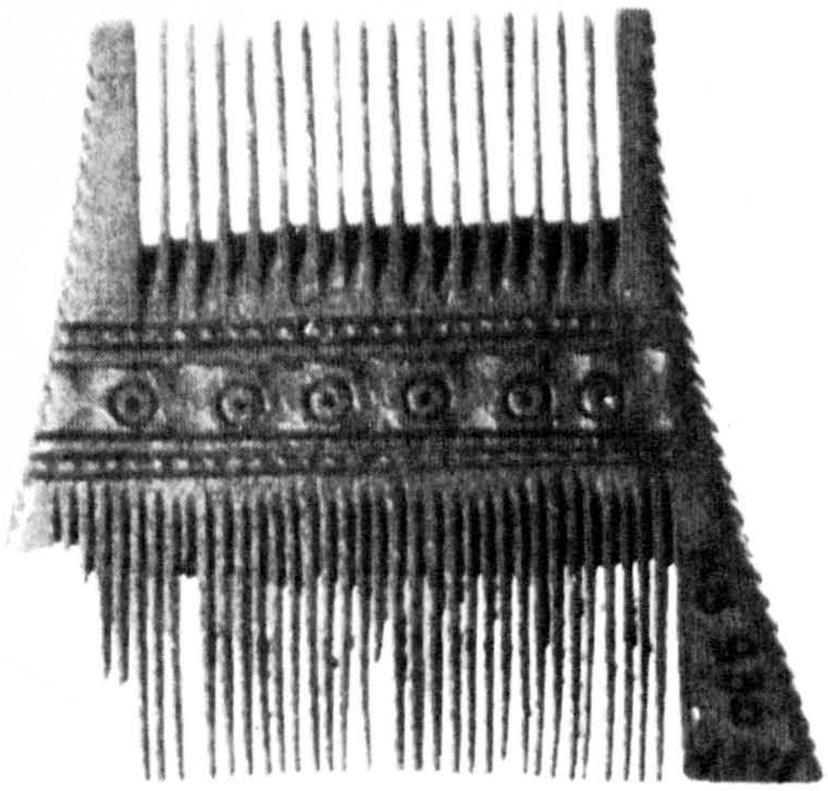


B1272



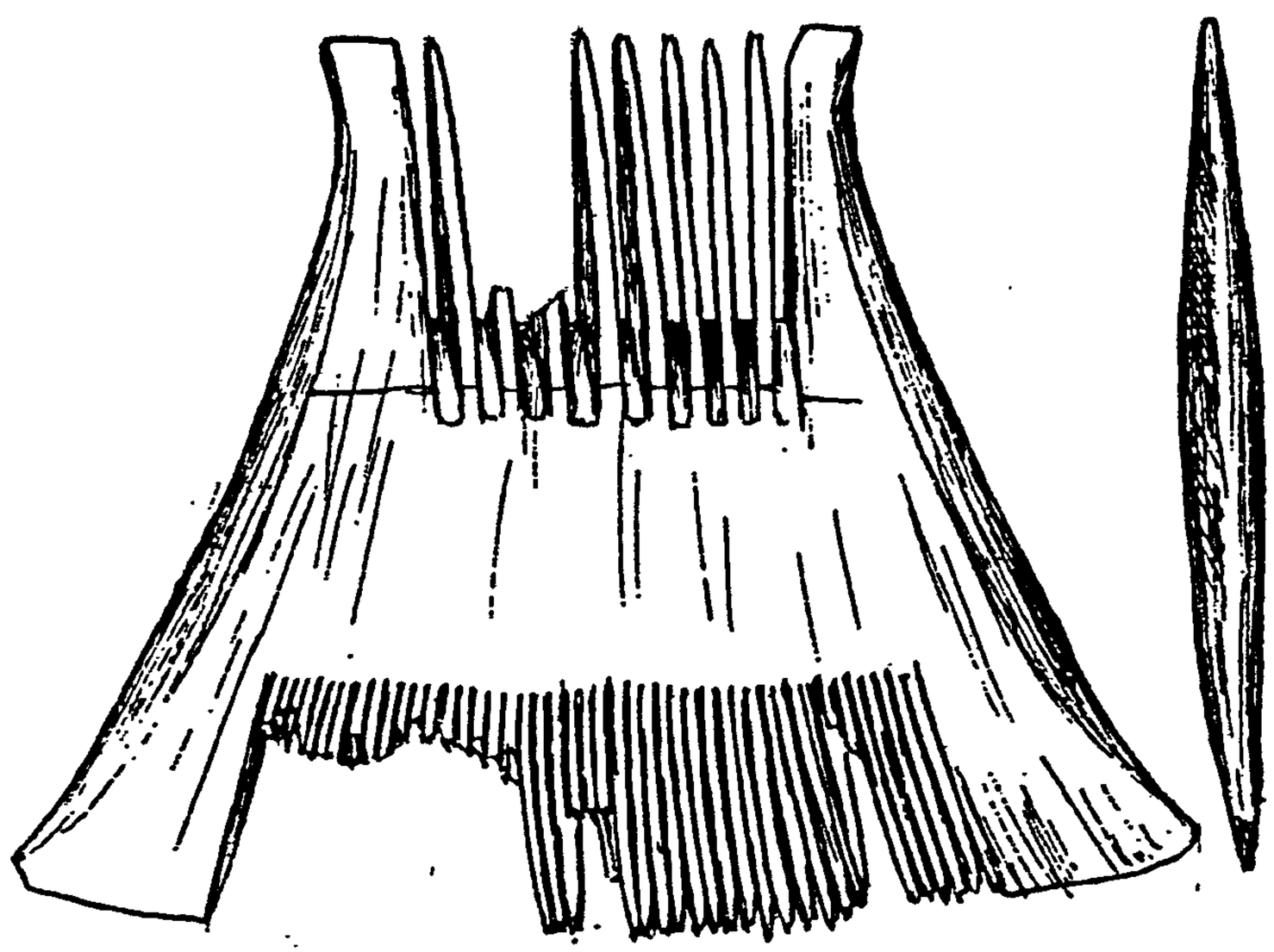
B1244

B919

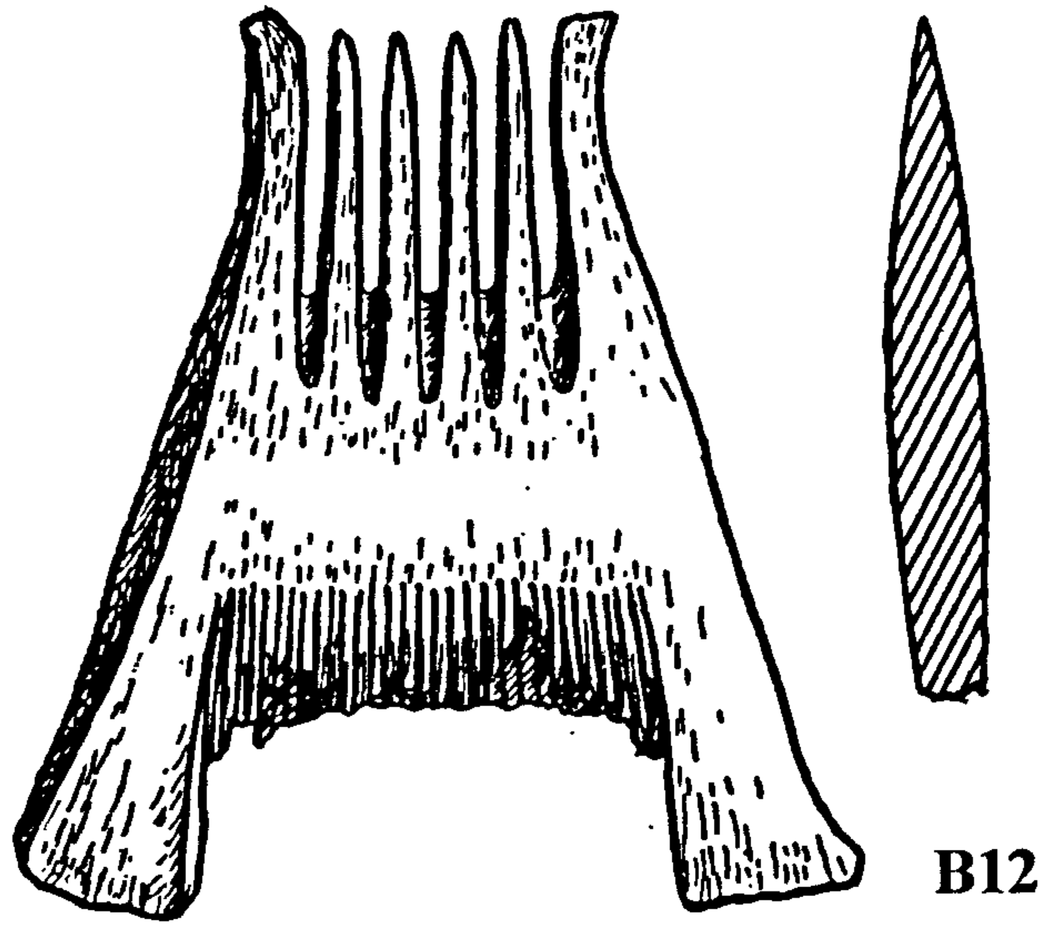


B944

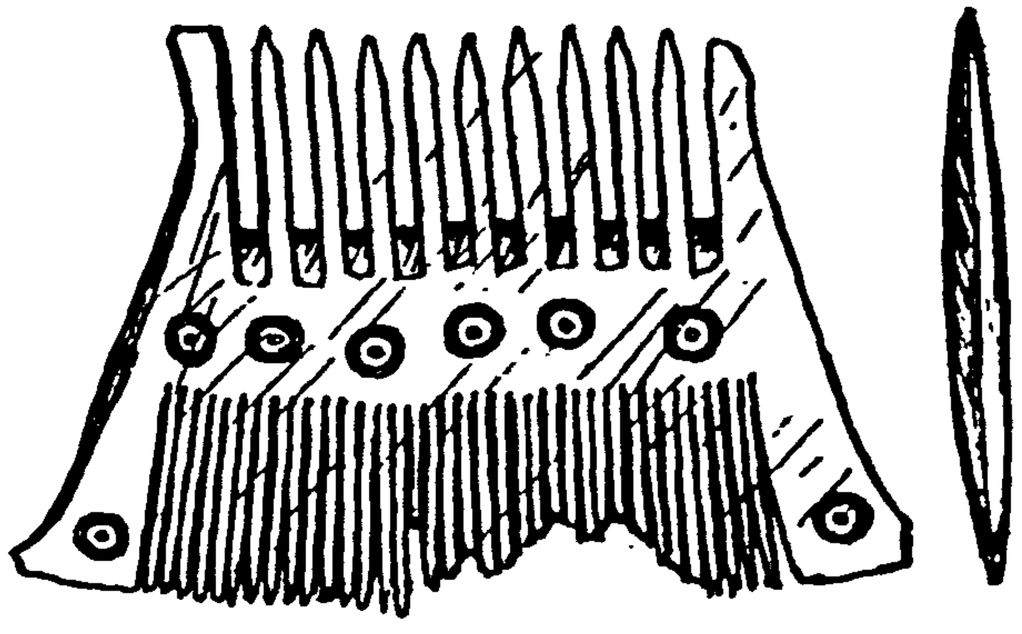
Fig. 4.19 13th - early 14th century combs with concave sides



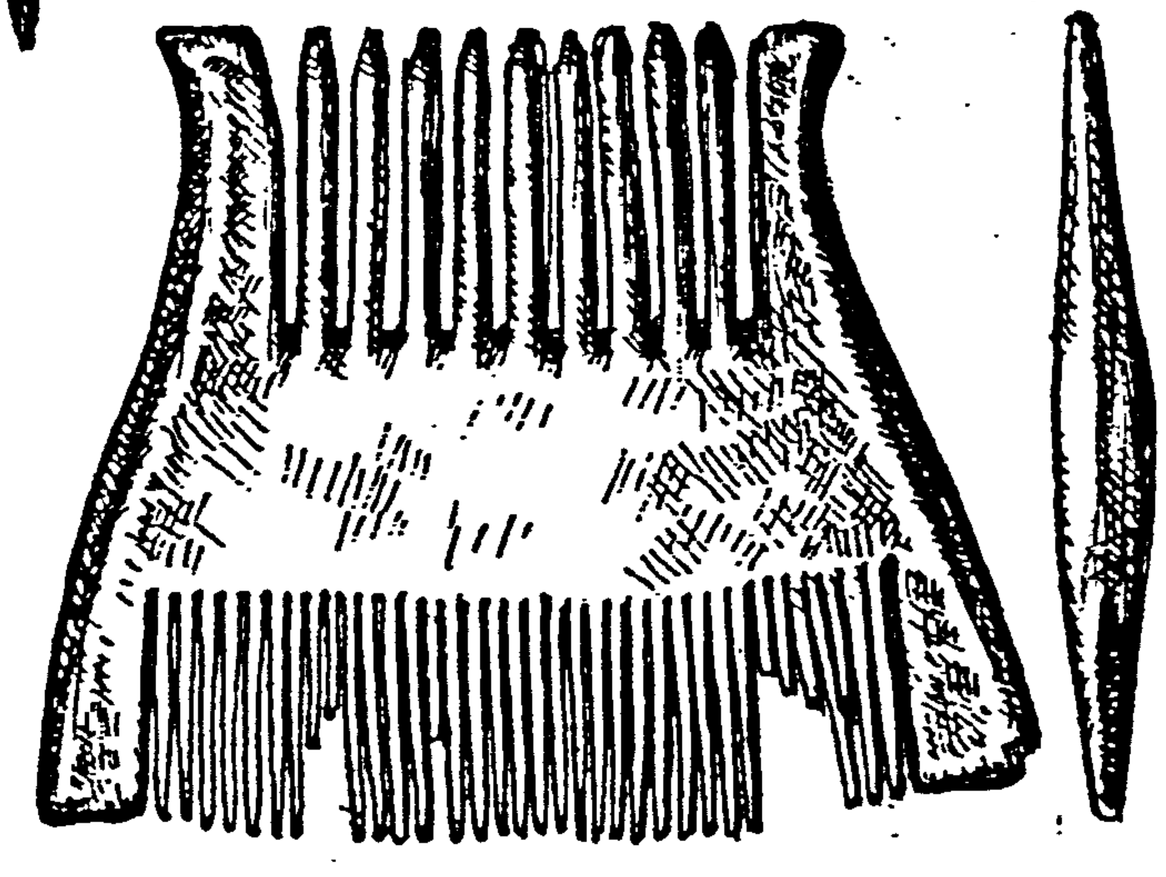
B302



B12

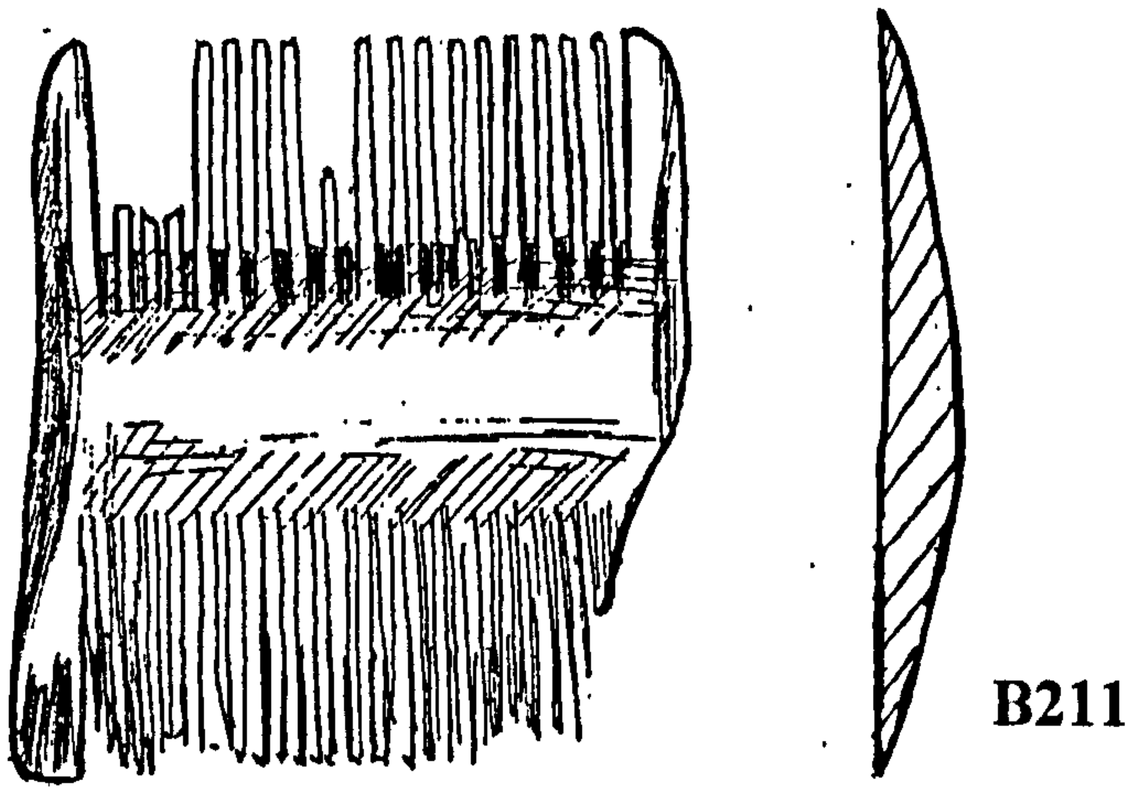


B299

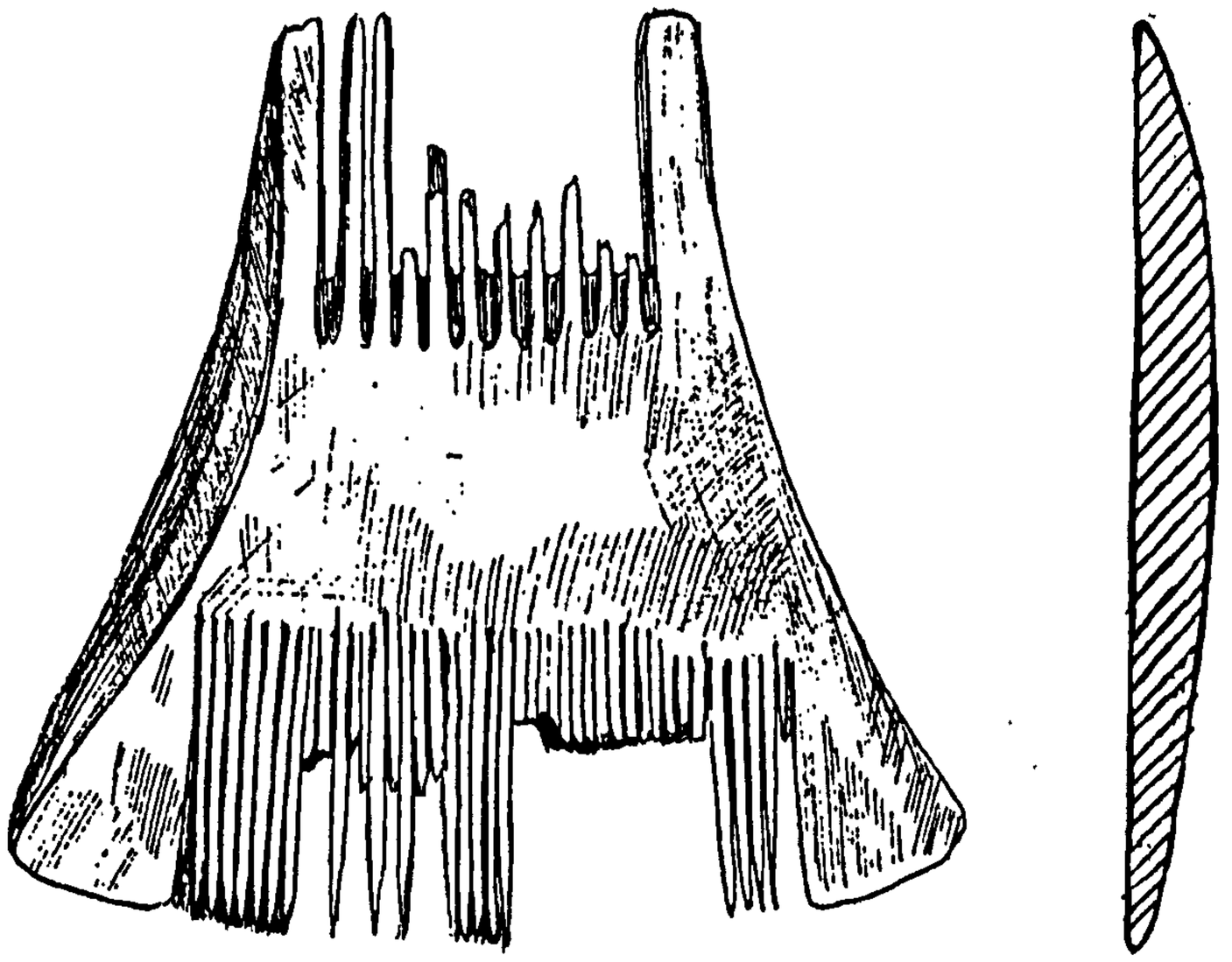


B311

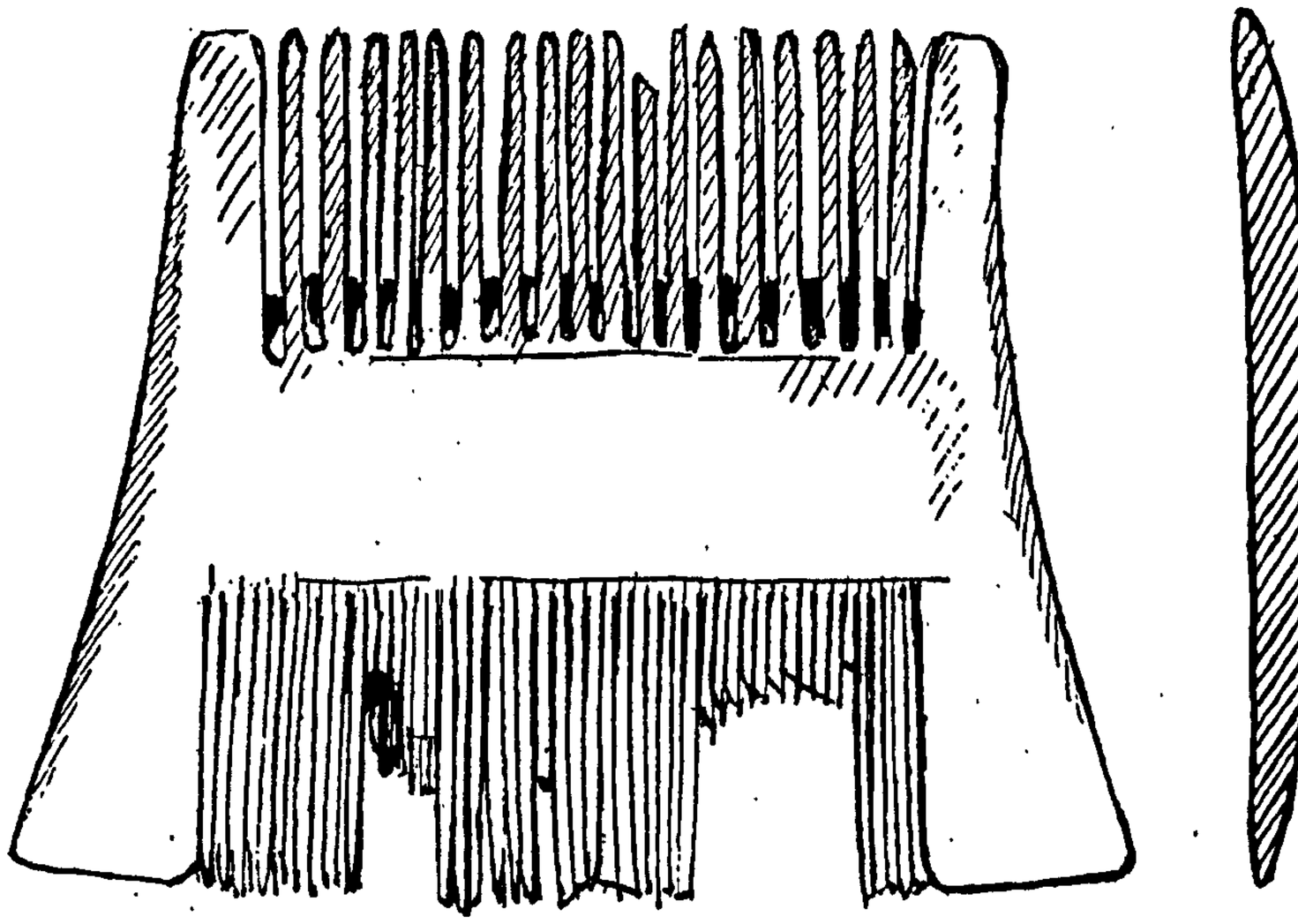
Fig. 4.20 13th century semi-lentoid cross-sectional combs



B211

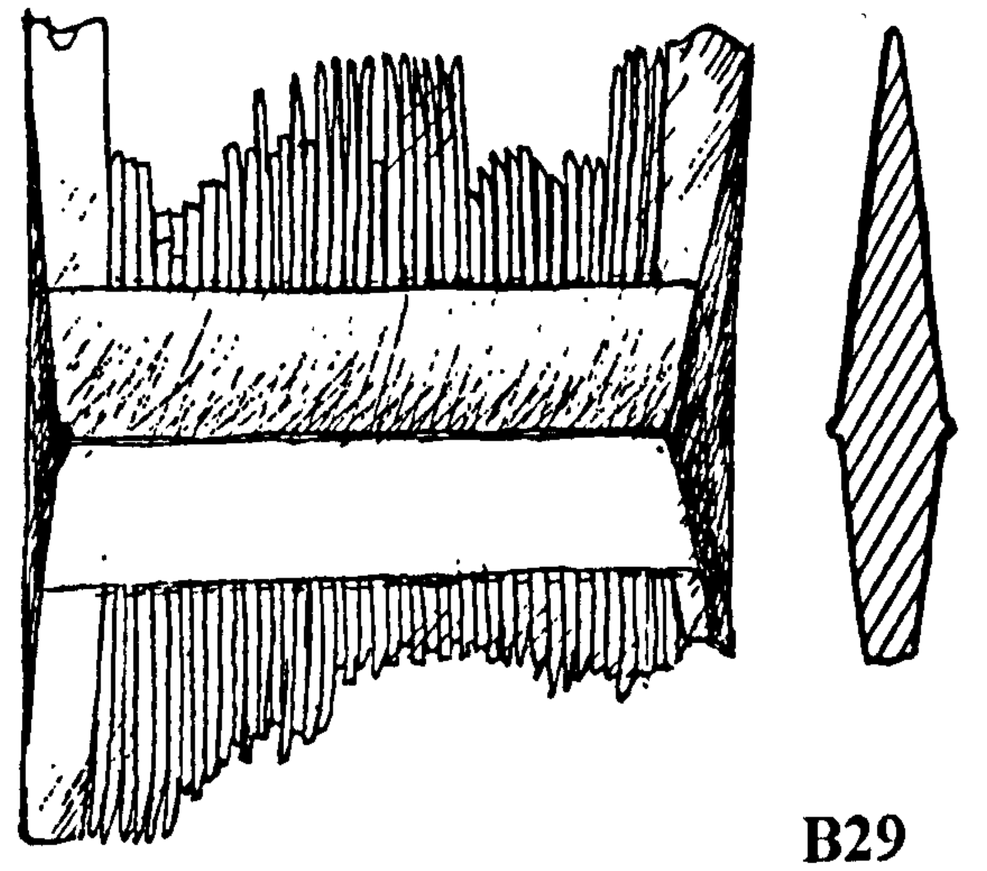


B54



B217

Fig. 4.21 11th-12th century rhomboid cross-sectional combs



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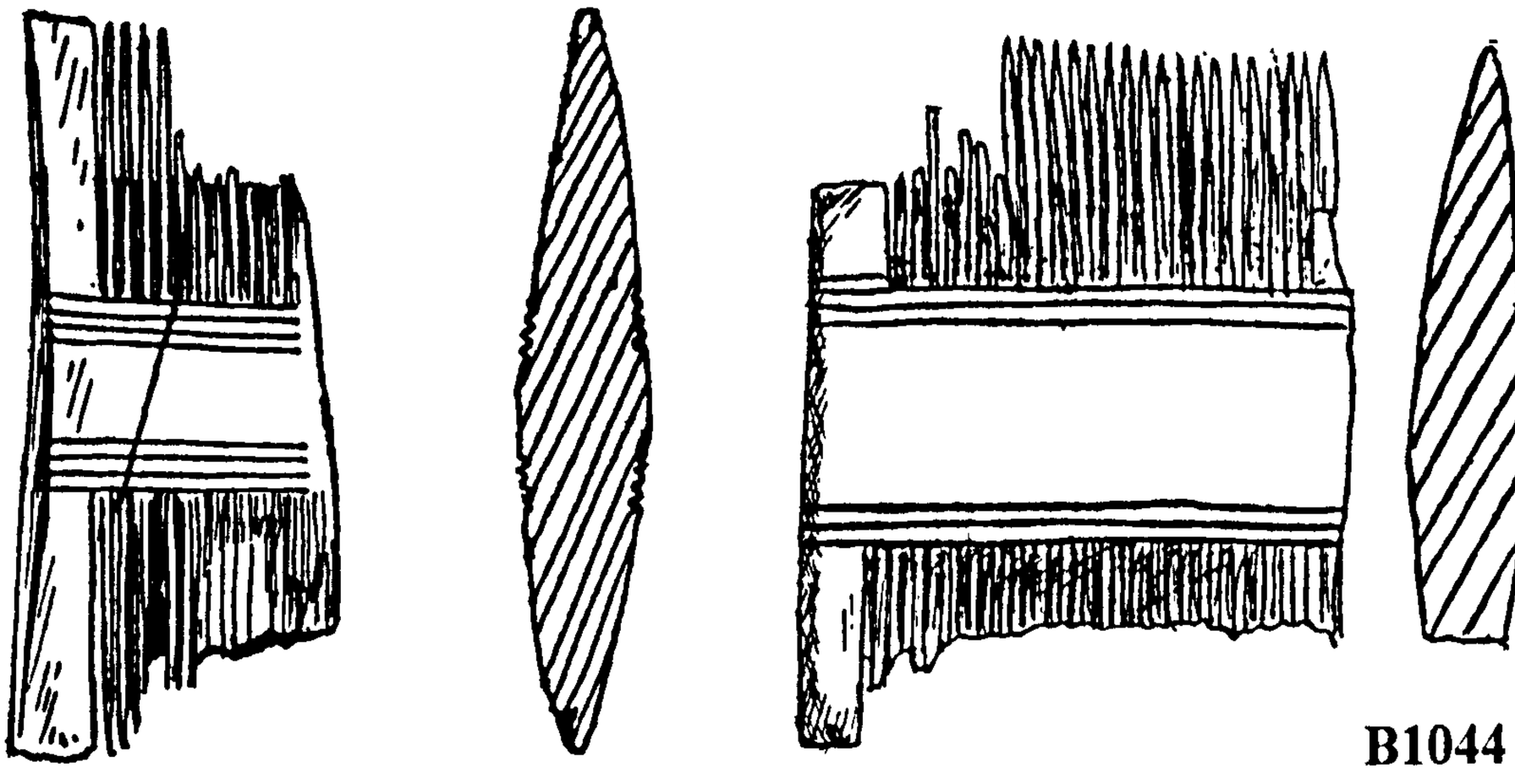
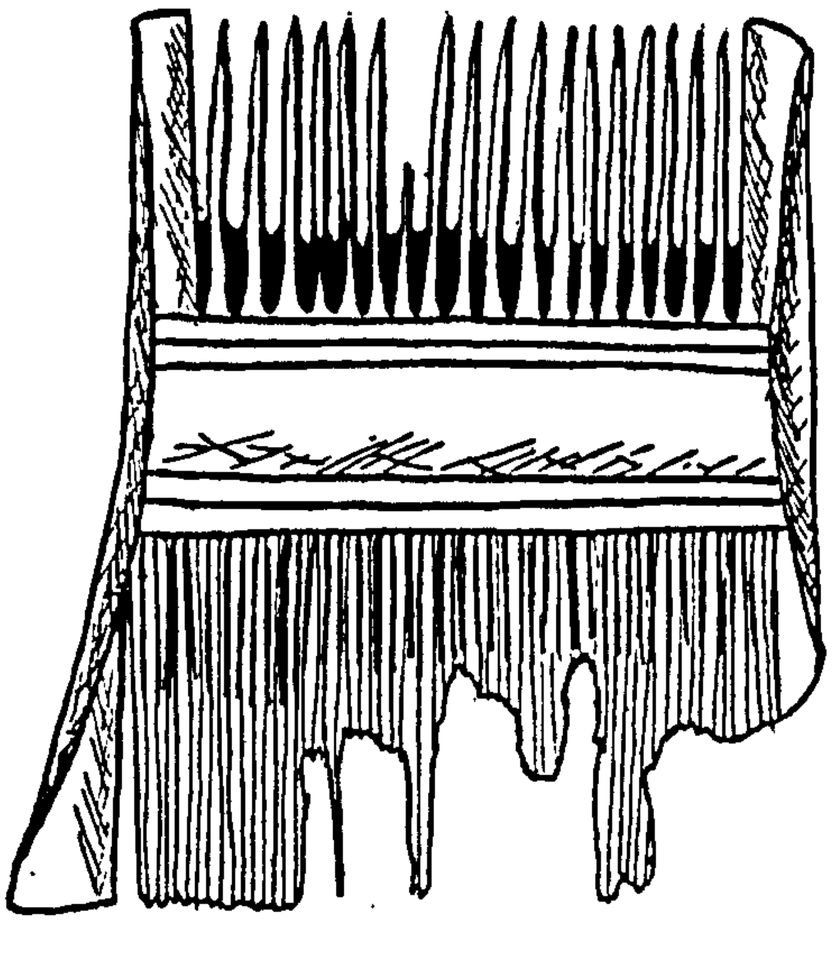


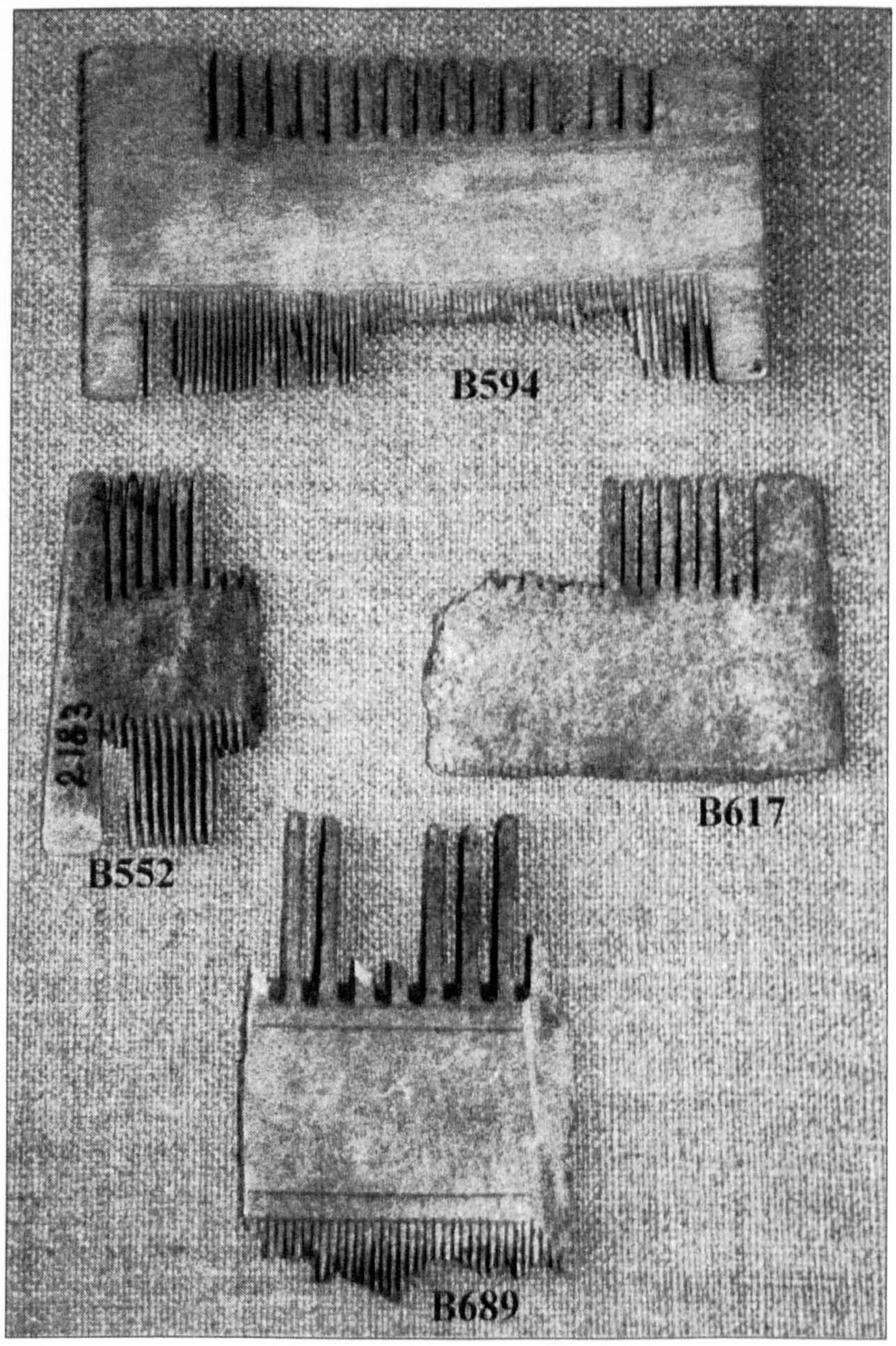
B1026

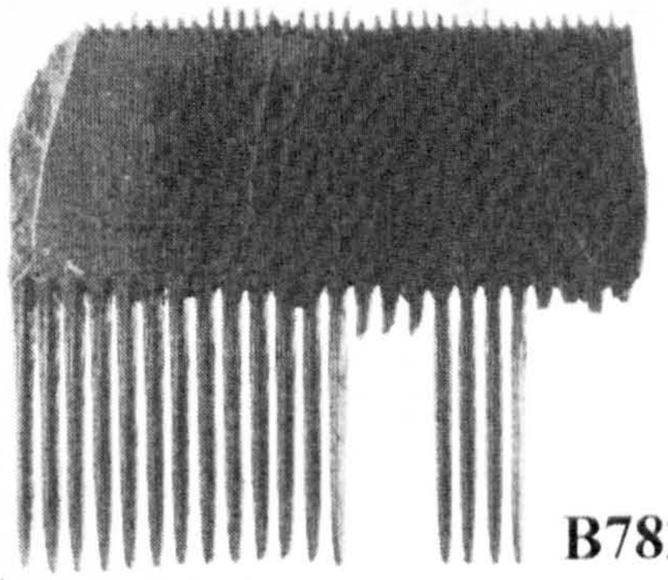
B1044



B176

Fig. 4.22 Combs with slender rectangular cross-section





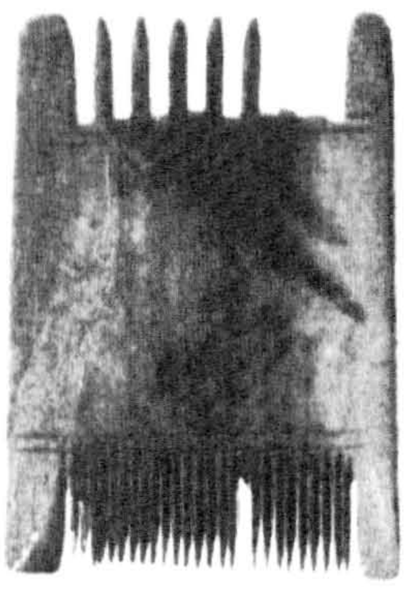
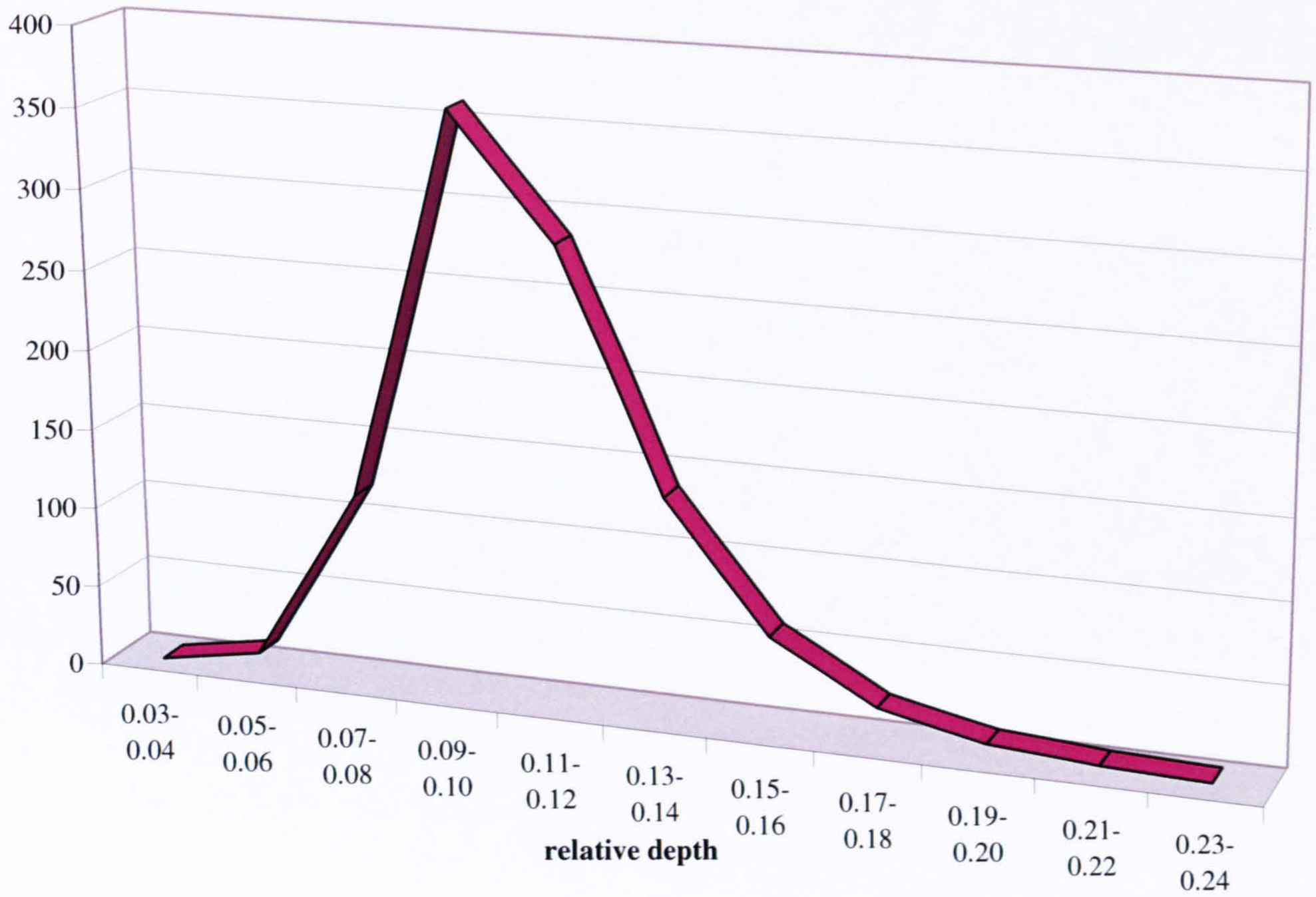


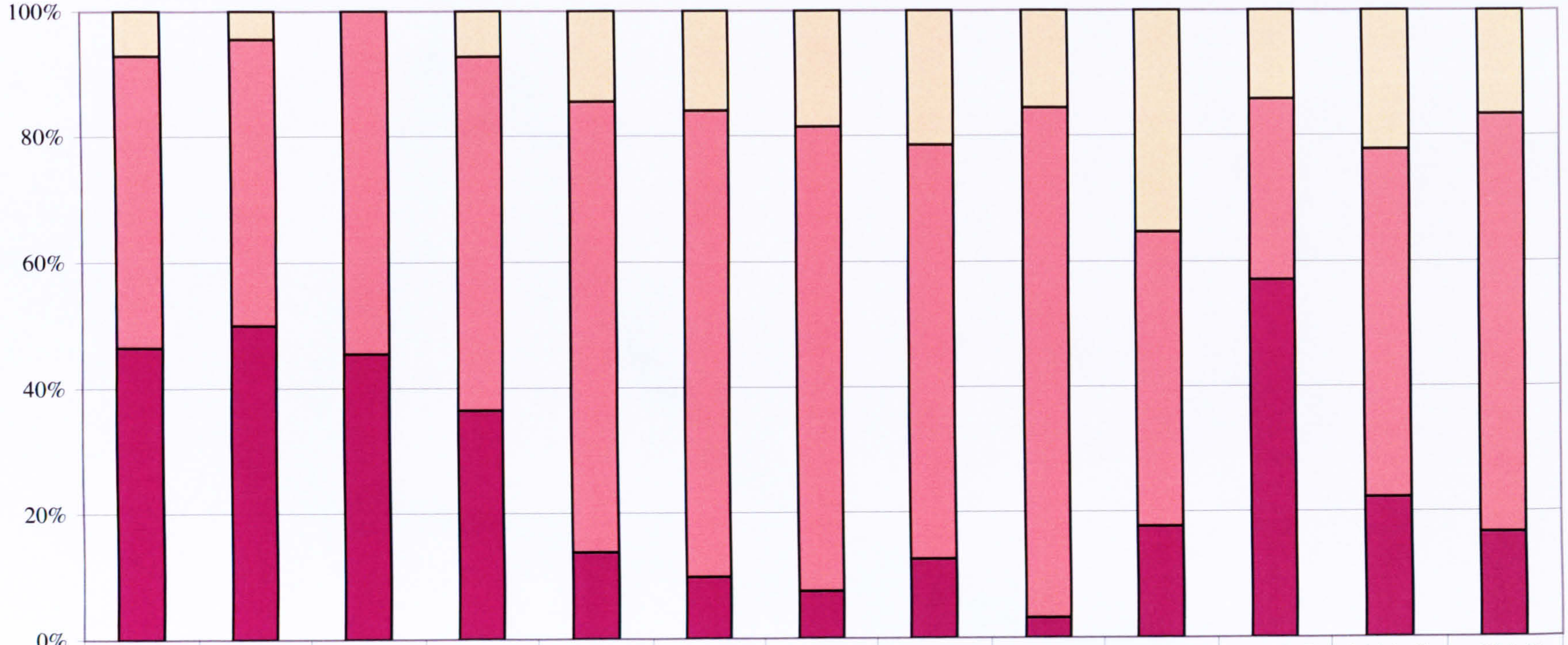
Fig. 4.23 Simple combs in skeletal materials. Relative depth



Σ 1018

	0.03-0.04	0.05-0.06	0.07-0.08	0.09-0.10	0.11-0.12	0.13-0.14	0.15-0.16	0.17-0.18	0.19-0.20	0.21-0.22	0.23-0.24
1018	1	12	119	361	285	138	60	24	10	5	3

Fig. 4.24
Simple combs in skeletal materials. Chronological changes in relative depth



	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.
thin(ird>0.09)	2	2	0	11	19	28	20	12	5	6	1	2	1
medium(ird 0.09-0.12)	13	20	48	85	94	130	80	37	26	8	2	5	4
thick(ird>0.12)	13	22	40	55	18	17	8	7	1	3	4	2	1

Σ 852

Fig. 4.25 Simple combs in skeletal materials. Sizes of antler combs

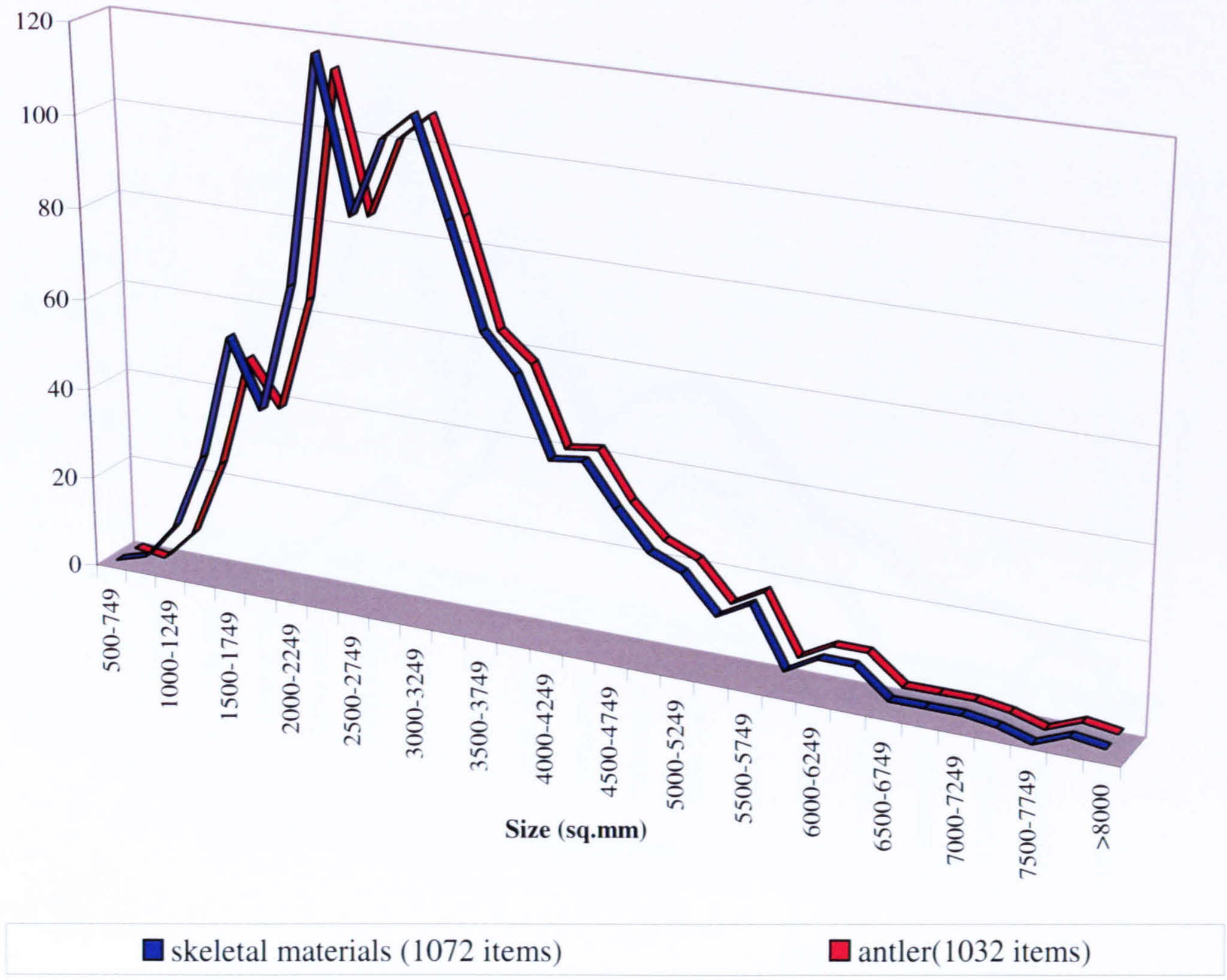


Fig. 4.26 Simple combs. Size of objects in antler and ivory

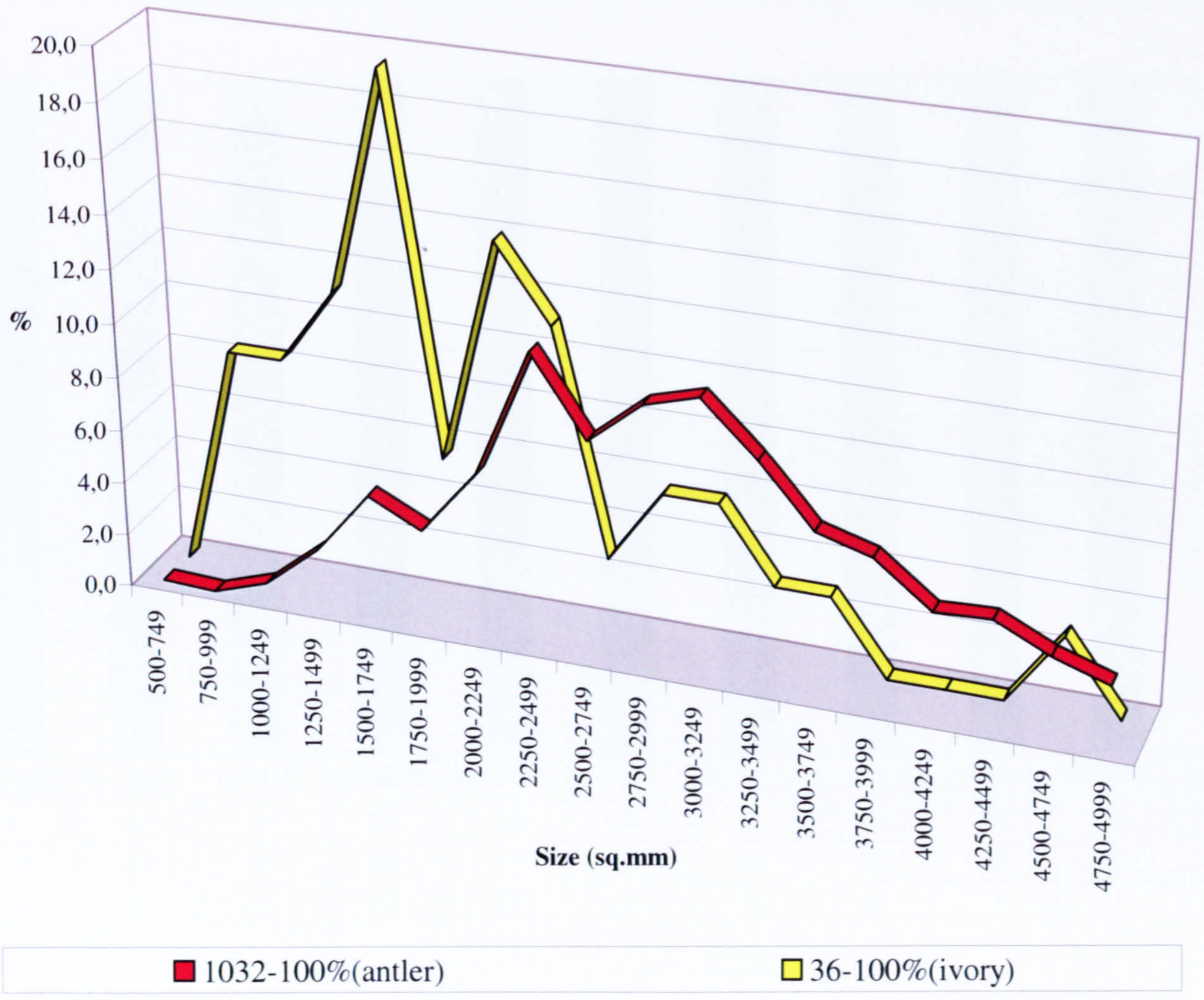
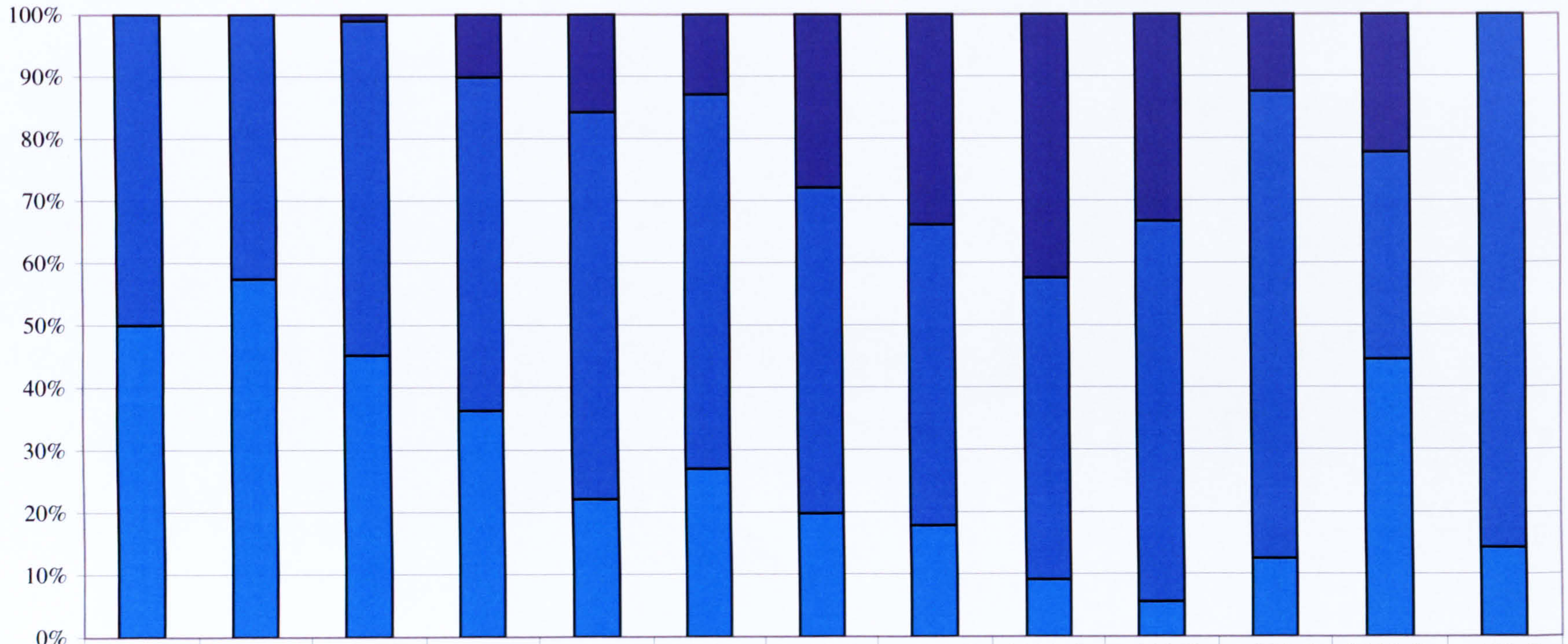


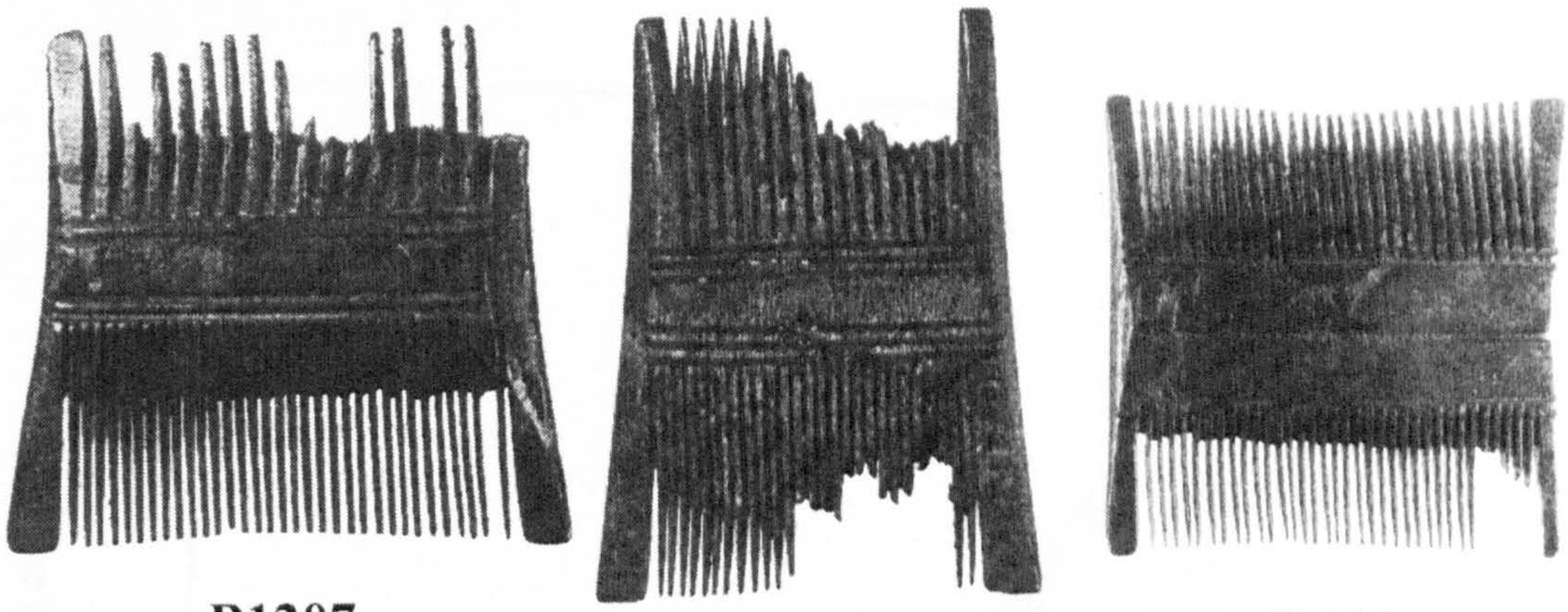
Fig. 4.27
Simple combs in skeletal materials. Chronological changes in comb sizes



	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.
Large (S>4323)	0	0	1	17	22	23	31	19	14	6	1	2	0
Medium (S 2476-4323)	15	20	50	90	87	107	58	27	16	11	6	3	6
Small(S<2476)	15	27	42	61	31	48	22	10	3	1	1	4	1

Σ 898

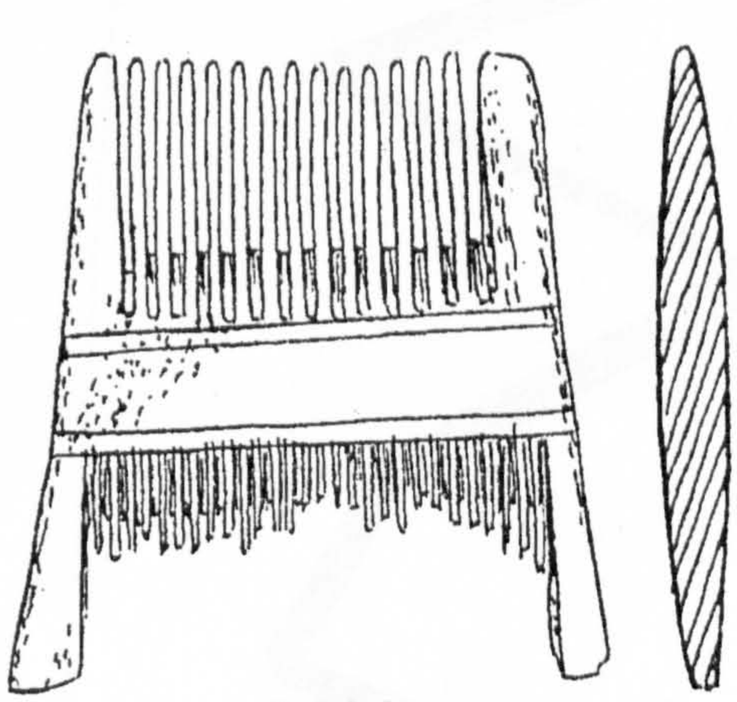
Fig. 4.28 Small combs from 11th (B324, B444, B1207, B1269), 12th (B1080, B1108) and 13th (B103) century contexts



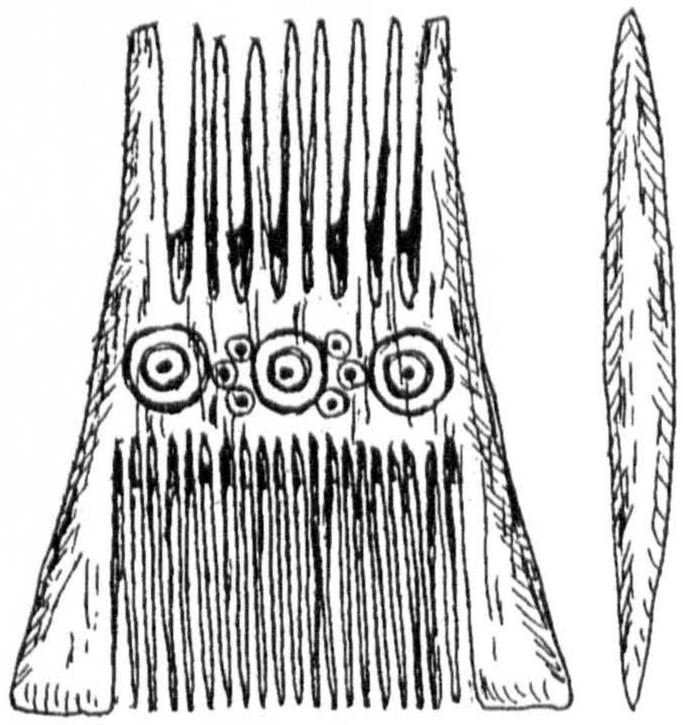
B1207

B1269

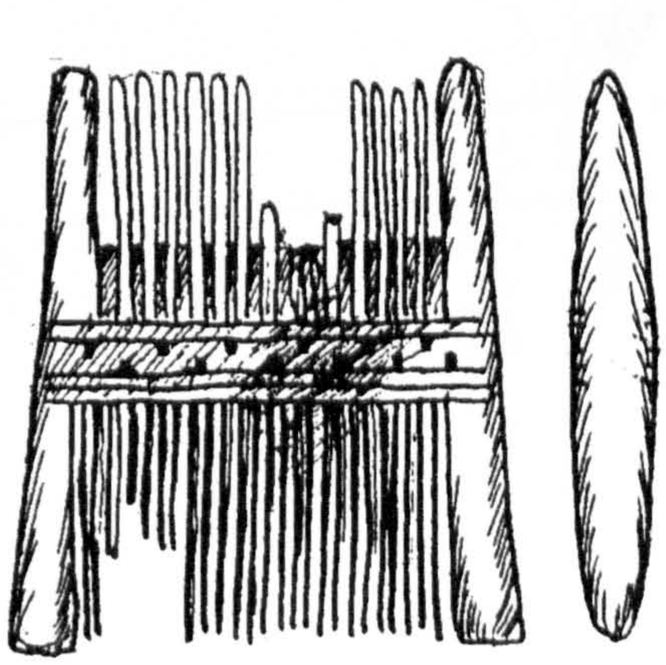
B444



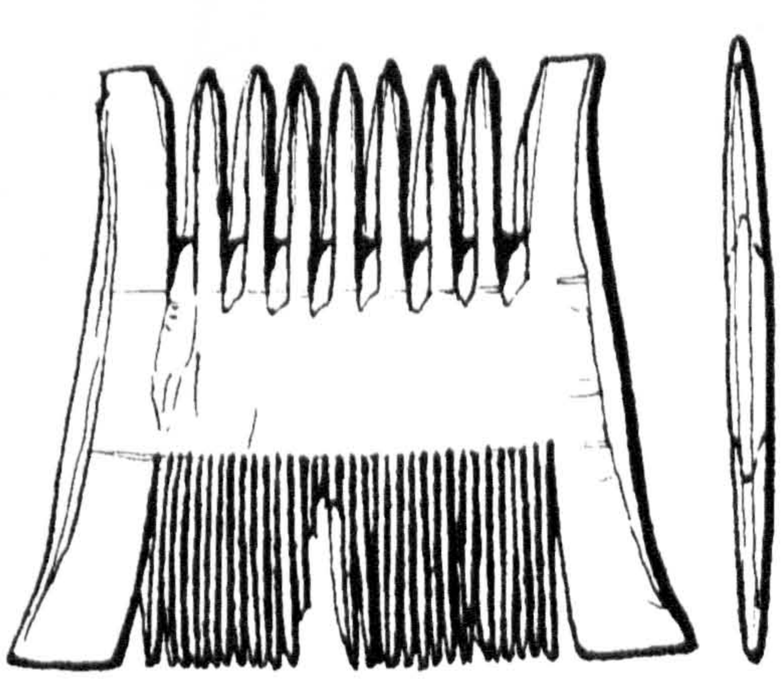
B324



B1080

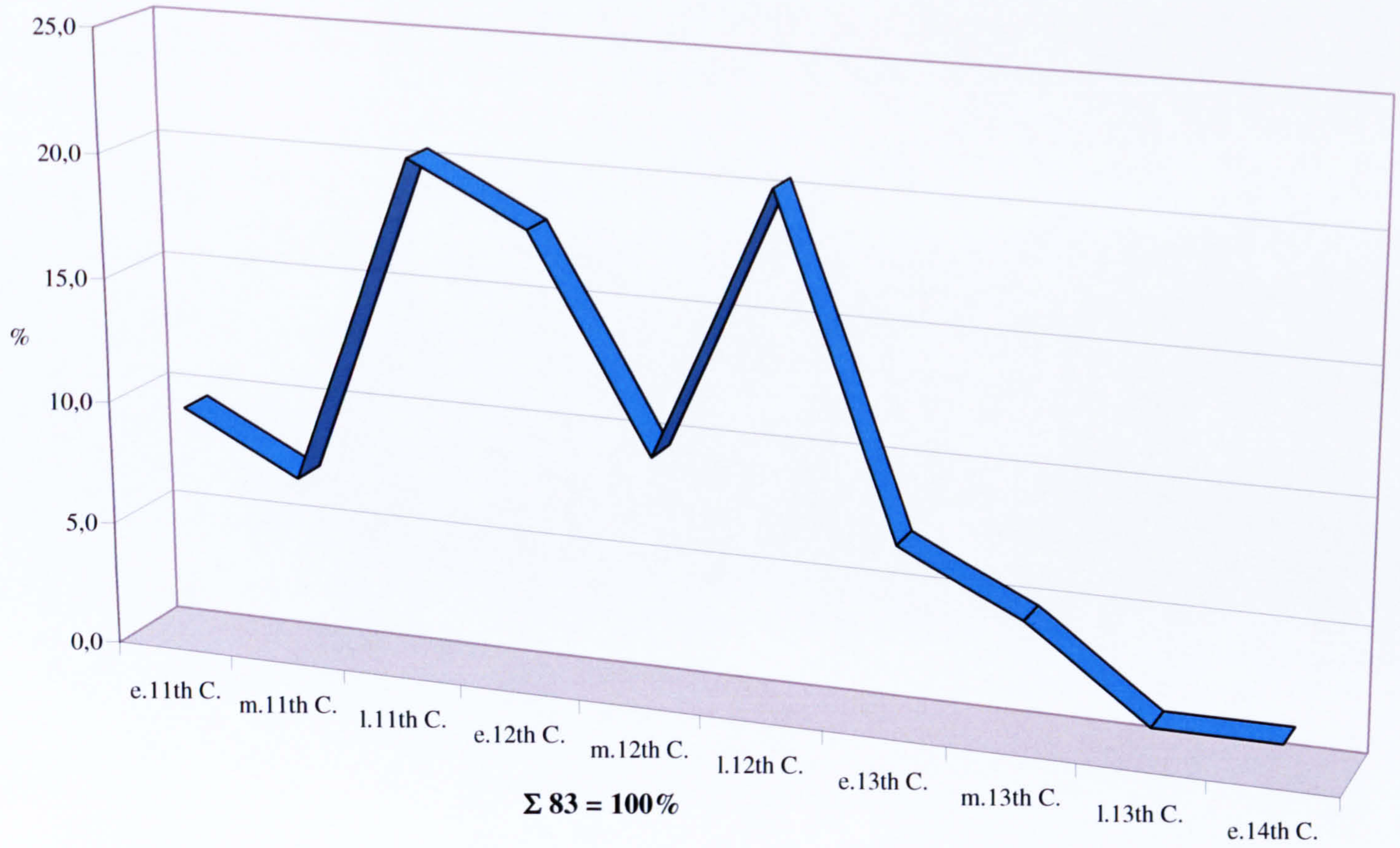


B1108



B103

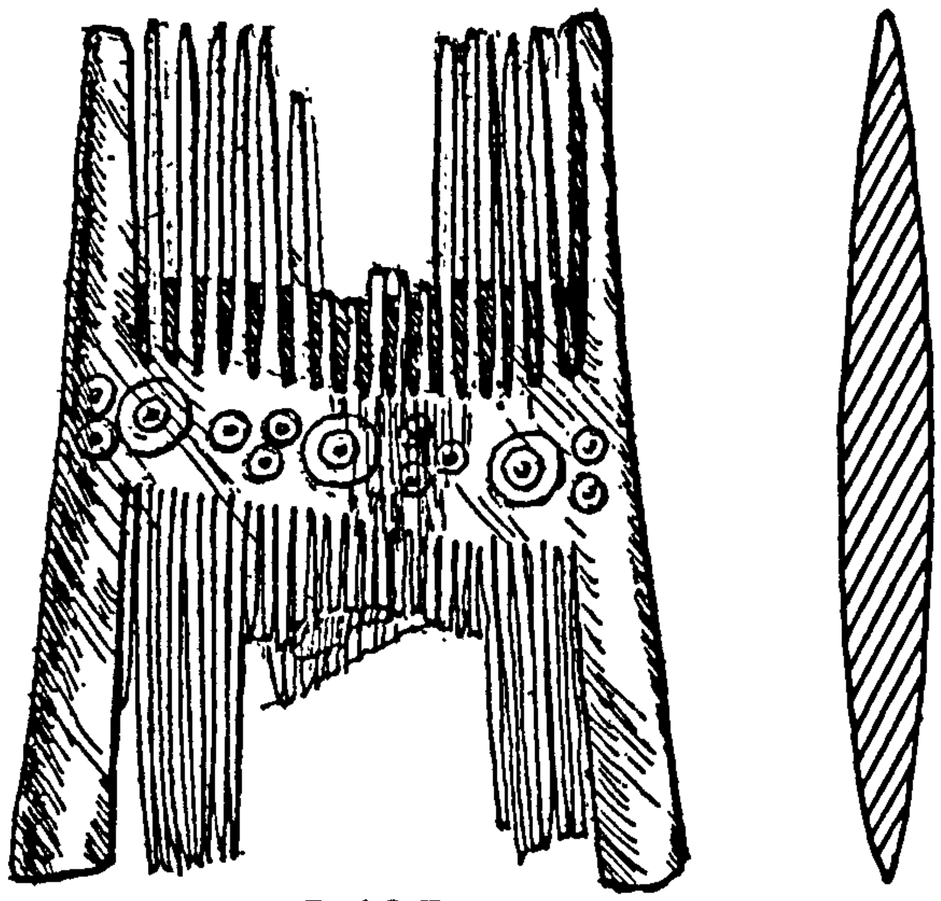
Fig. 4.29 Chronological distribution of miniature simple combs



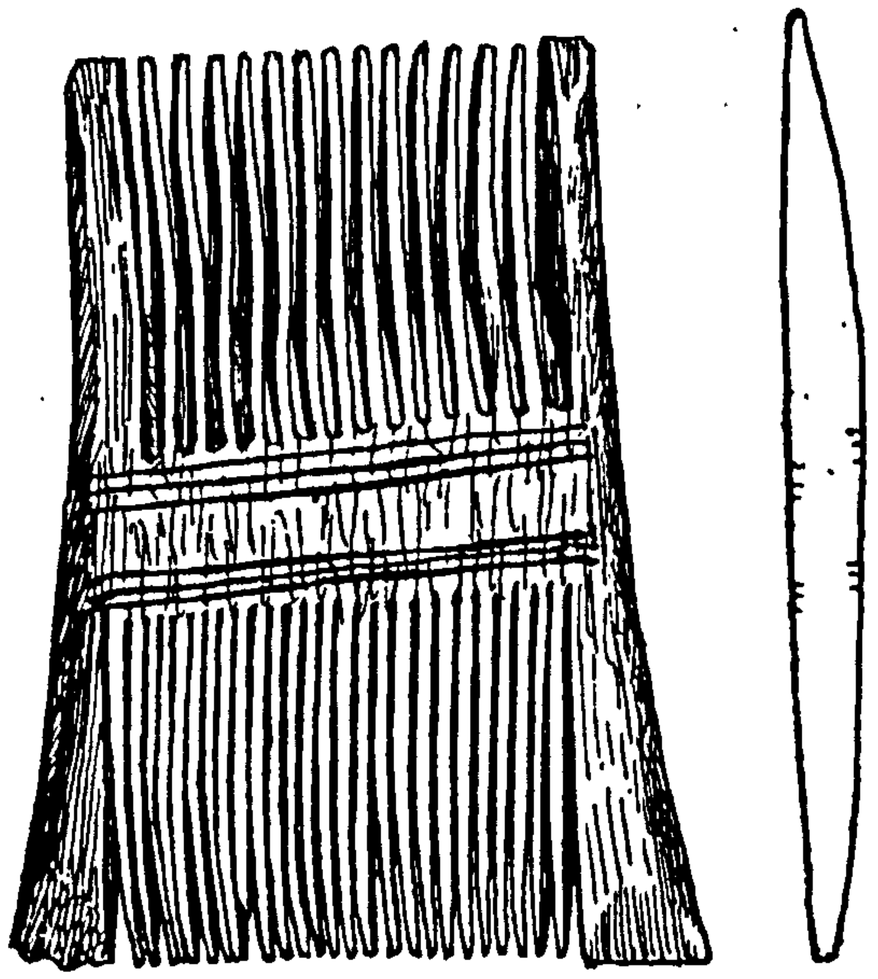
Σ 83 = 100%

	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.
'100%	9,6	7,2	20,5	18,1	9,6	20,5	7,2	4,8	1,2	1,2

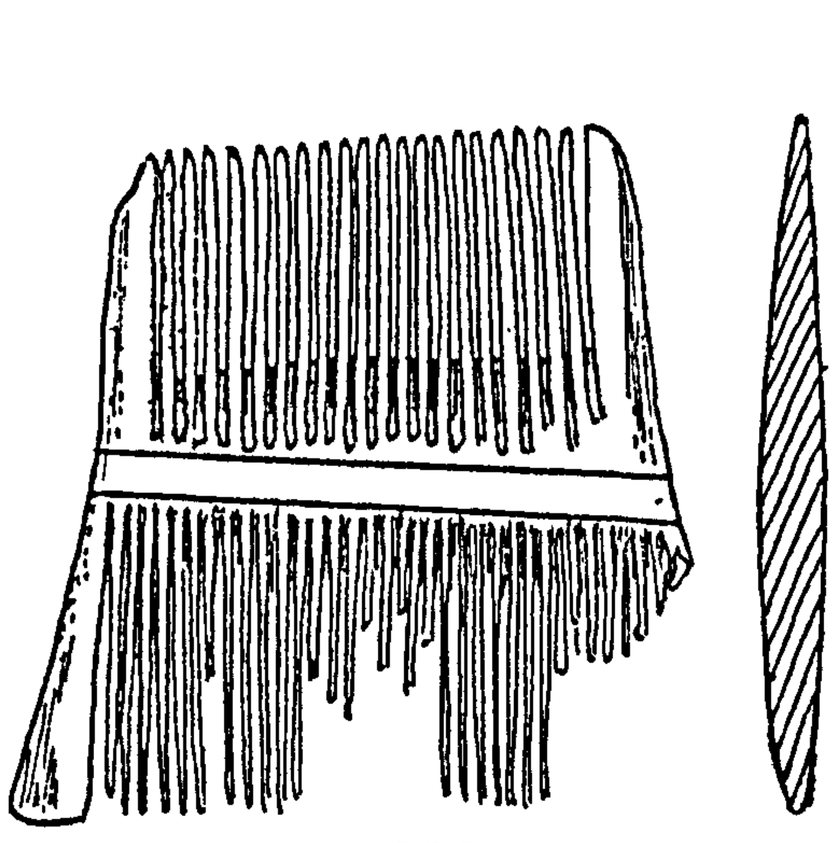
Fig. 4.30 Combs featuring obliquely cut teeth



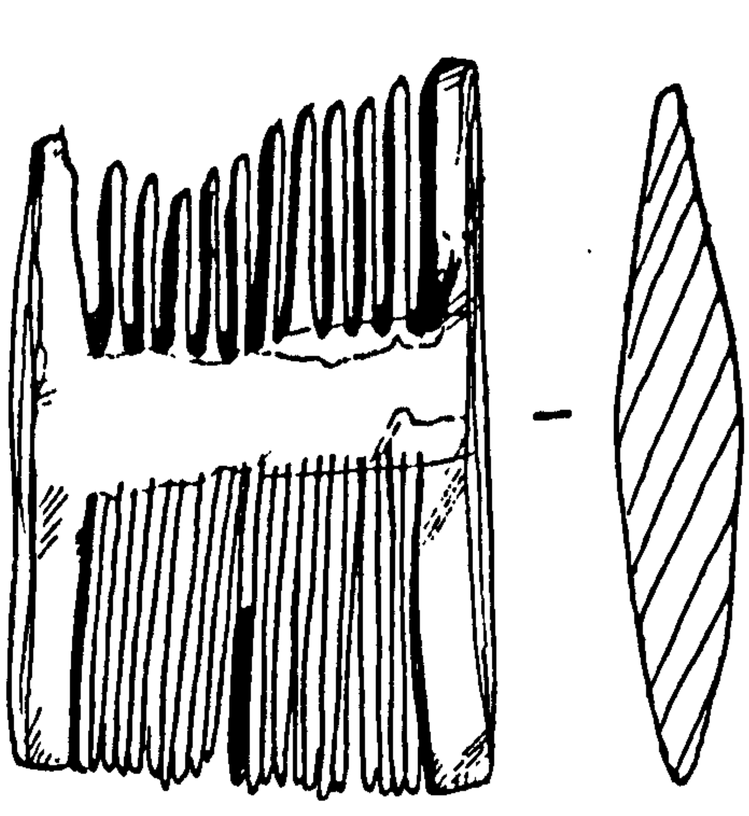
B125



B63

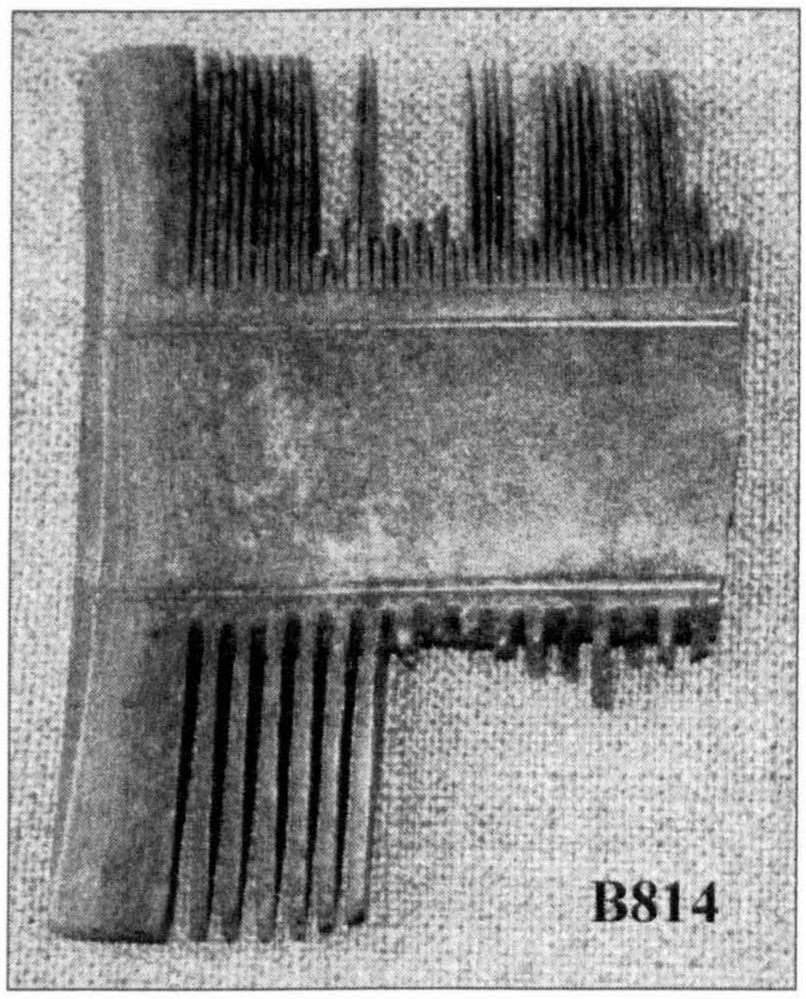


B322

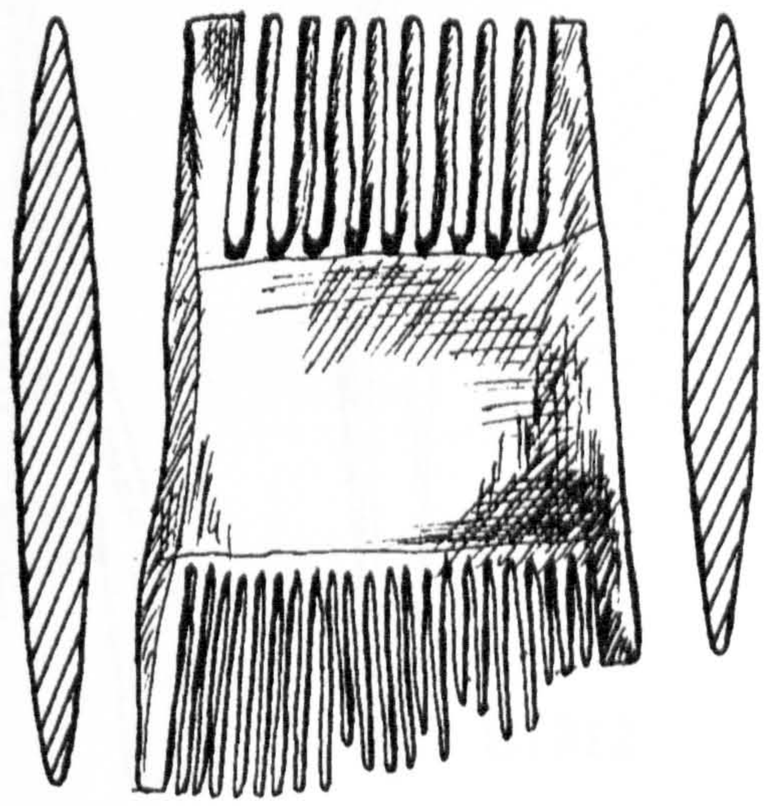


B94

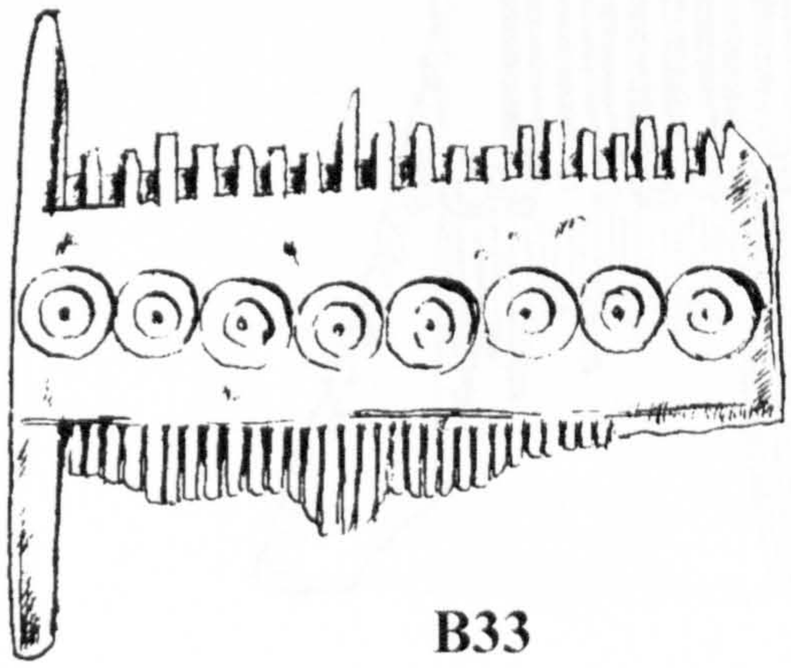
Fig. 4.31 Combs featuring scratched guidelines for cutting teeth



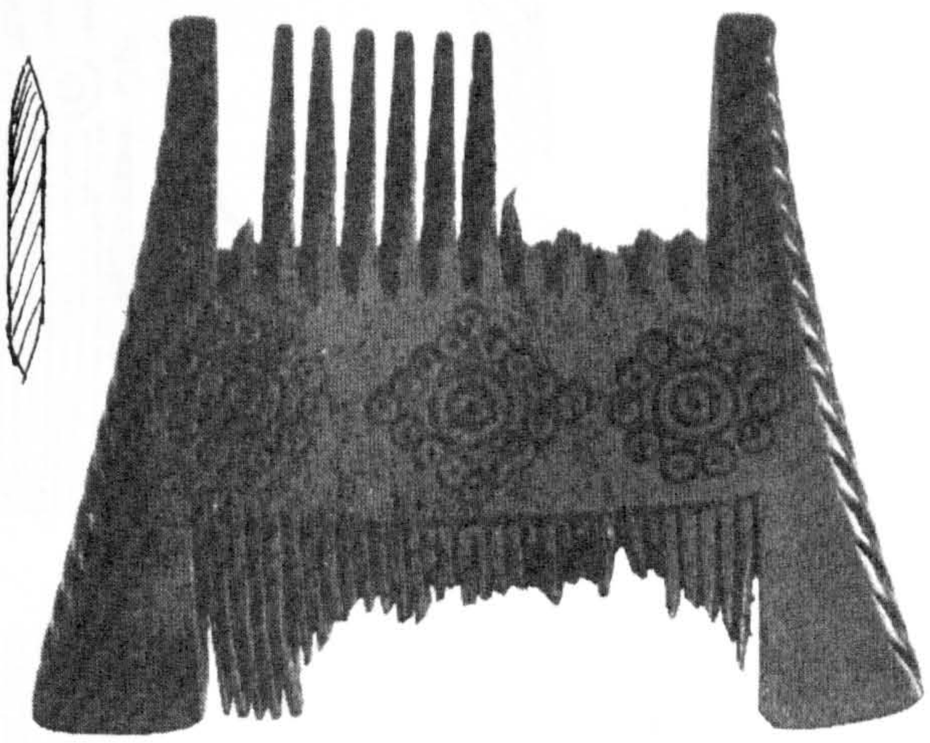
B814



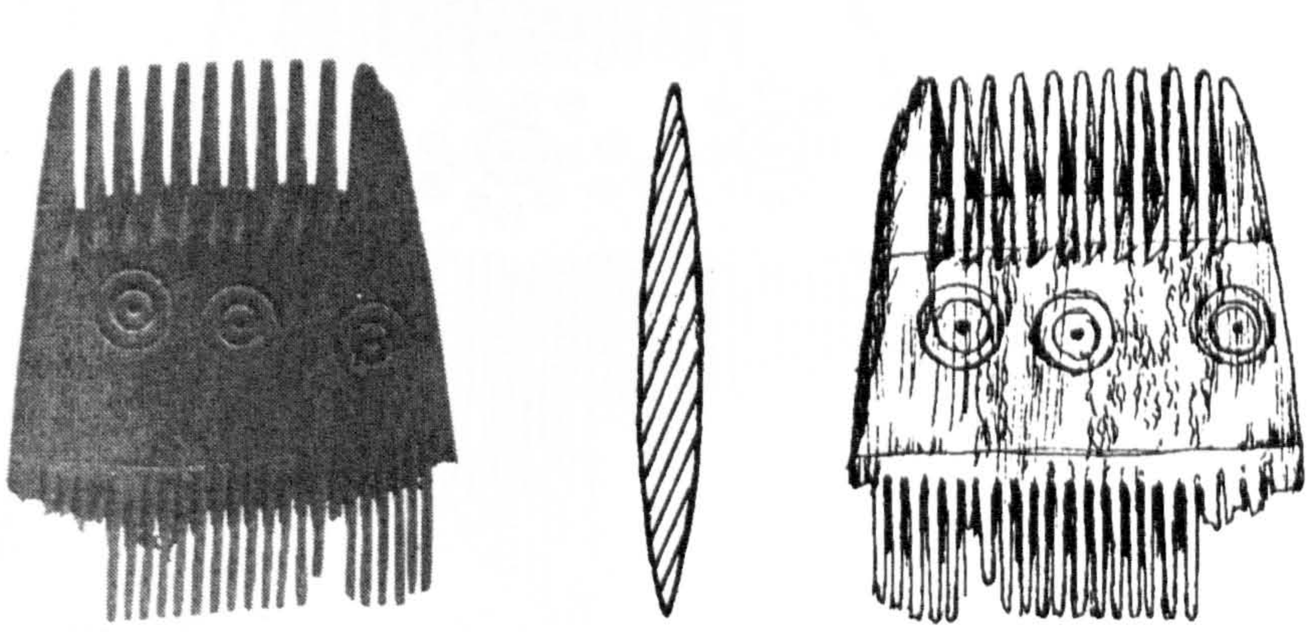
B155



B33

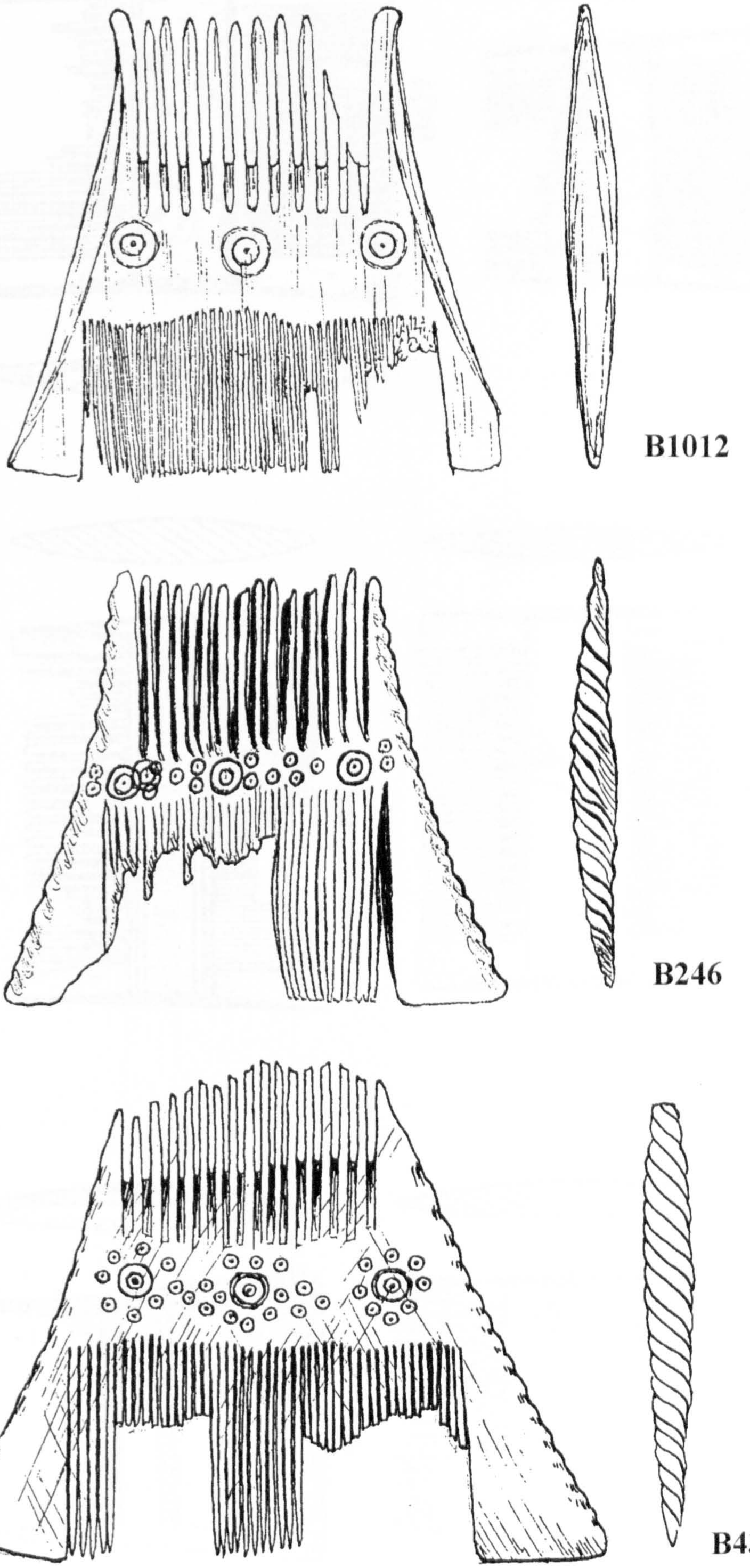


B88



B405

Fig. 4.32 Simple combs featuring uneven tooth base line

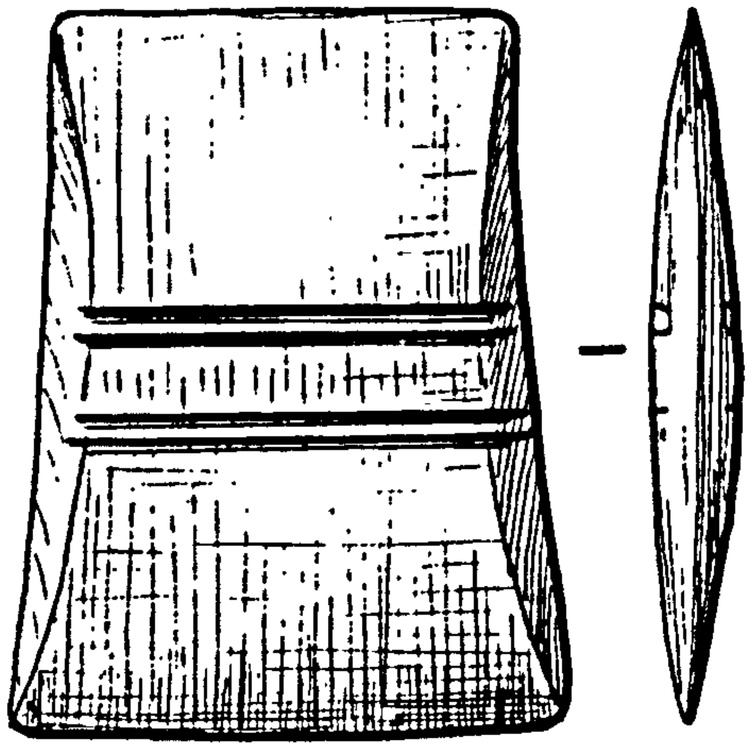


B1012

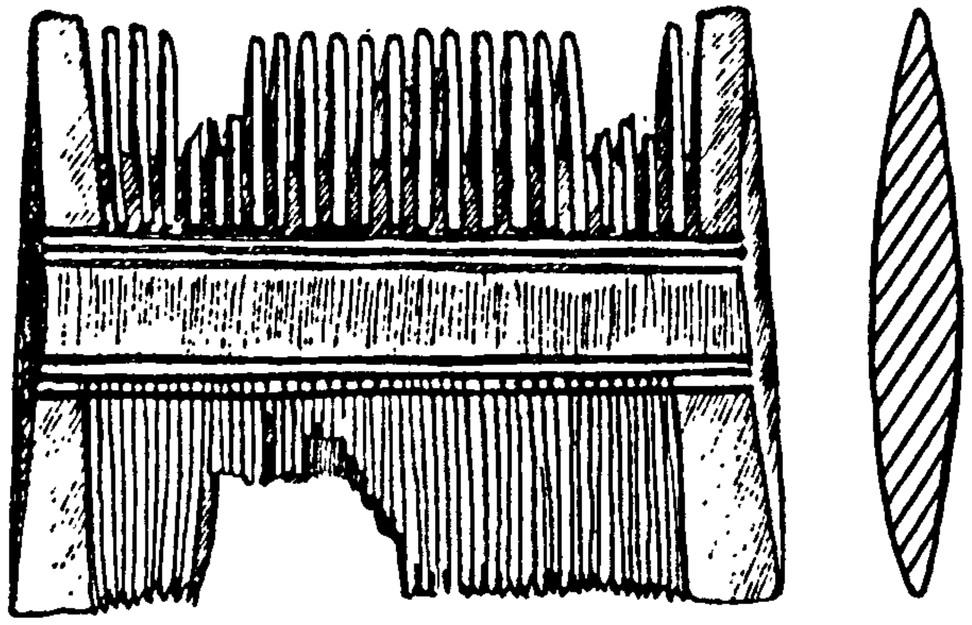
B246

B430

Fig. 4.33 Combs and unfinished specimens featuring sawn guidelines exploited decoratively as linear decoration



Sarkel



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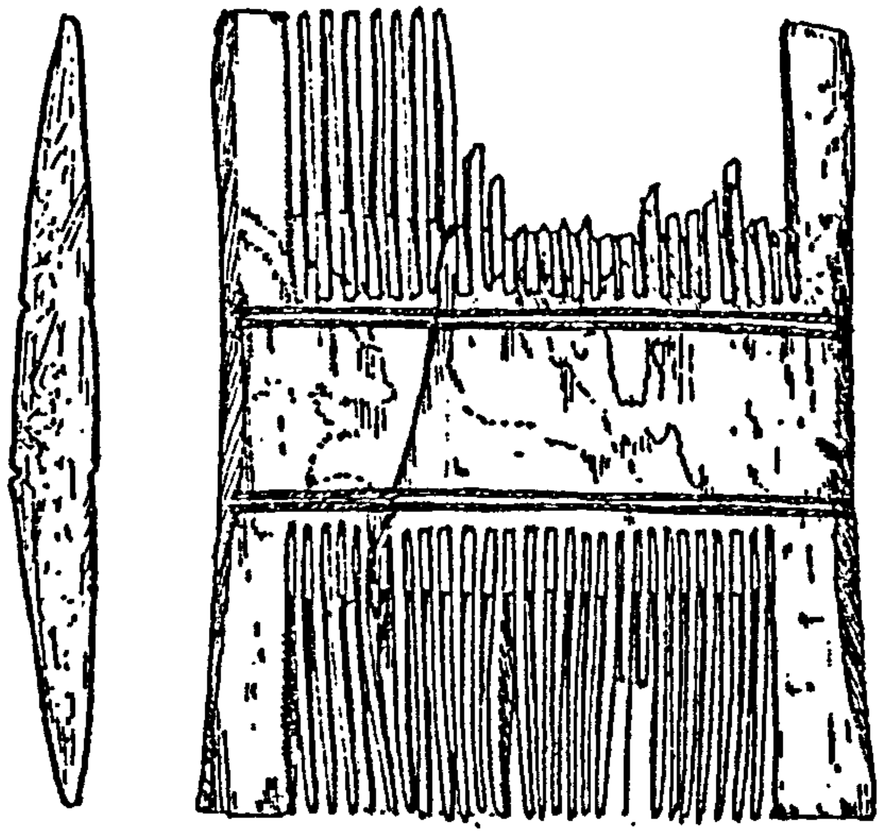

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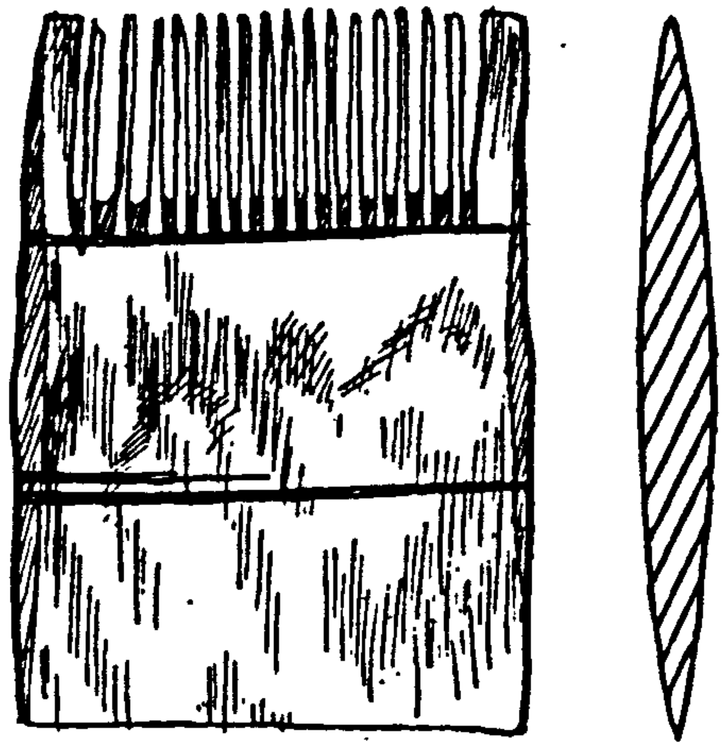
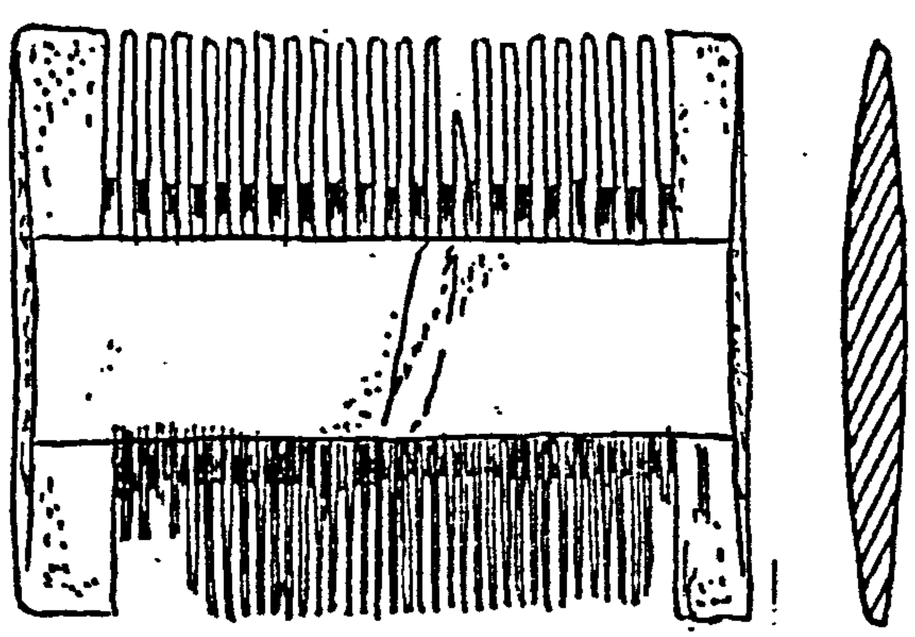


B113



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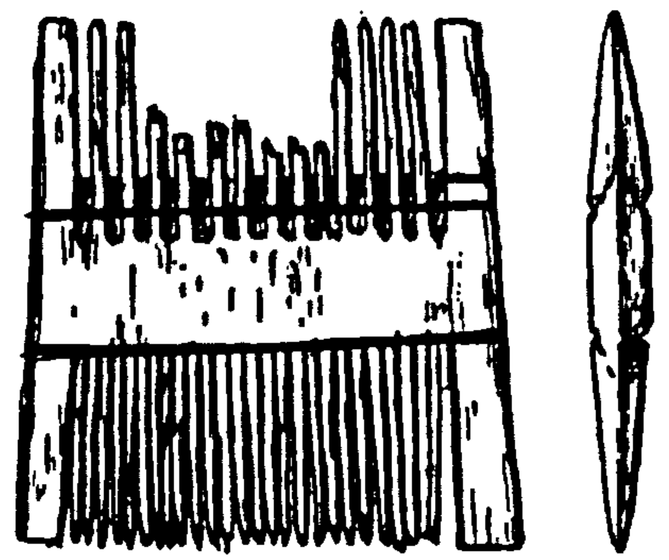
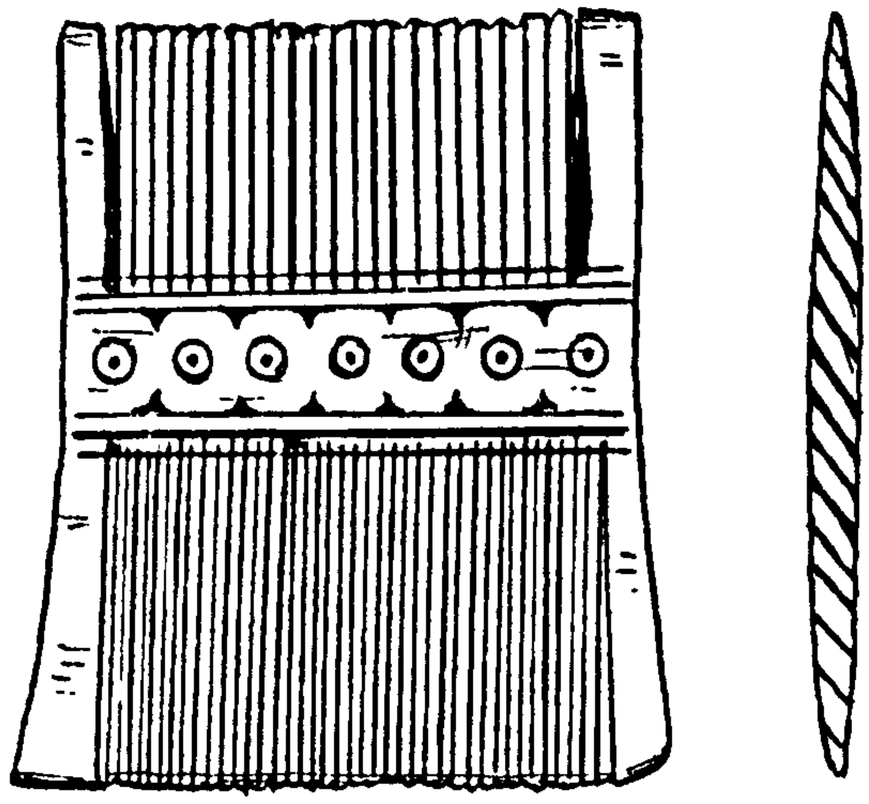
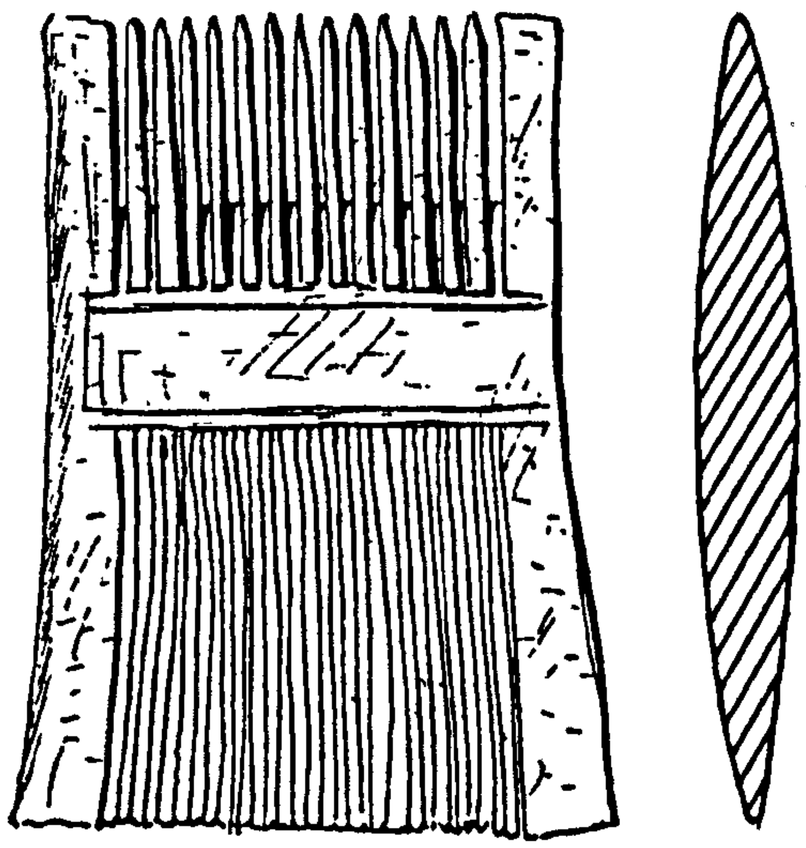


B415

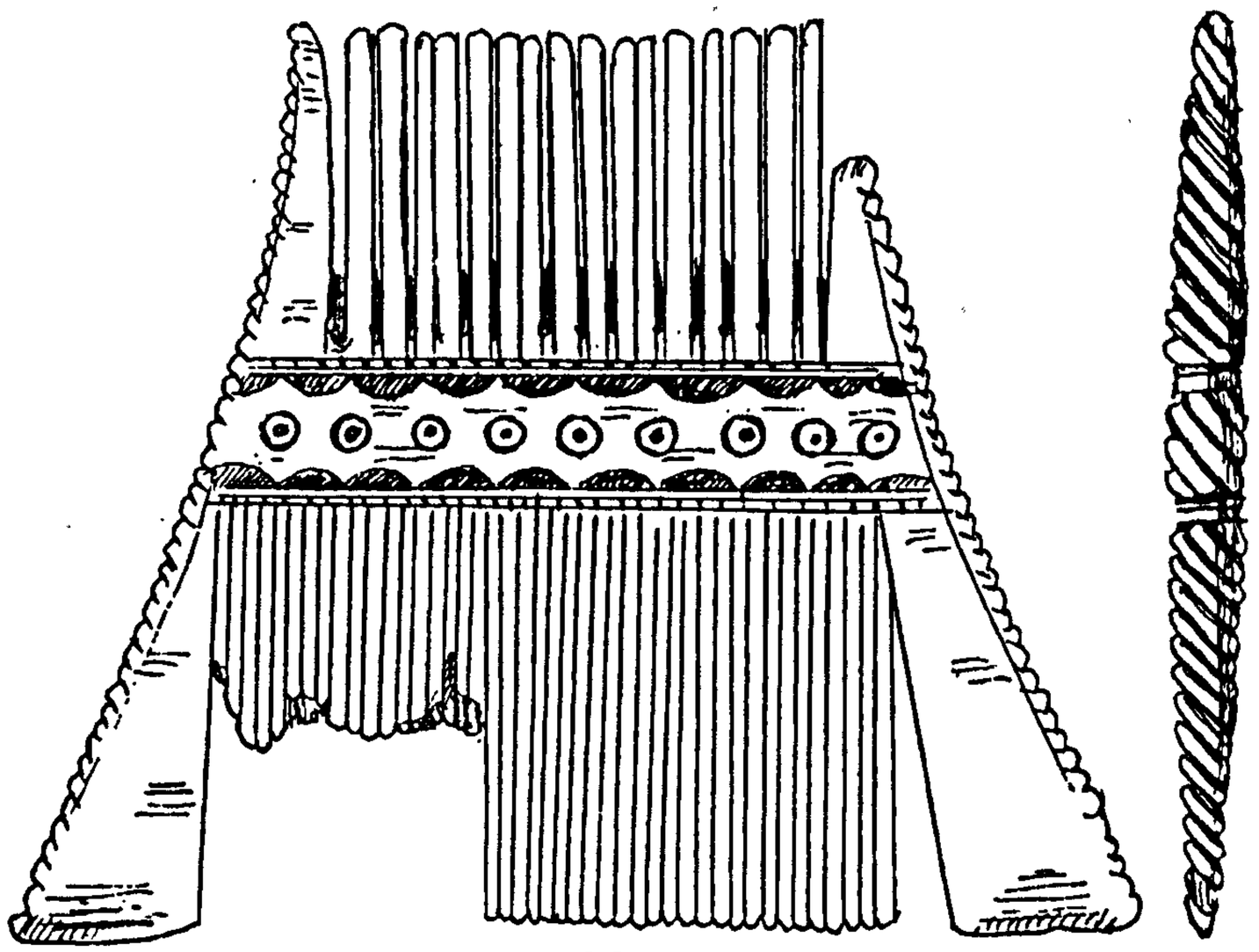
Fig. 4.34 12th century combs with fine teeth higher than coarse teeth



B96

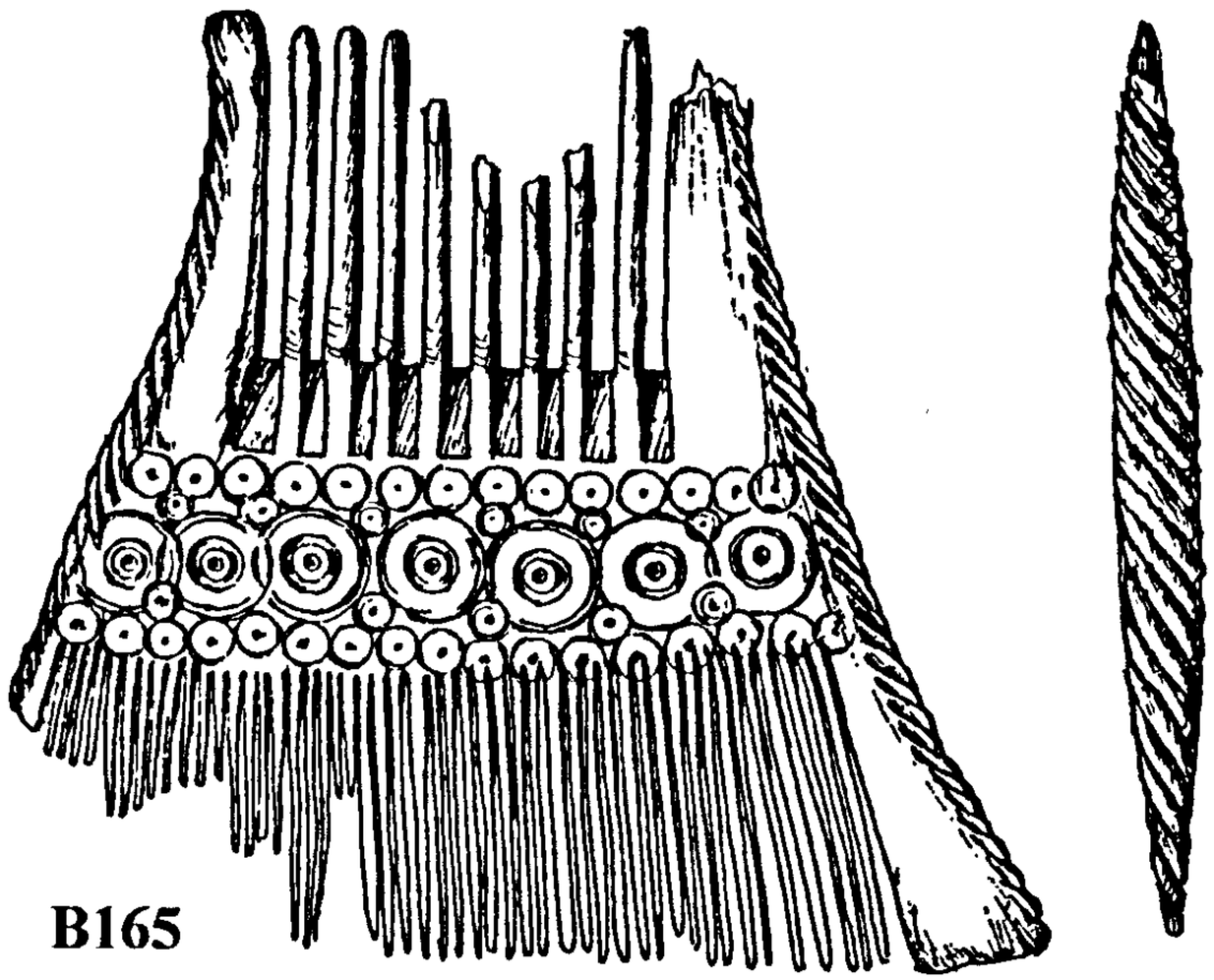


B6

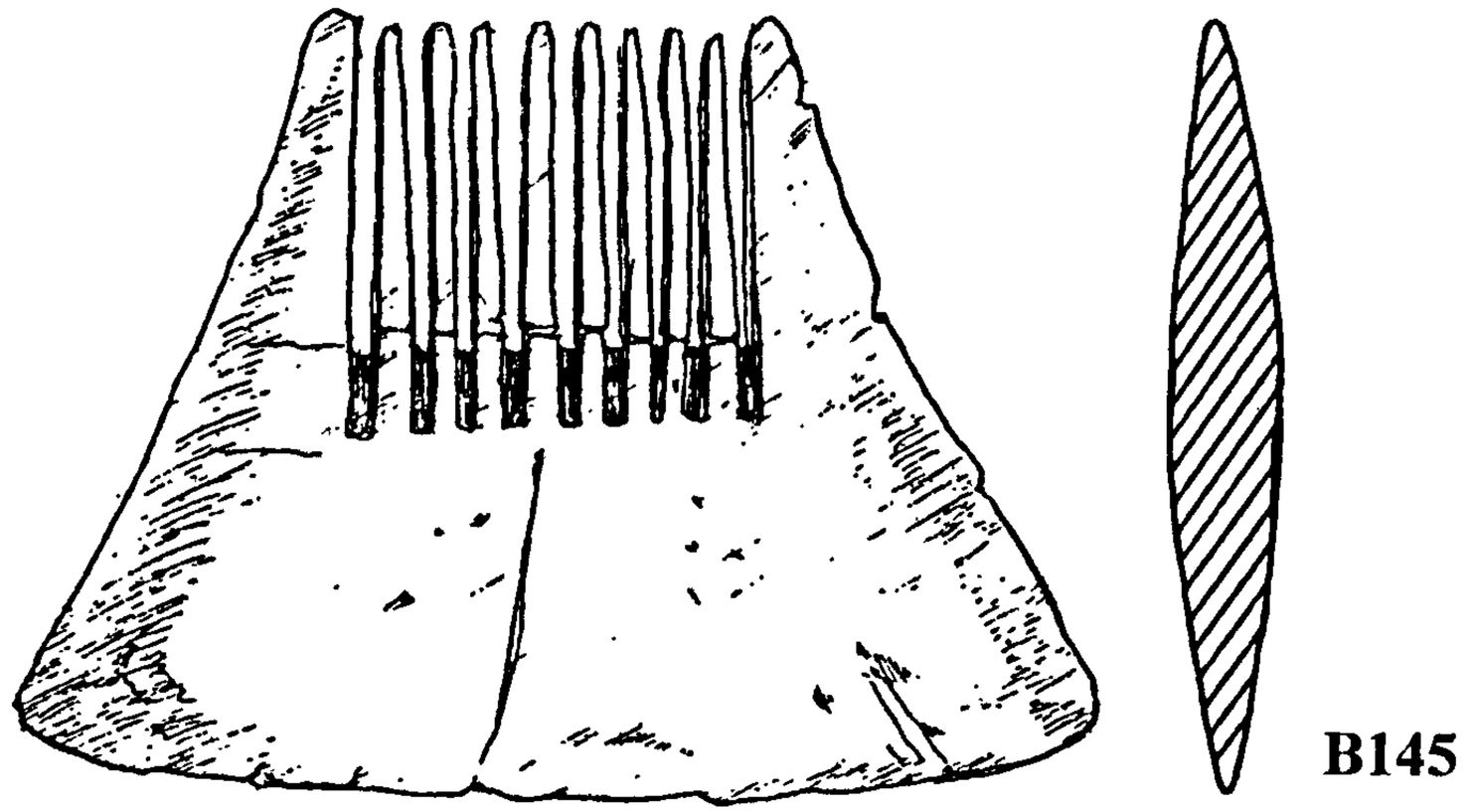


B98

Fig. 4.35 13th century combs with coarse teeth higher than fine teeth



B165



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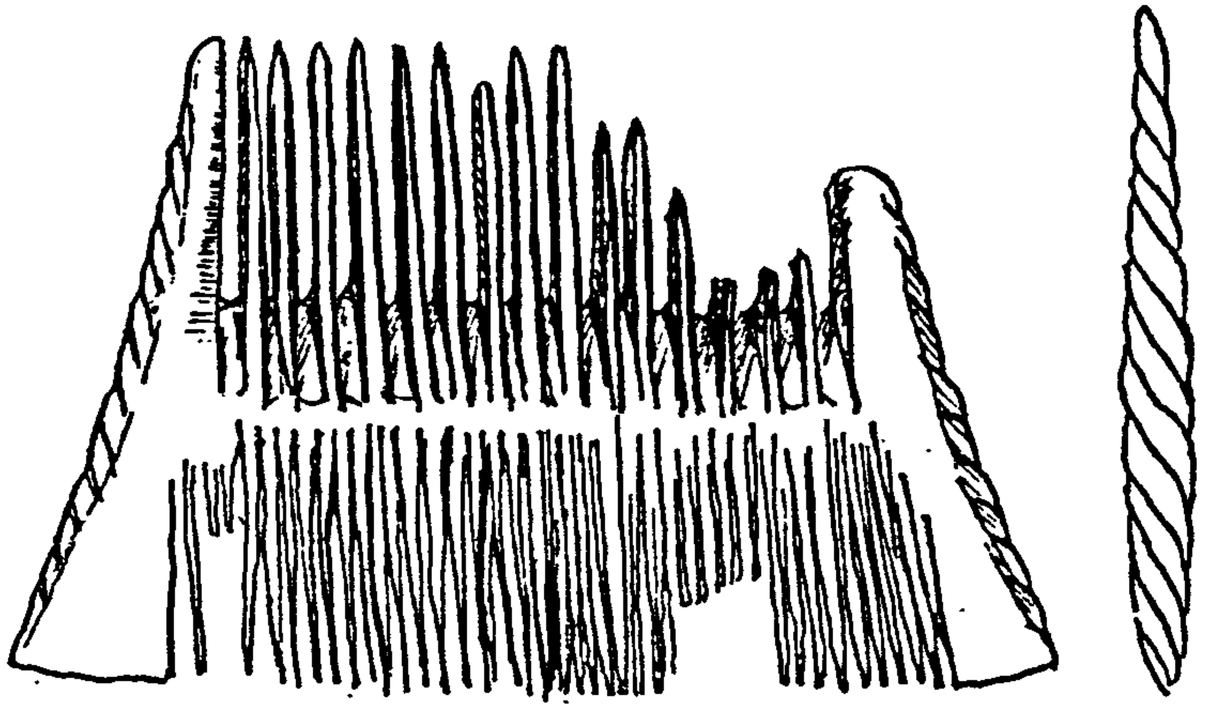

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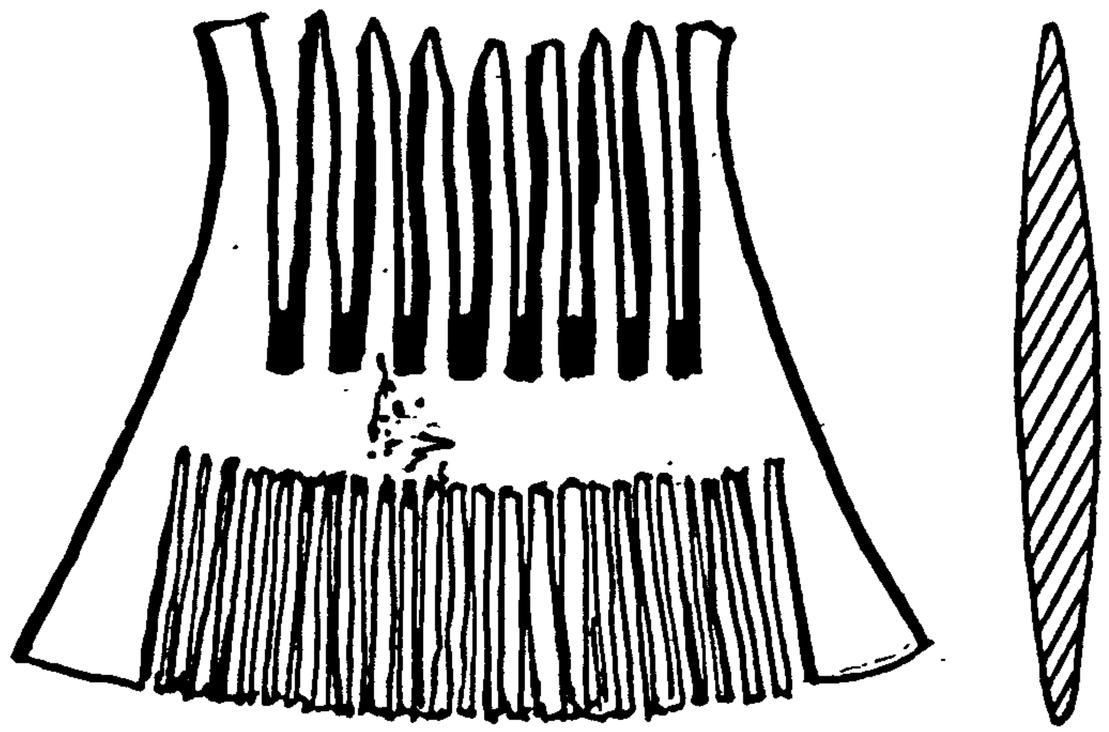
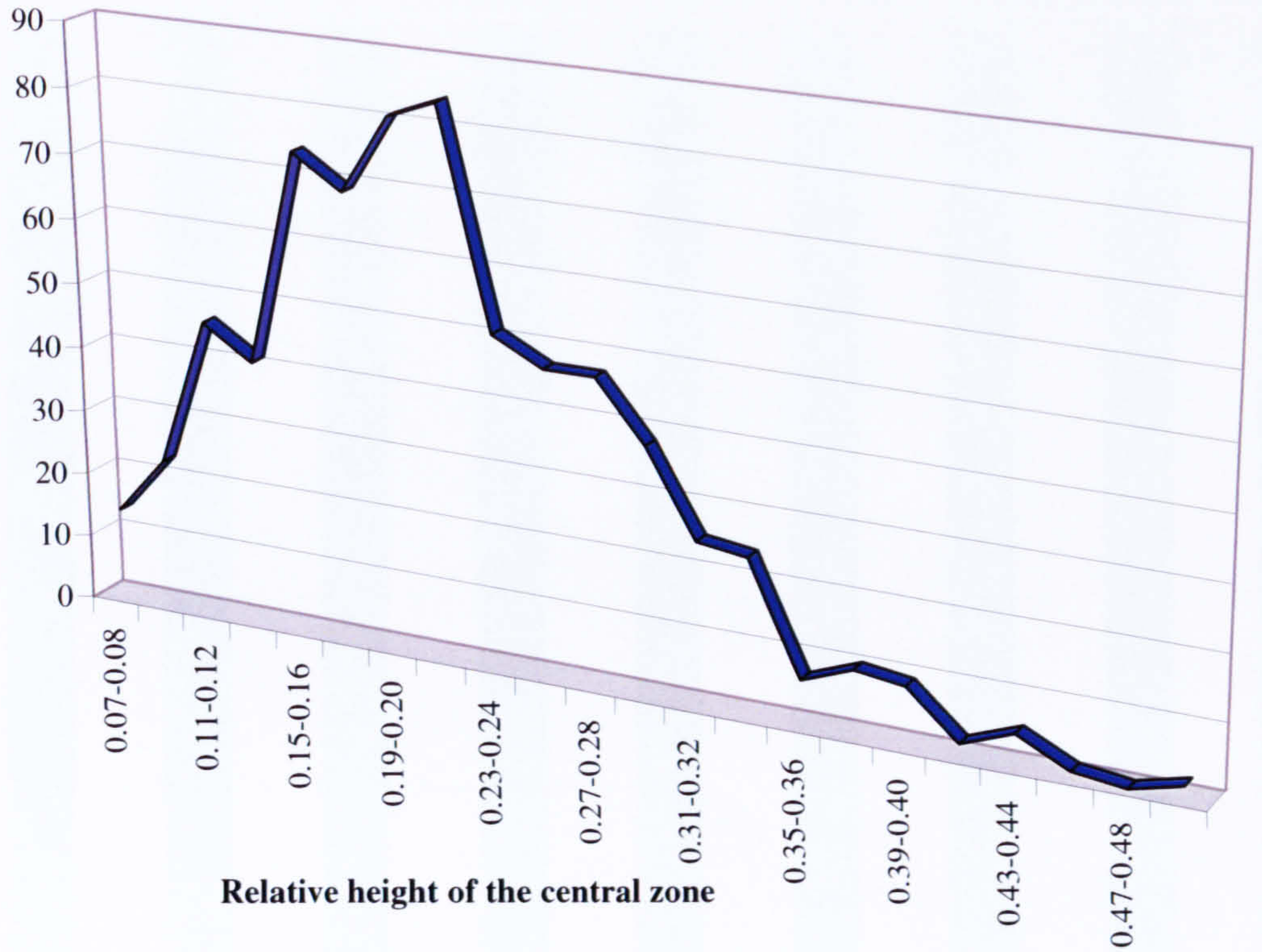


B180

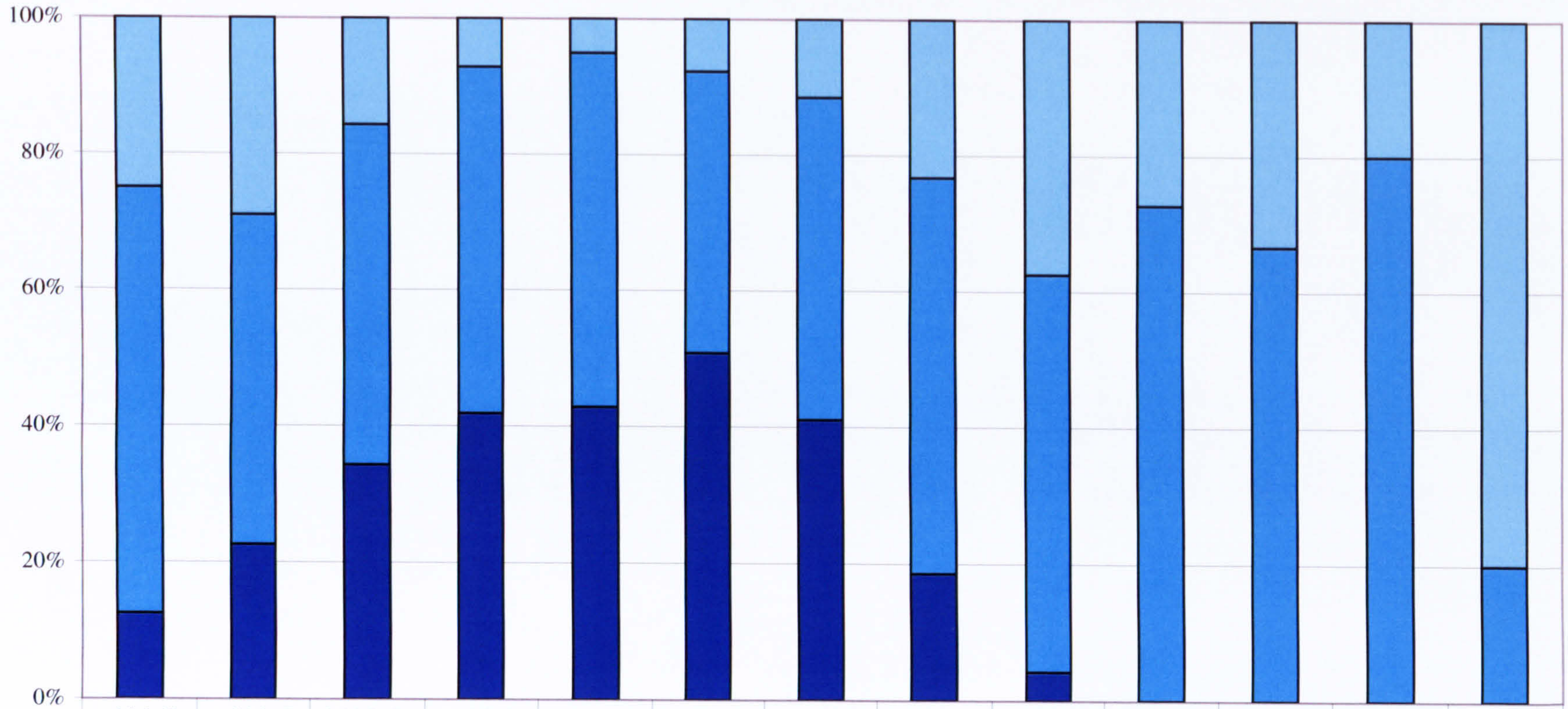
Fig. 4.36
Simple combs in skeletal materials. Relative height of the central zone



Σ 700

	0.07-0.08	0.09-0.10	0.11-0.12	0.13-0.14	0.15-0.16	0.17-0.18	0.19-0.20	0.21-0.22	0.23-0.24	0.25-0.26	0.27-0.28	0.29-0.30	0.31-0.32	0.33-0.34	0.35-0.36	0.37-0.38	0.39-0.40	0.41-0.42	0.43-0.44	0.45-0.46	0.47-0.48	0.49-0.50
700	14	23	46	41	74	69	81	84	51	47	47	38	25	24	7	10	9	2	5	1	0	2

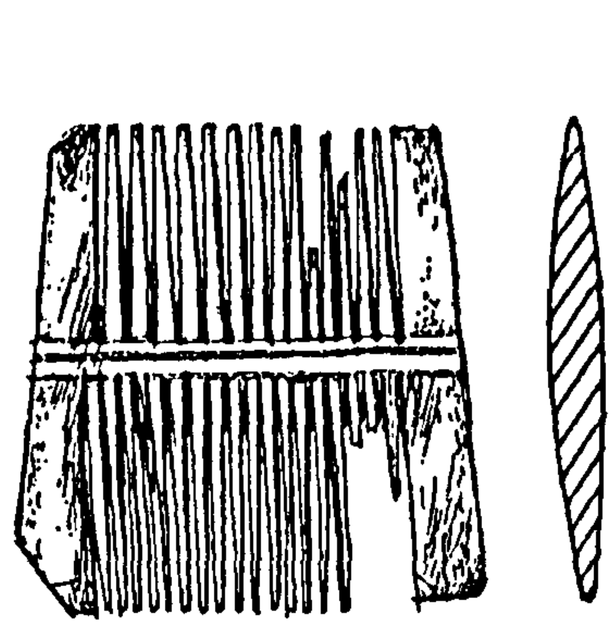
Fig. 4.37
Simple combs in skeletal materials. Chronological changes in relative height of central zone



	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.
rh=0.32-0.50 (wide)	2	9	11	11	5	9	9	10	9	3	1	1	4
rh=0.19-0.31 (medium)	5	15	35	78	51	48	37	25	14	8	2	4	1
rh<0.19 (narrow)	1	7	24	64	42	59	32	8	1	0	0	0	0

Σ 645

Fig. 4.38 Late 11th - early 13th century combs featuring narrow central zones



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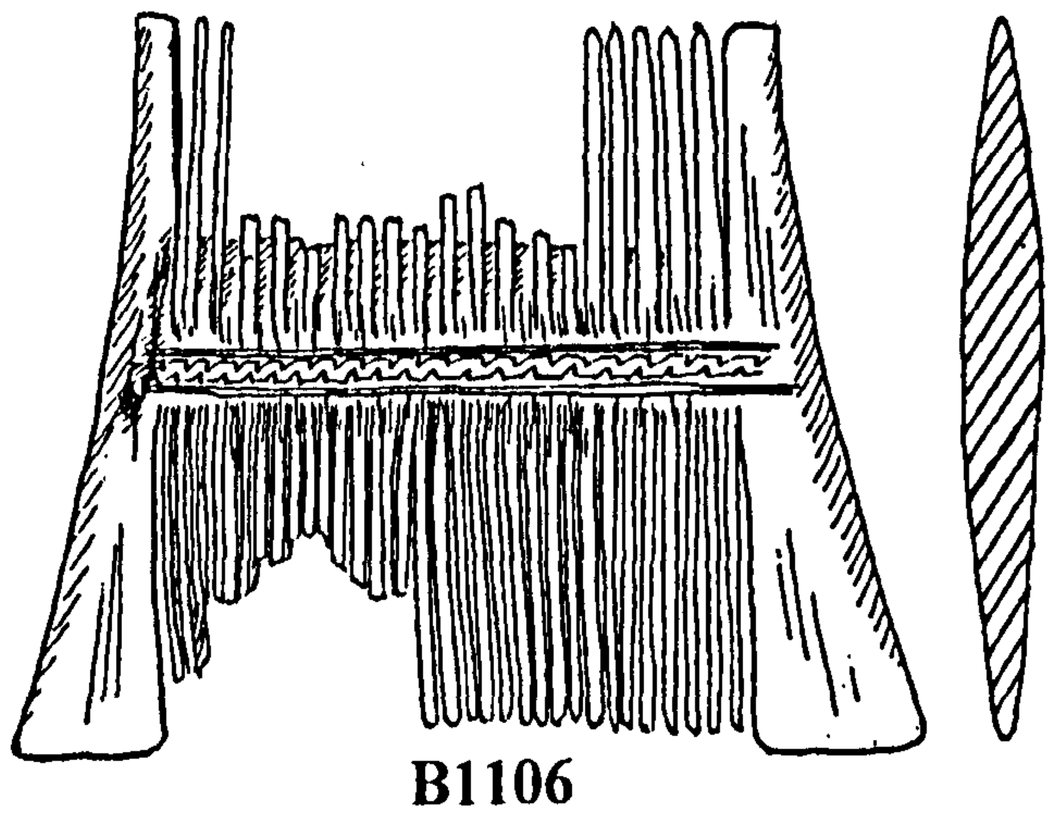

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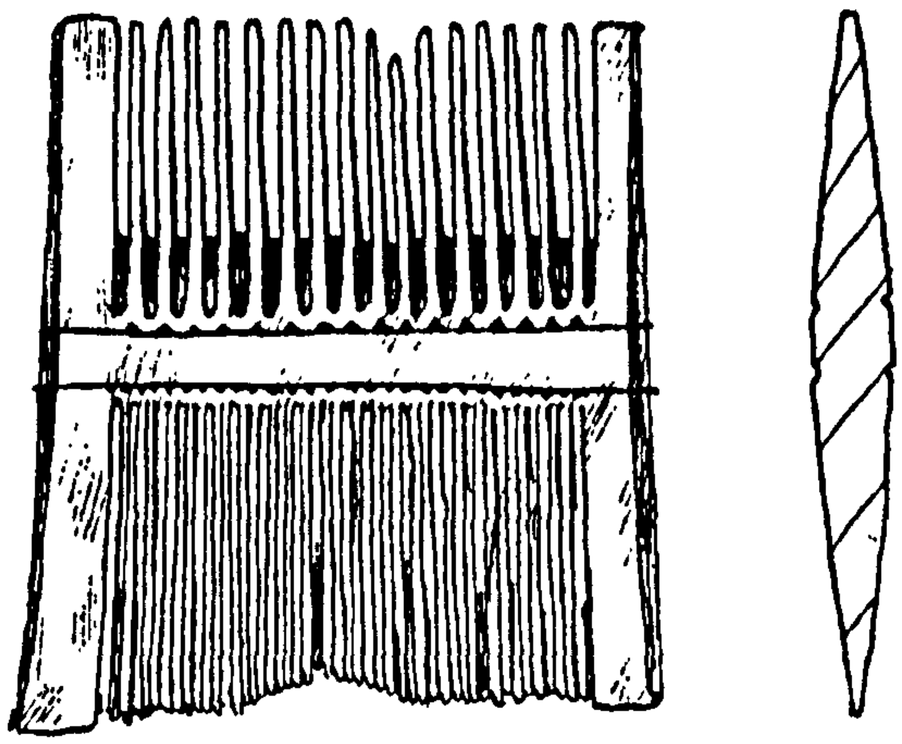

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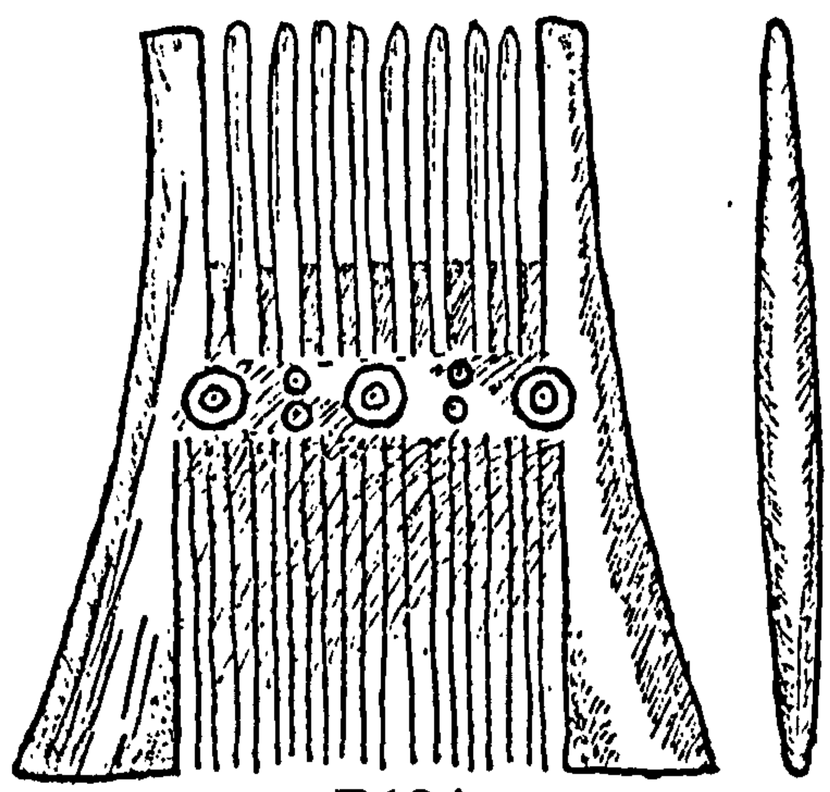

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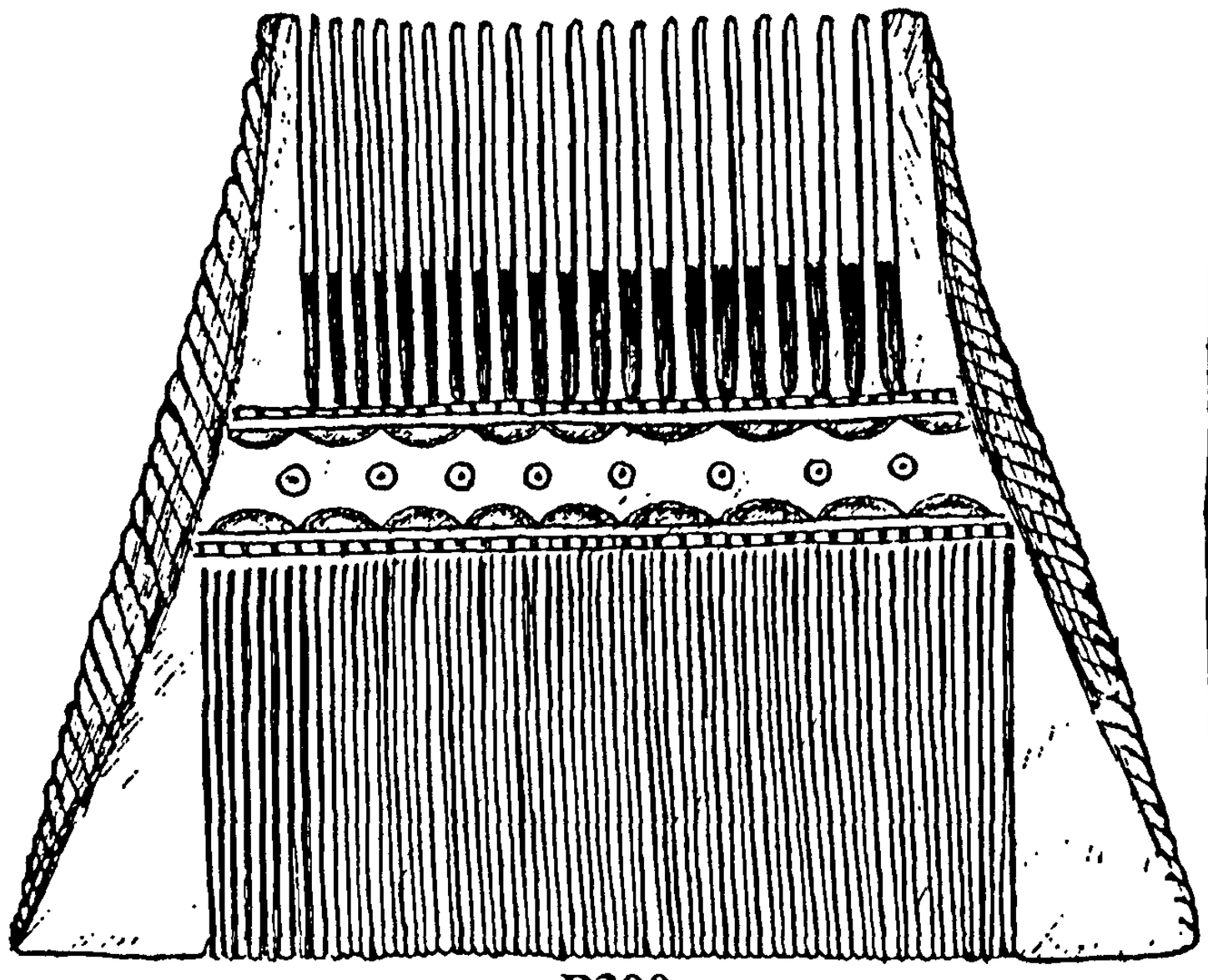

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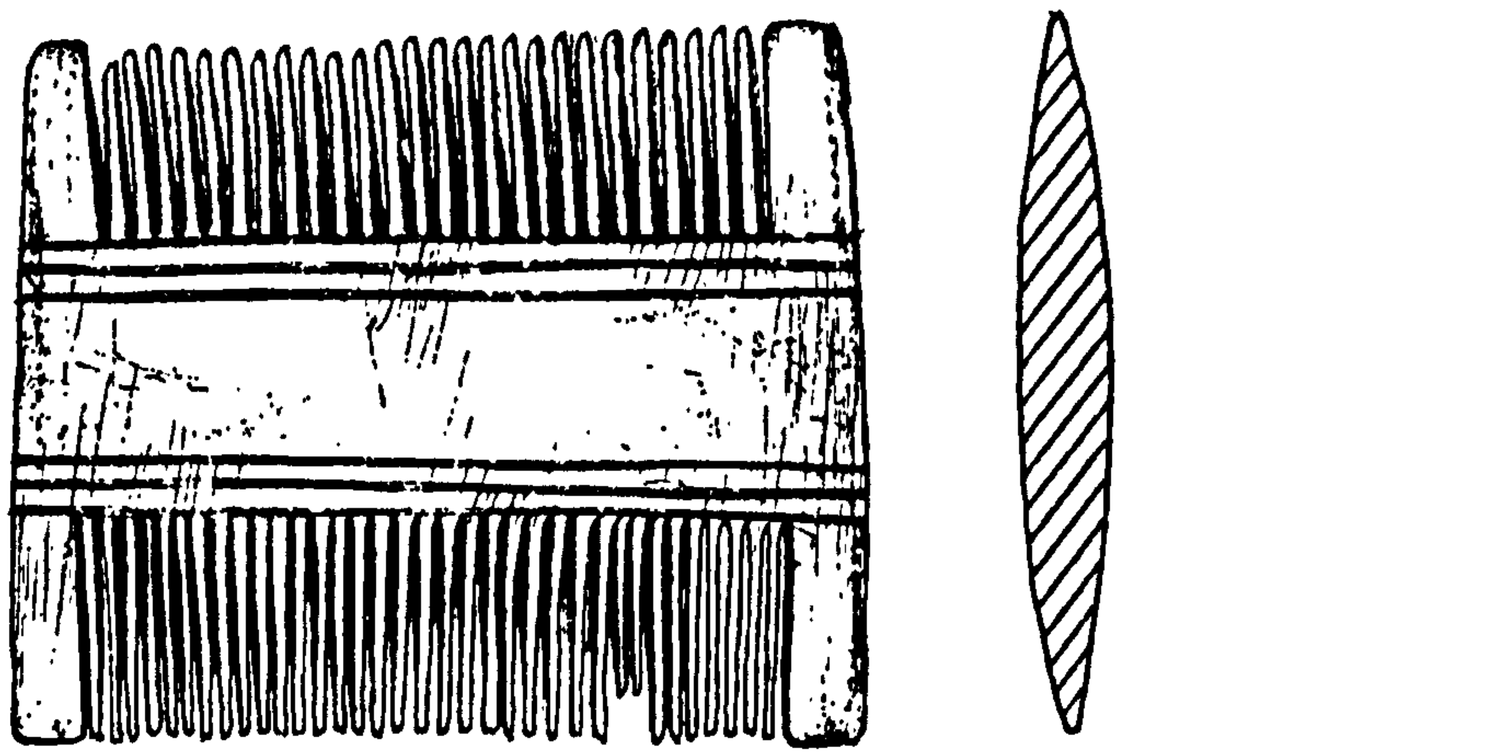
Fig. 4.39 11th century combs featuring wide central zones



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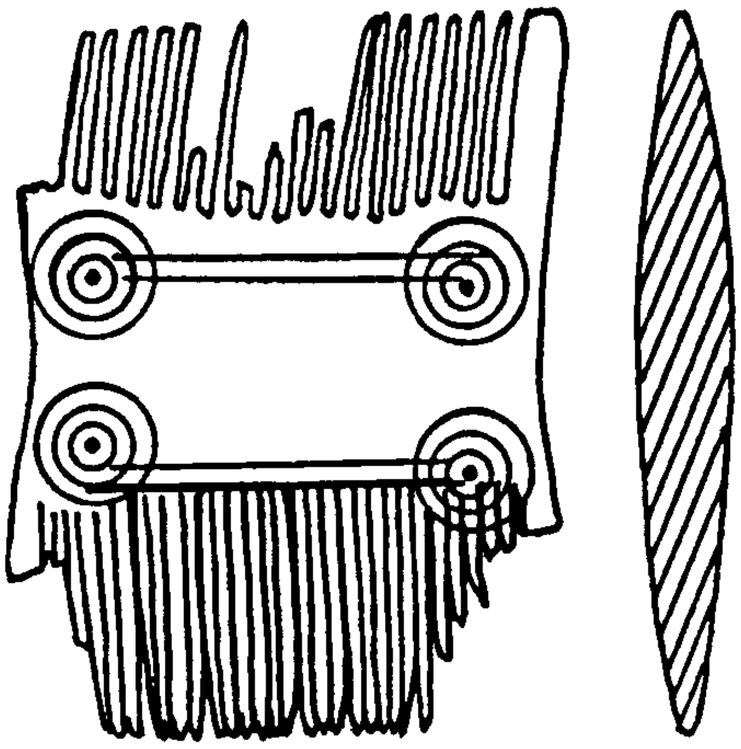

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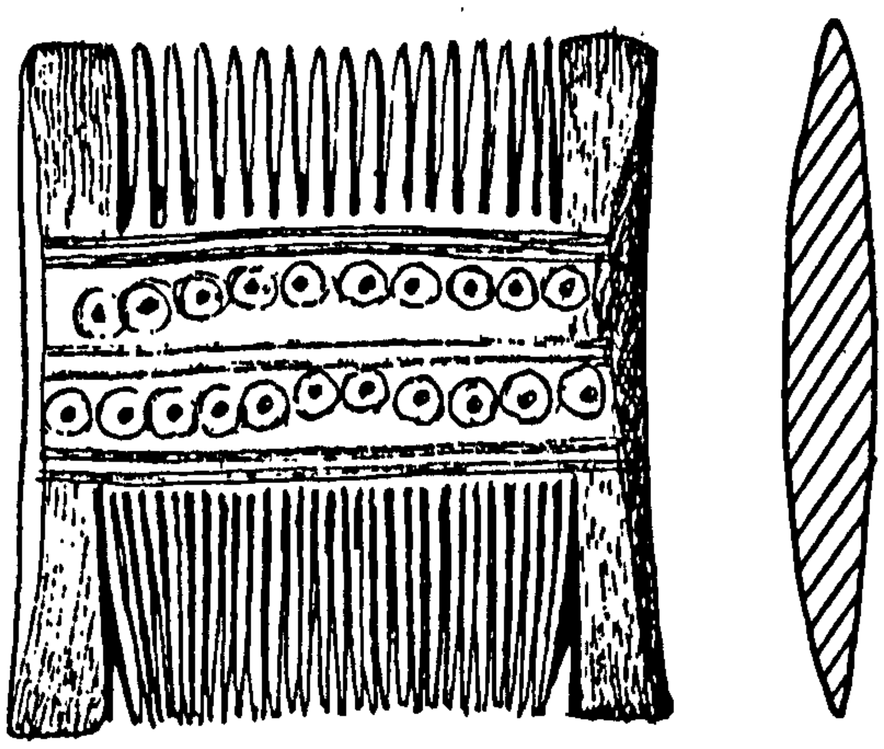

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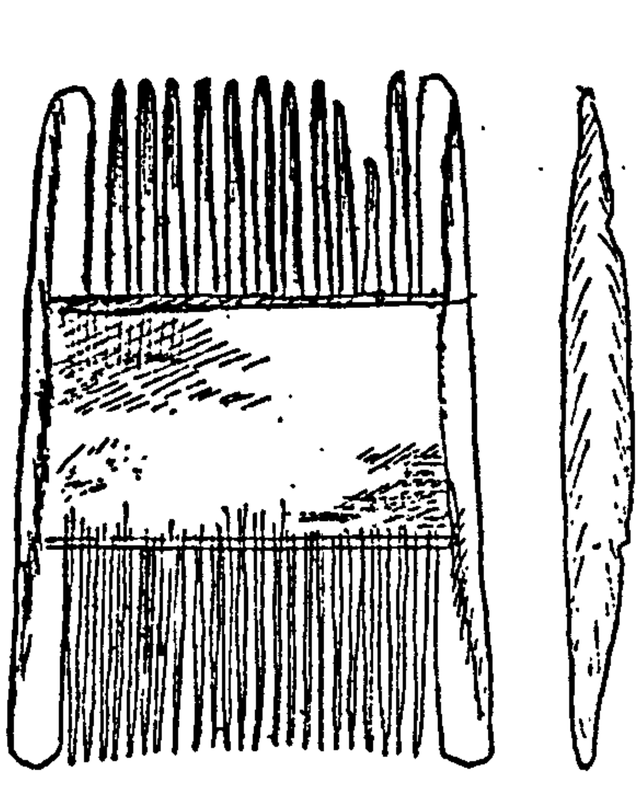

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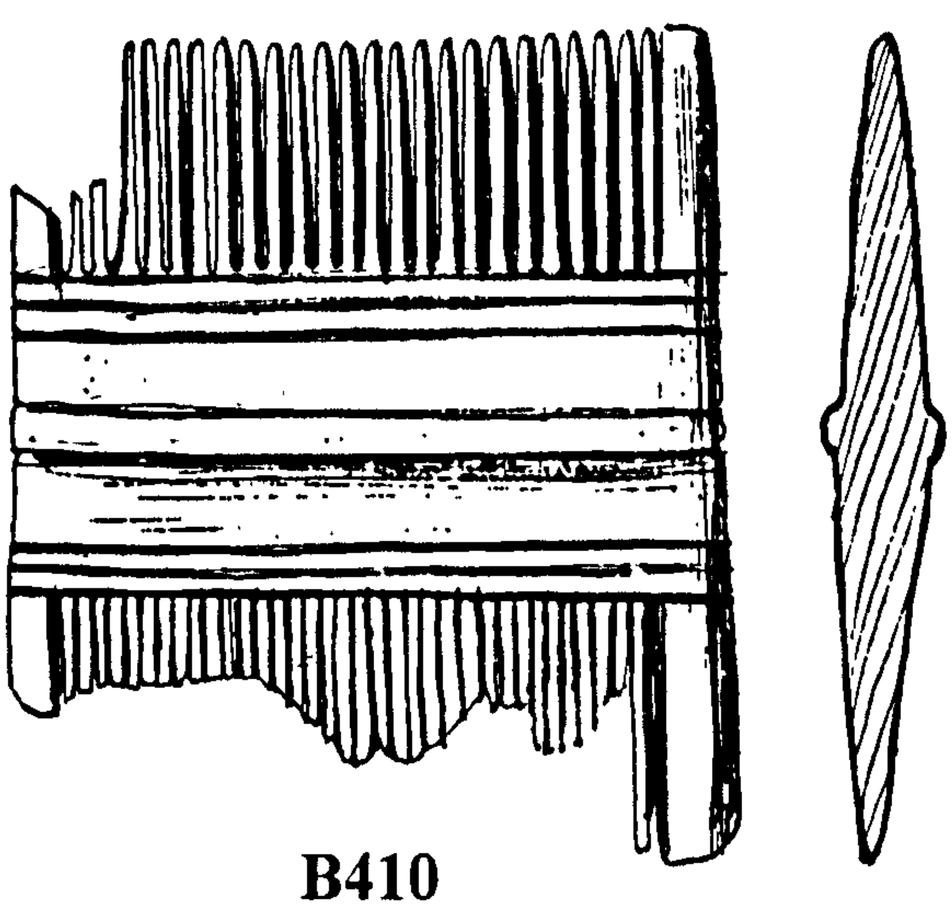
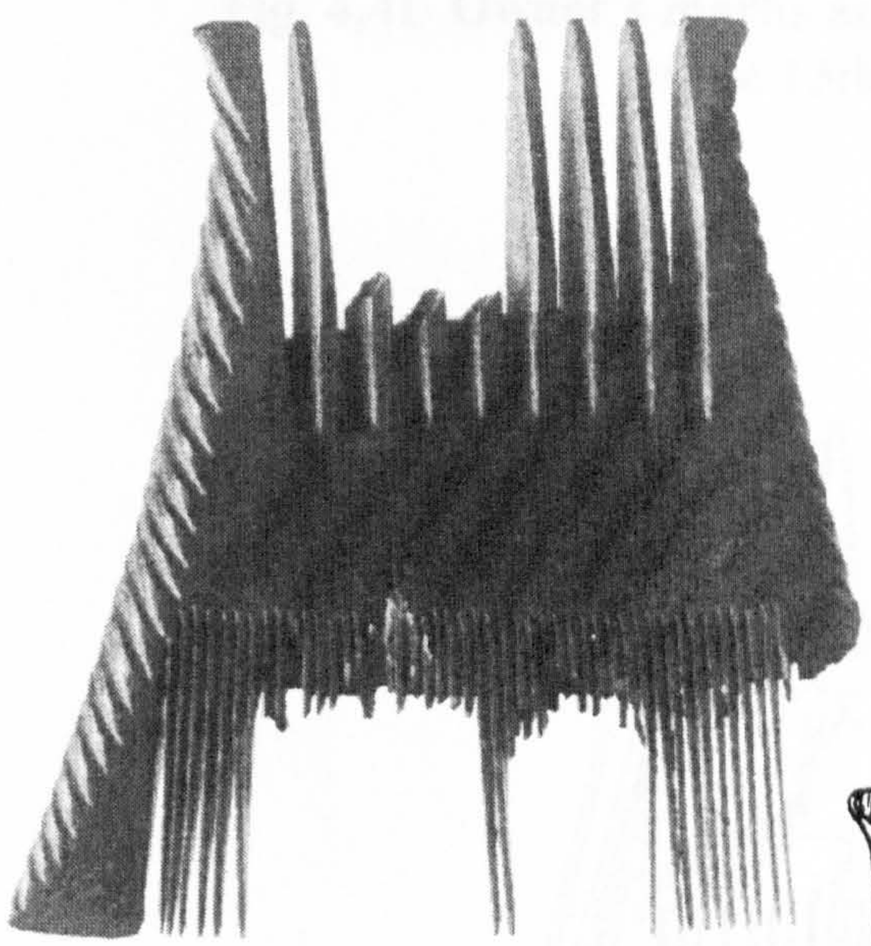


B410

Fig. 4.40 Unfinished 12th century combs featuring undecorated central zones



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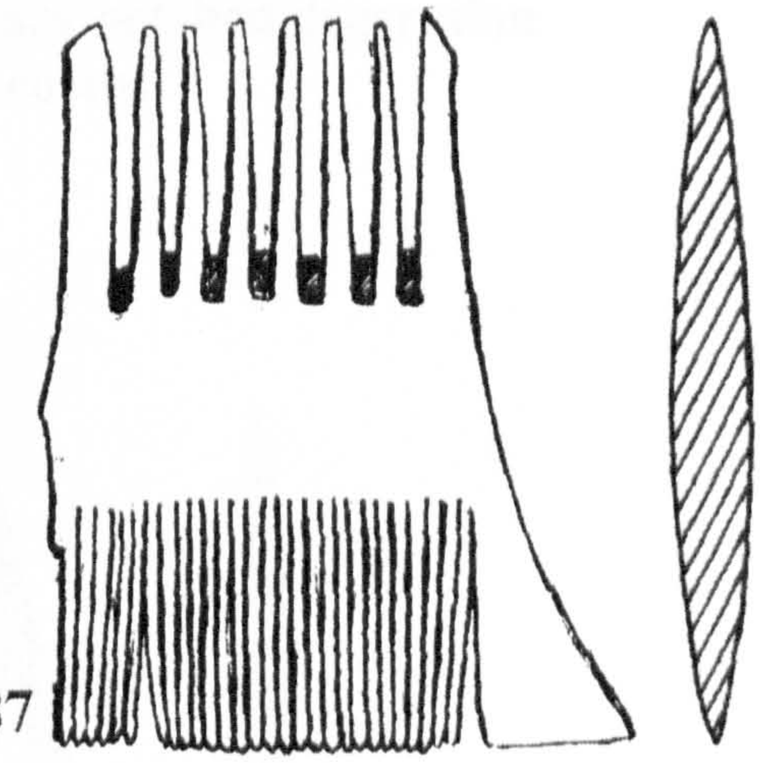

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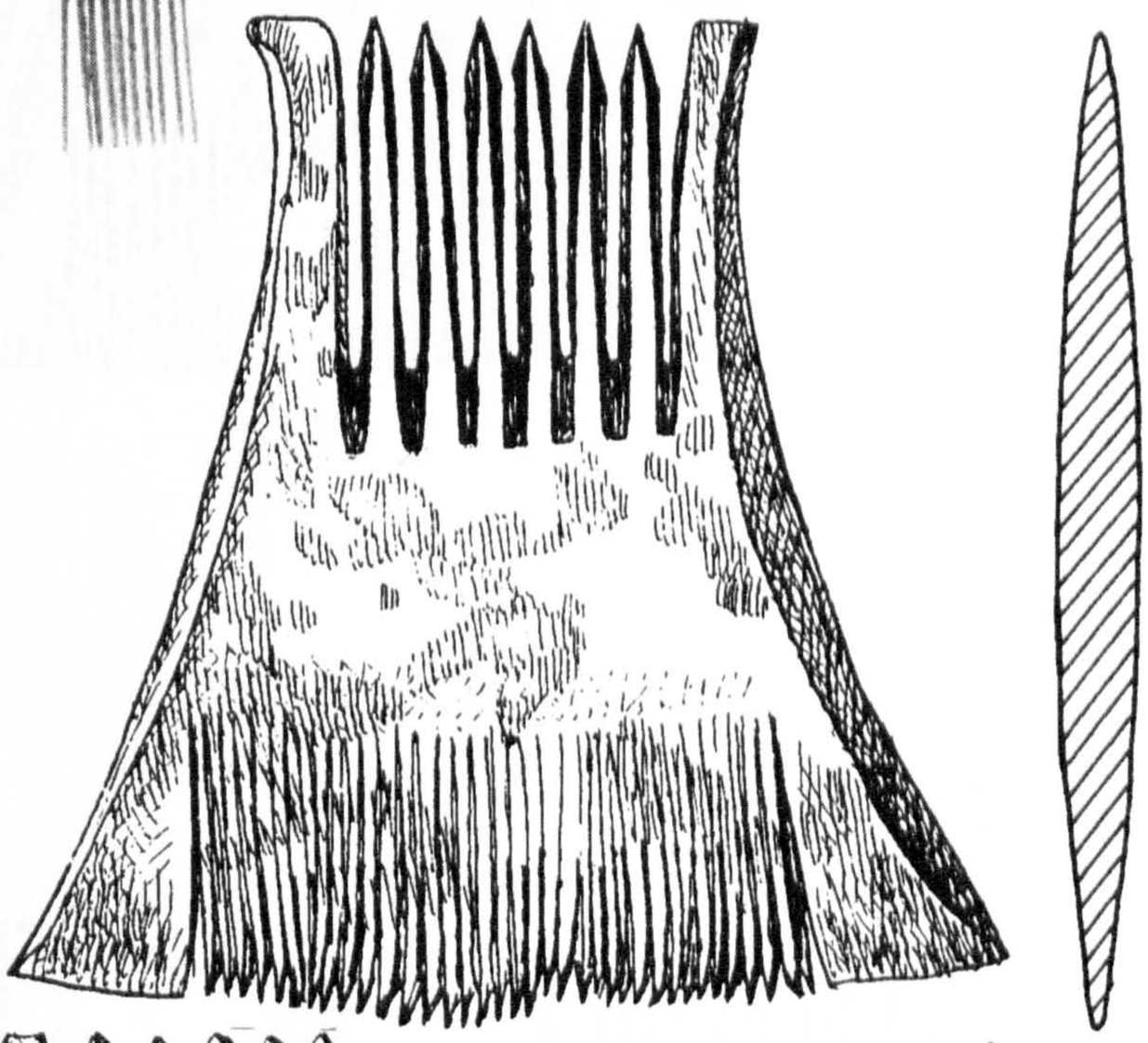

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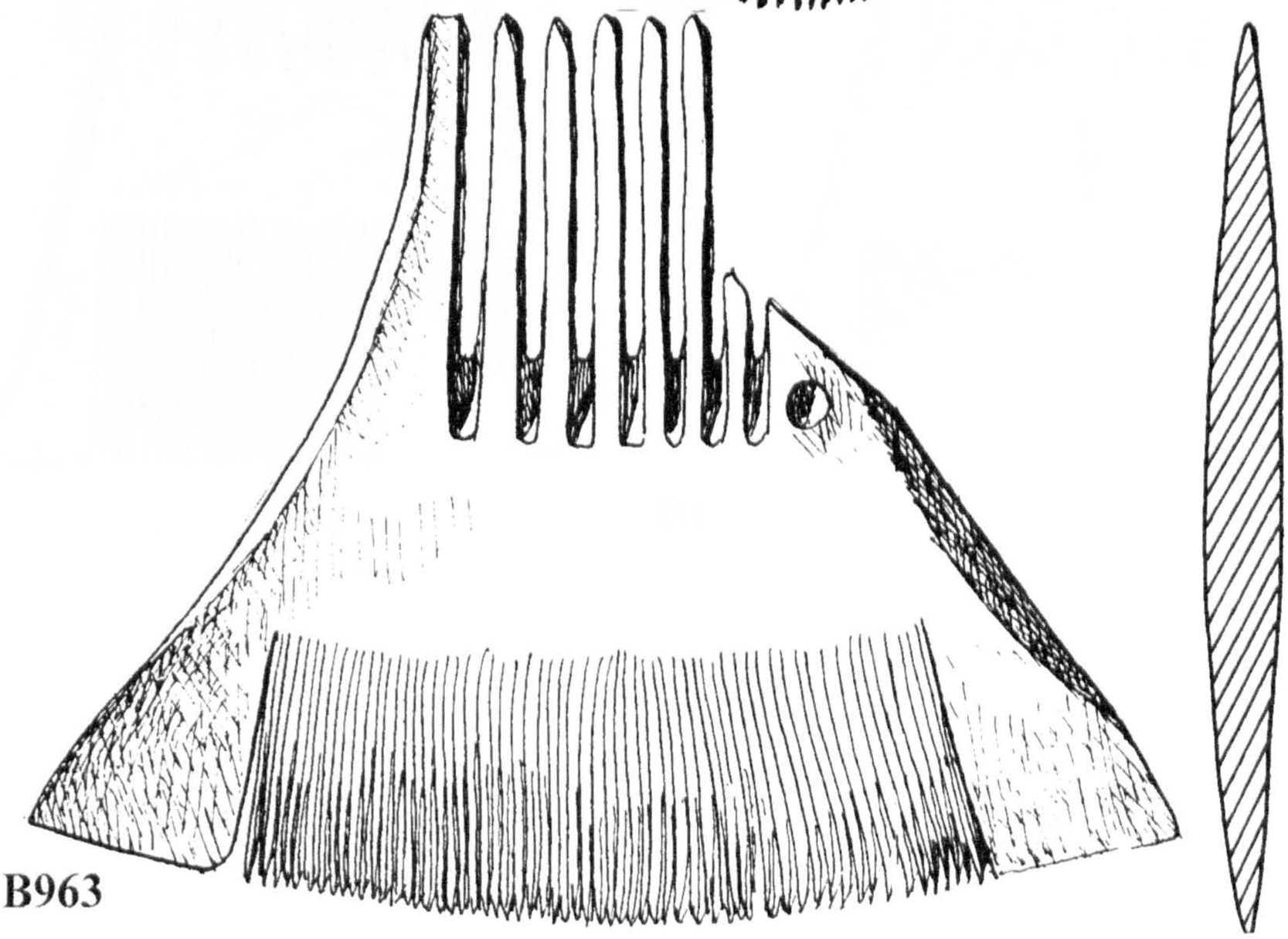
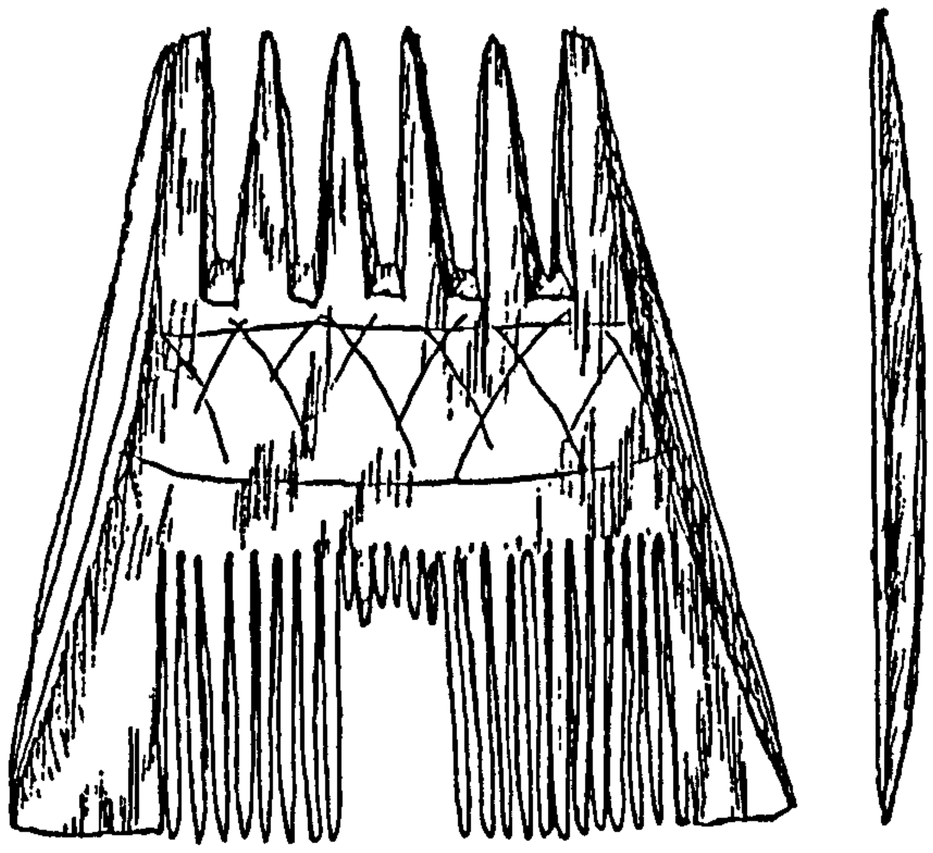


B963

Fig. 4.41 Owner's marks and secondary botched decoration on the 13th century combs



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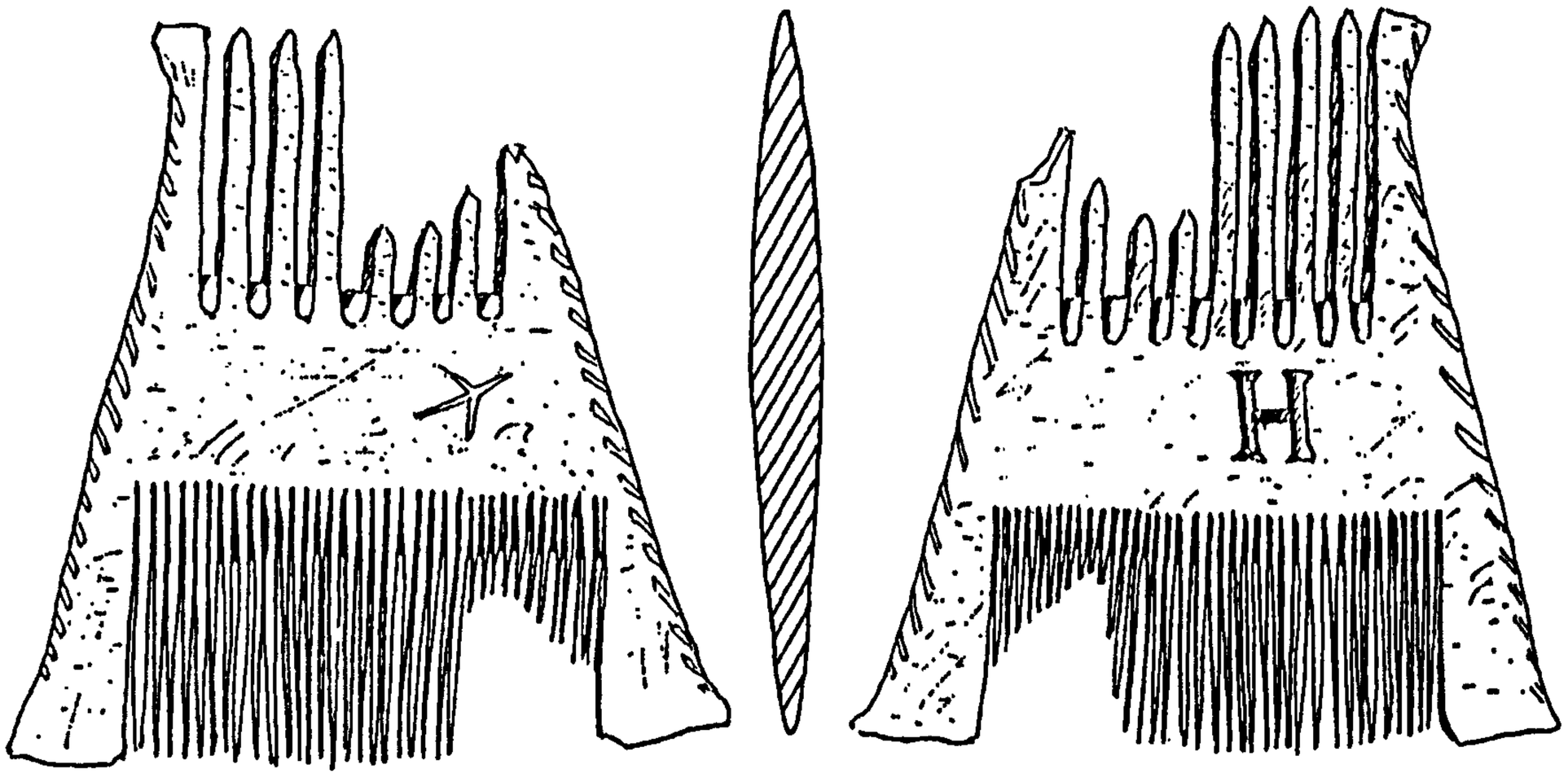
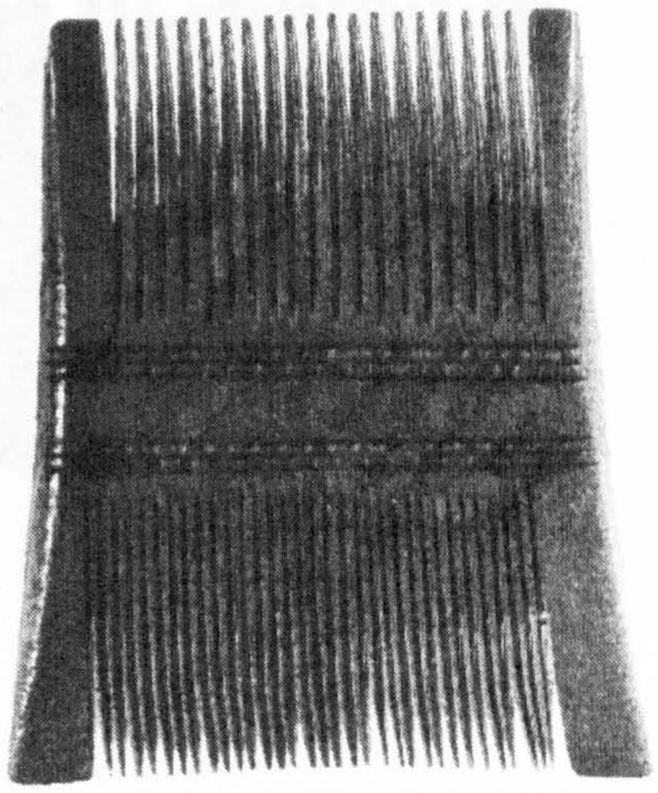


B4

Fig. 4.42 Combs featuring central zones with marginal linear incisions combined with other decorative motifs



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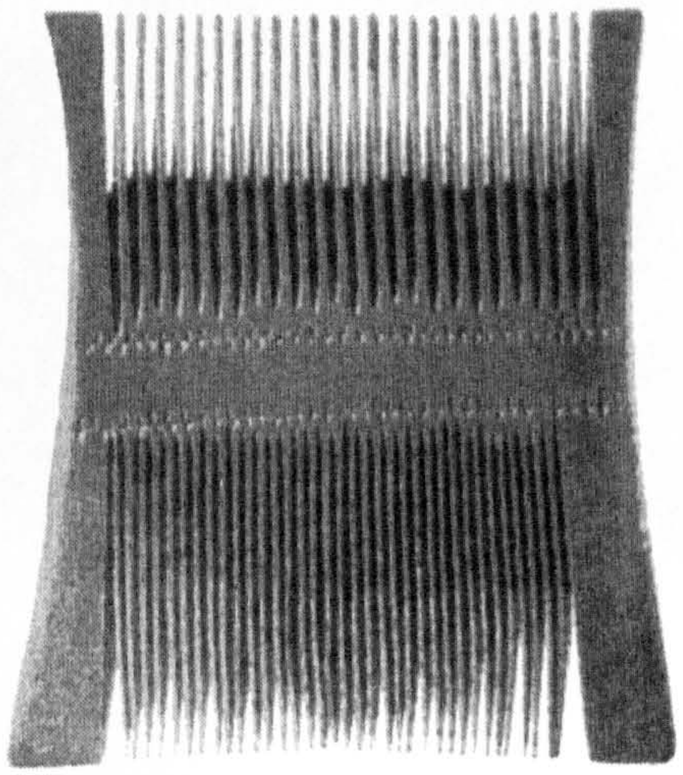

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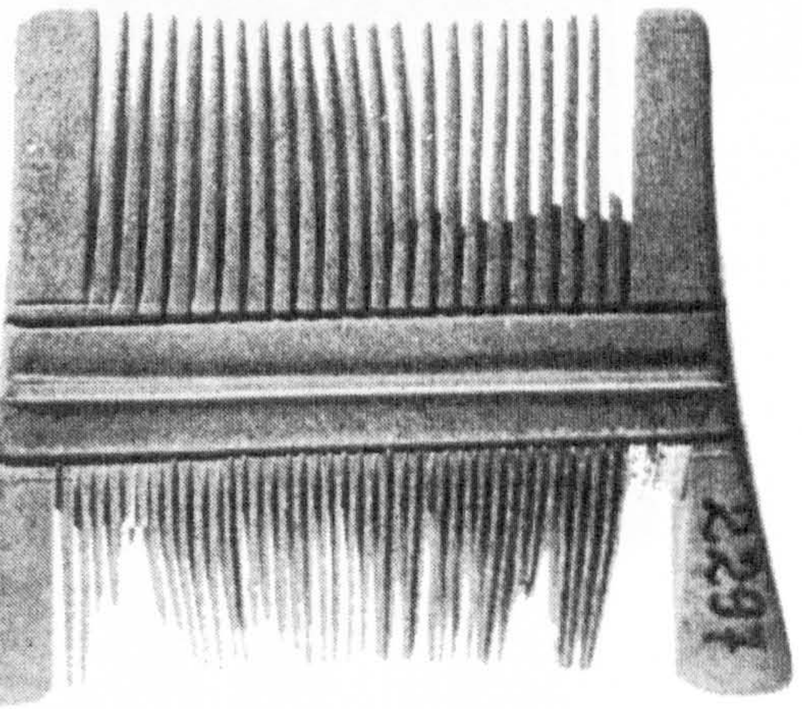

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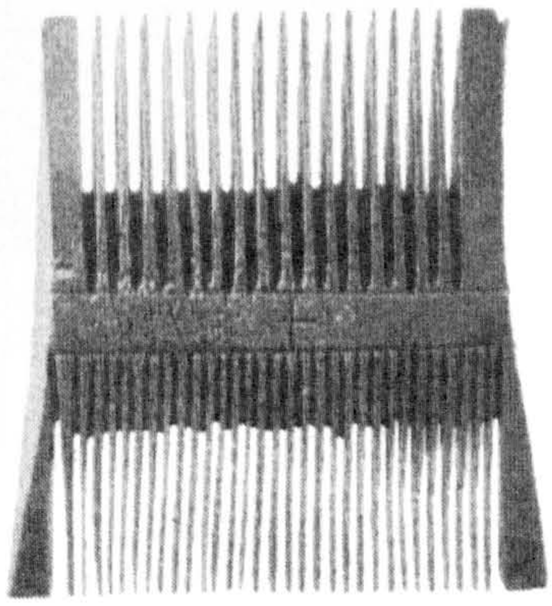

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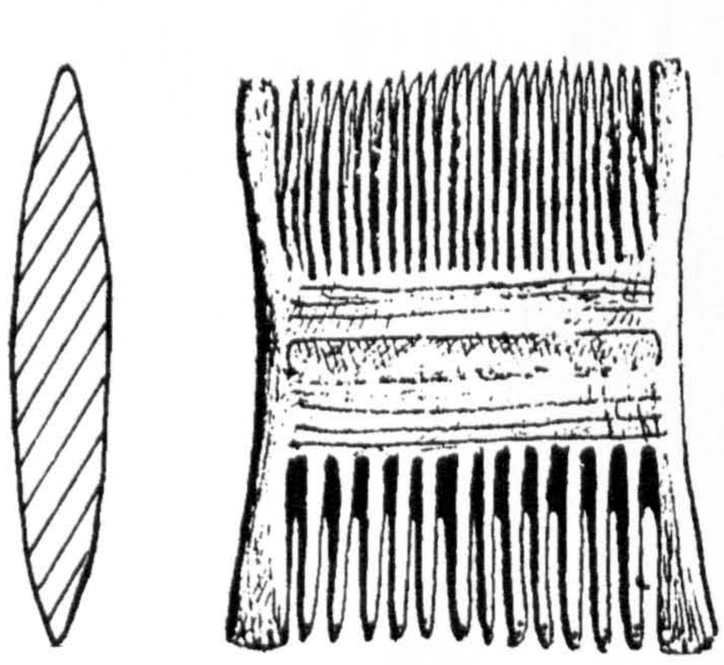

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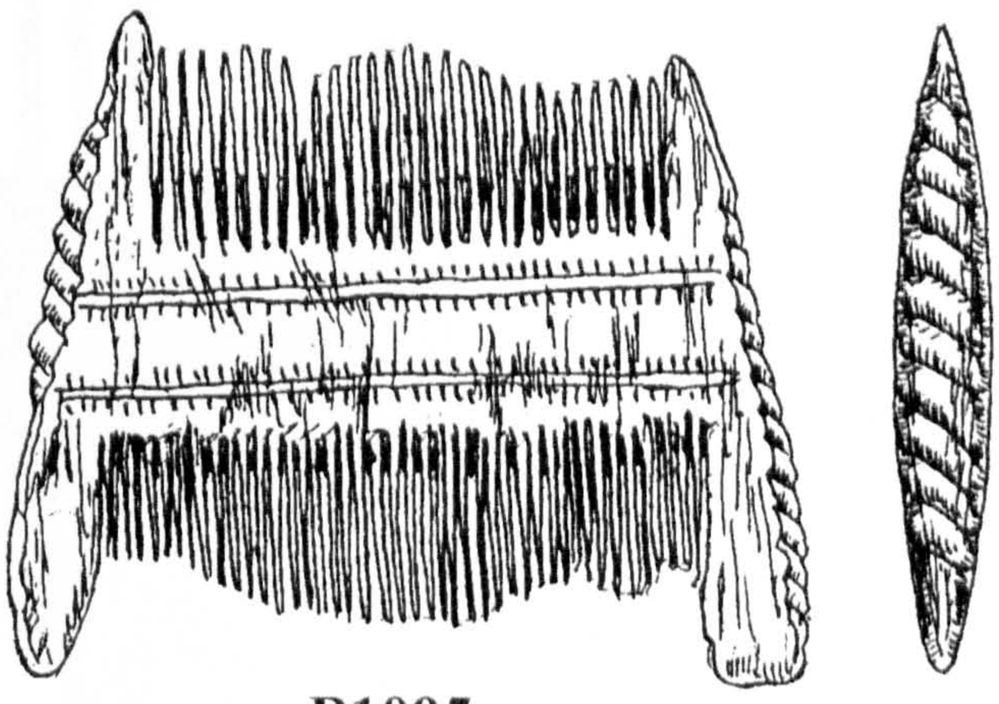

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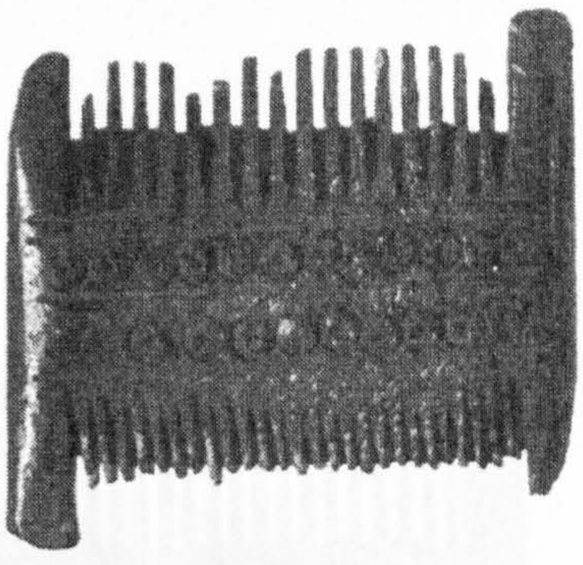
Fig. 4.43 Combs featuring marginal linear incisions combined with ring-and-dot motifs in the central zone



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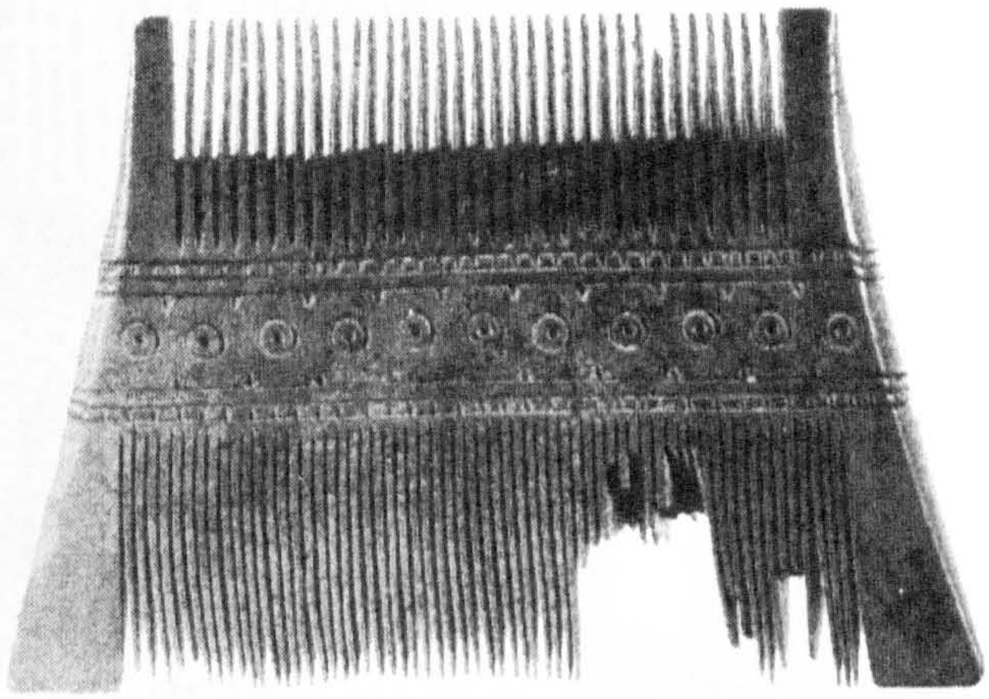

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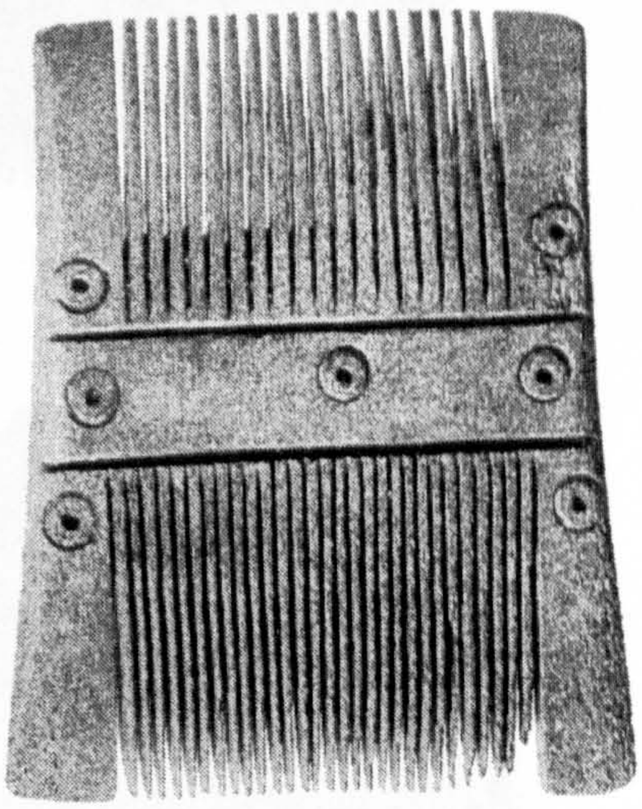

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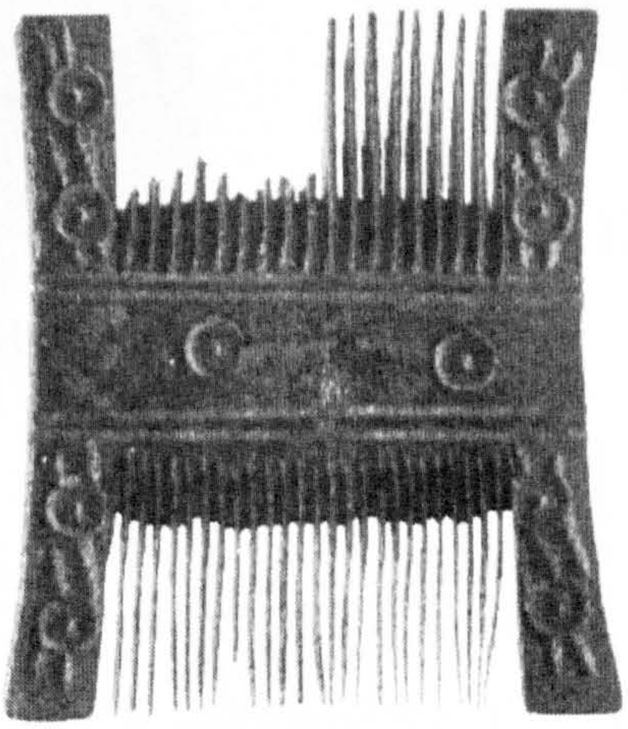

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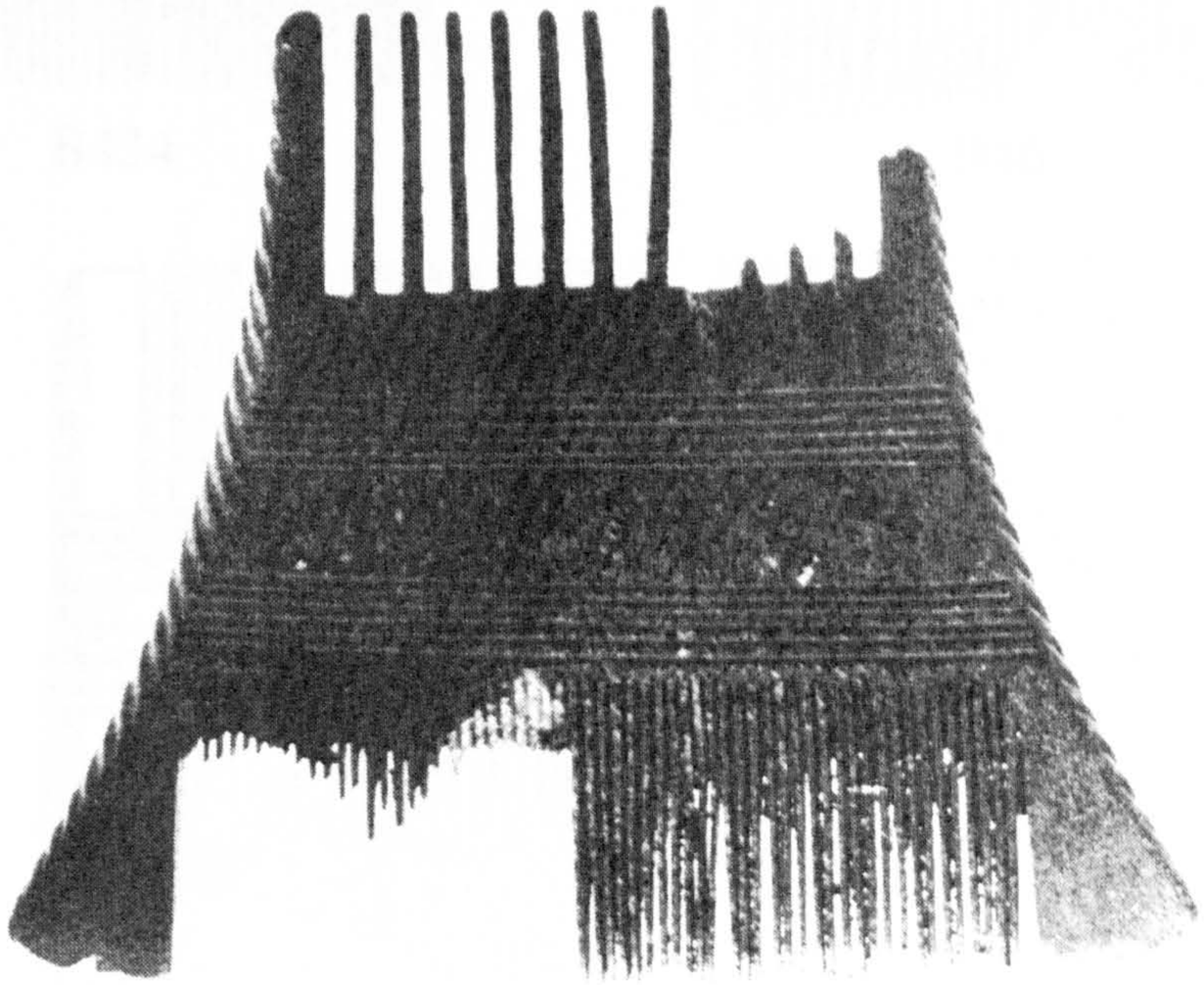

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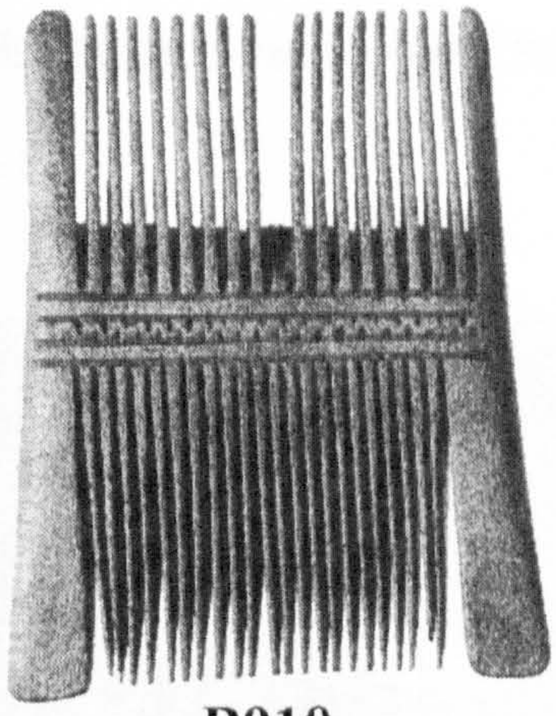
Fig. 4.44 11th and 12th century combs featuring central zones with meander patterns



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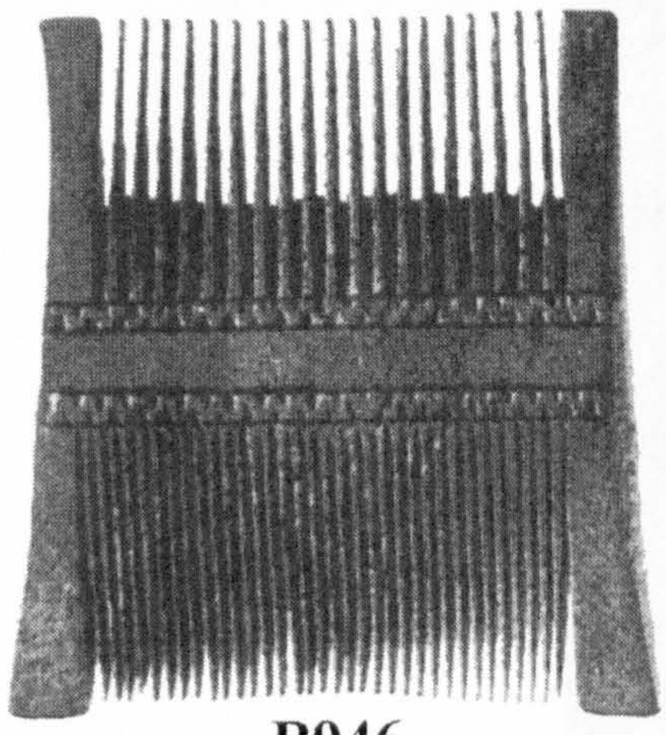

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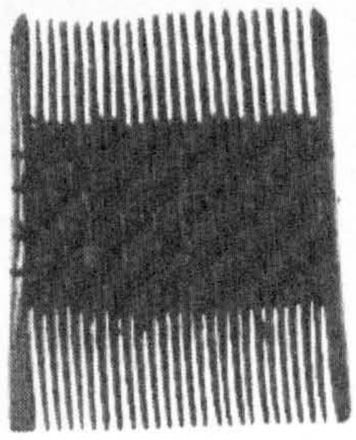

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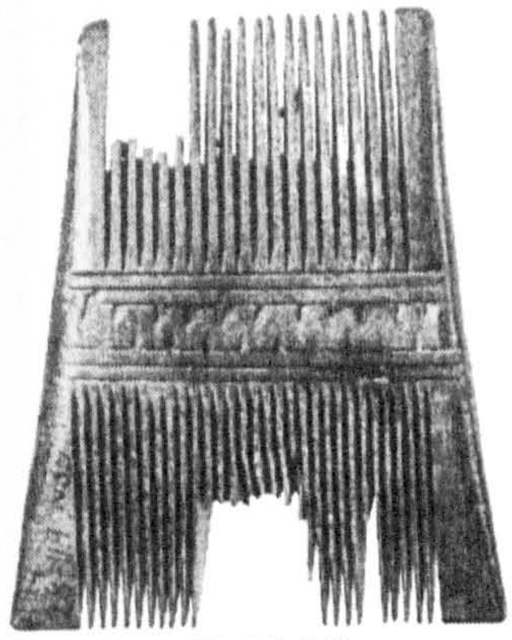

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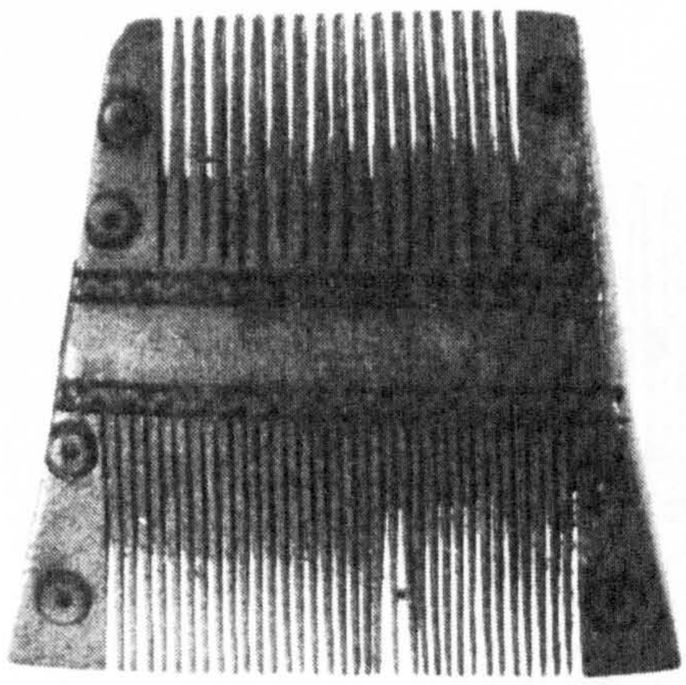

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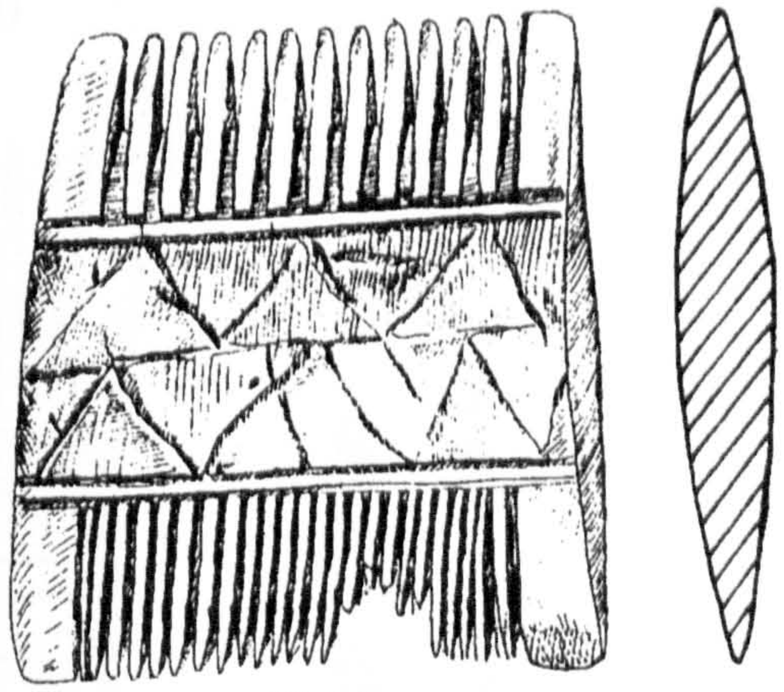

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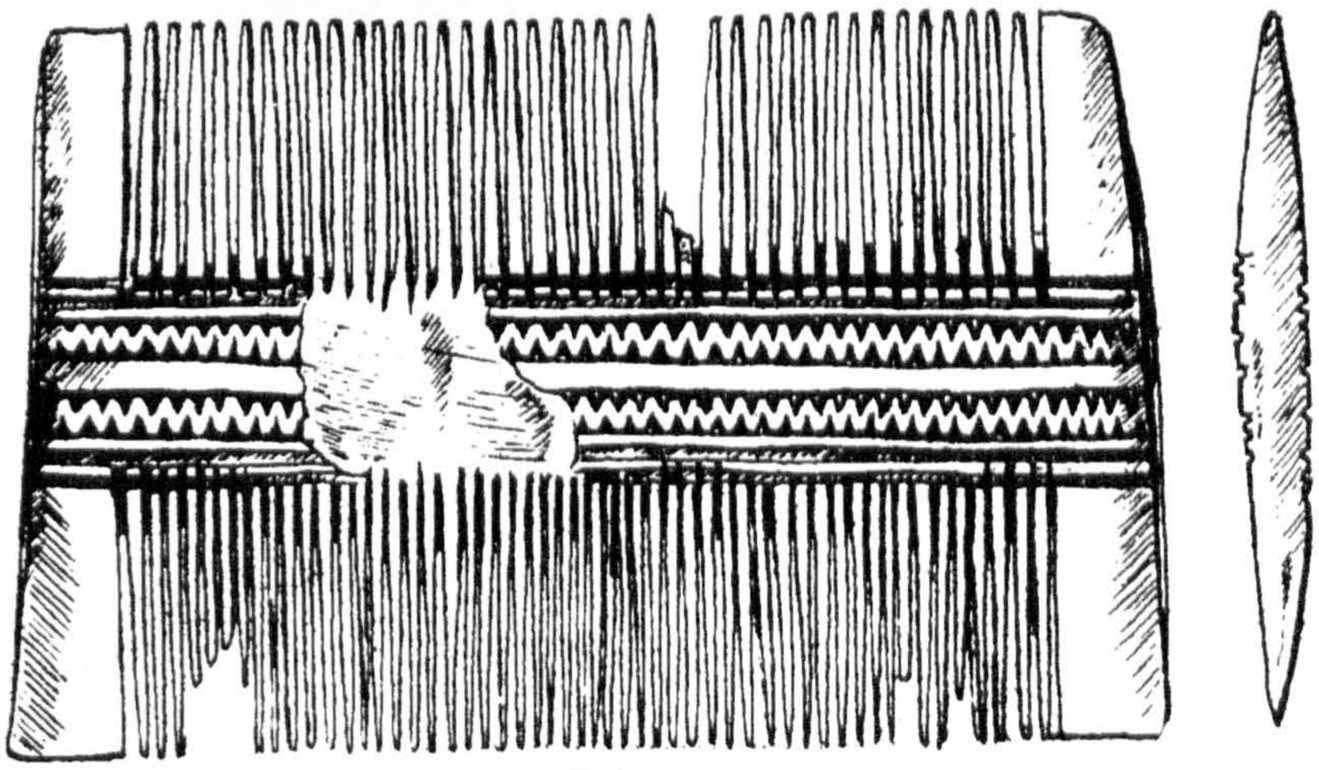
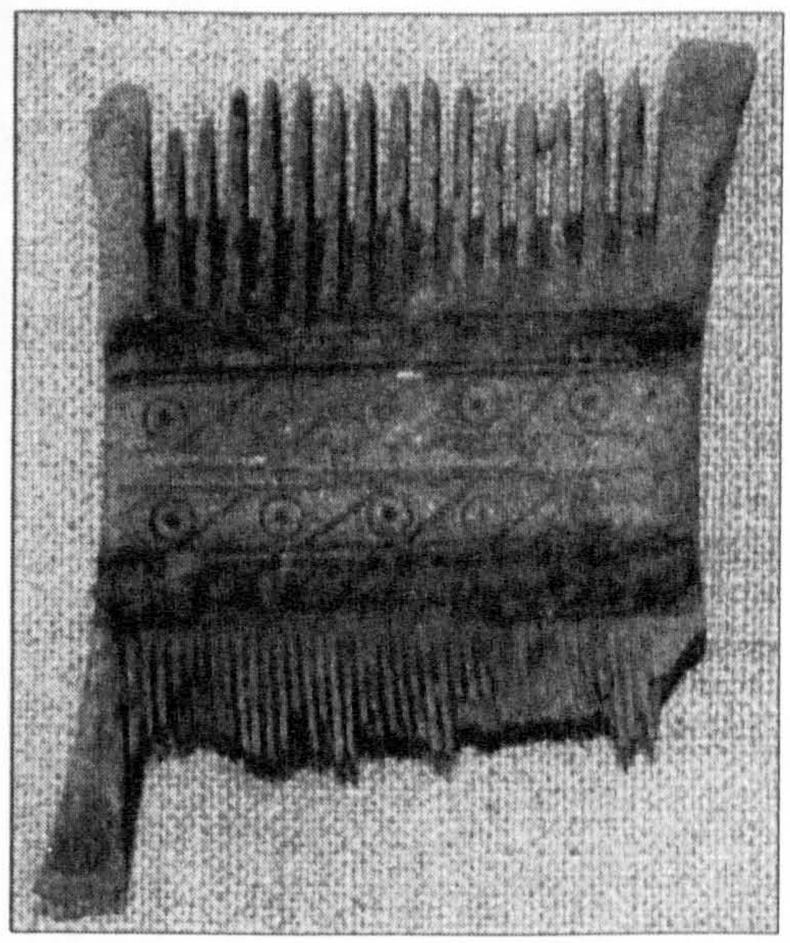


B305

Fig. 4.45 Mid-late 12th century comb with inlaid metal strips



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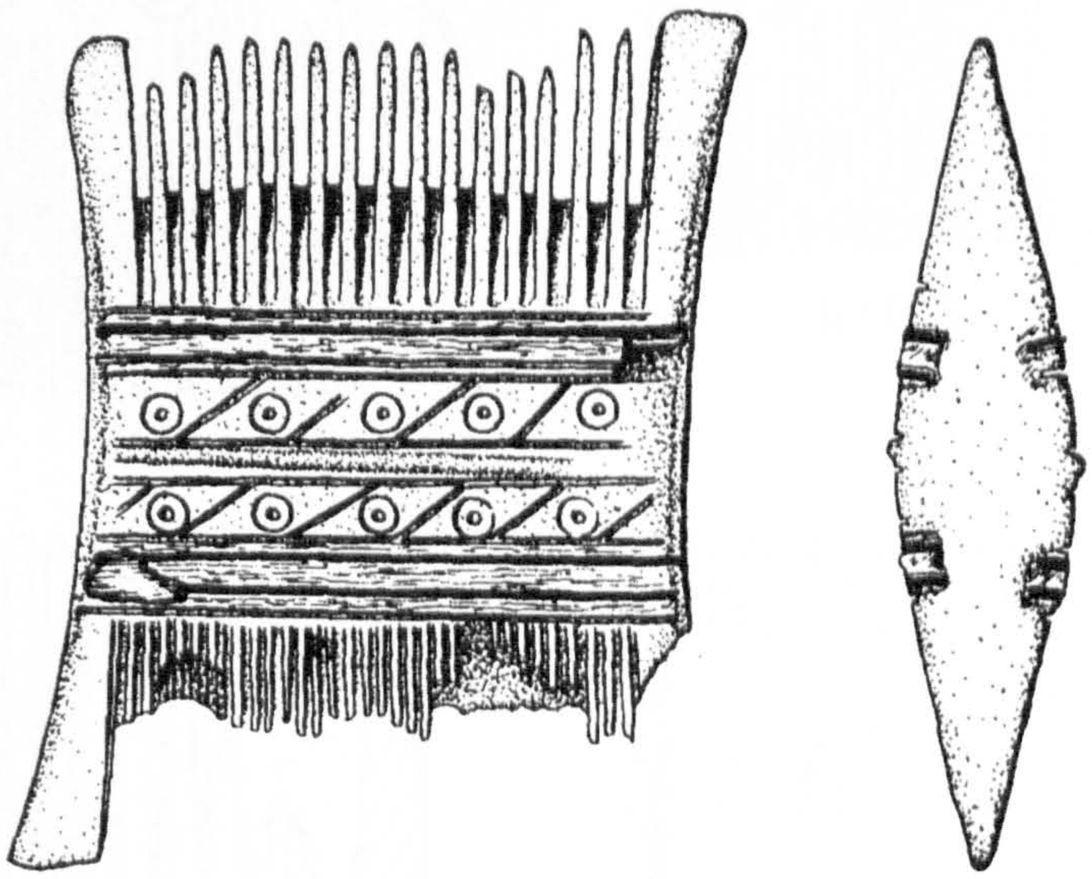
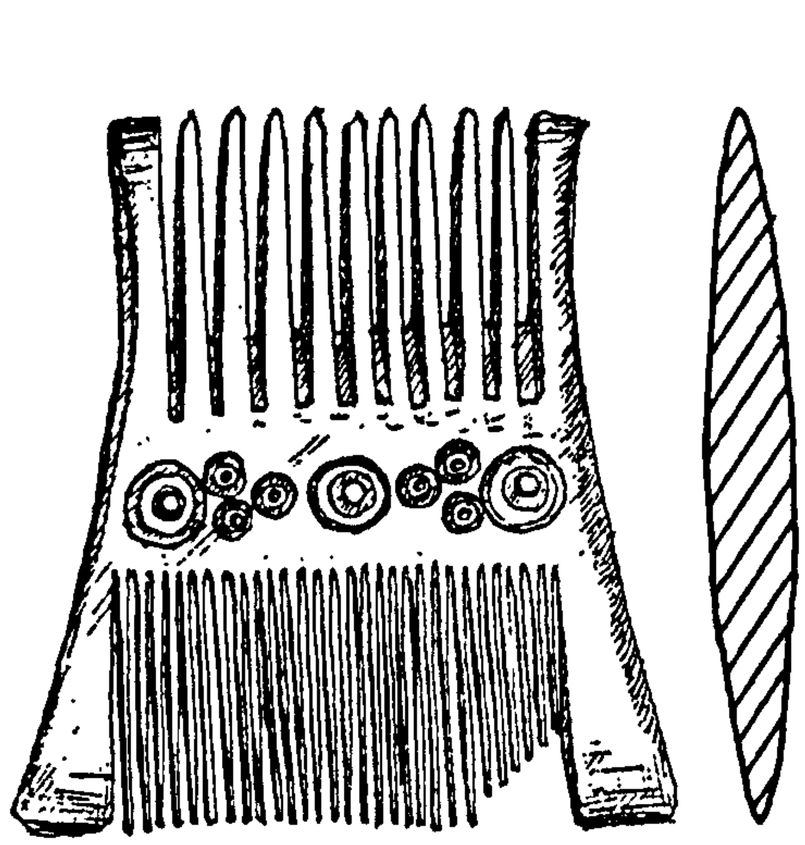


Fig. 4.46 Simple combs featuring central zones with common RDE pattern



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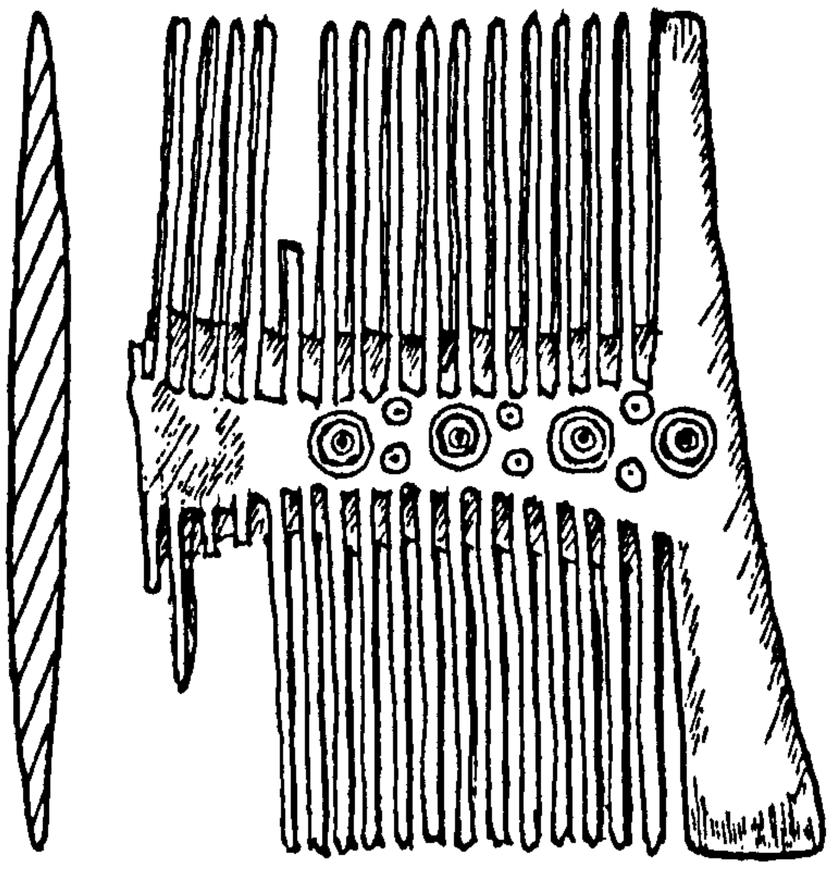

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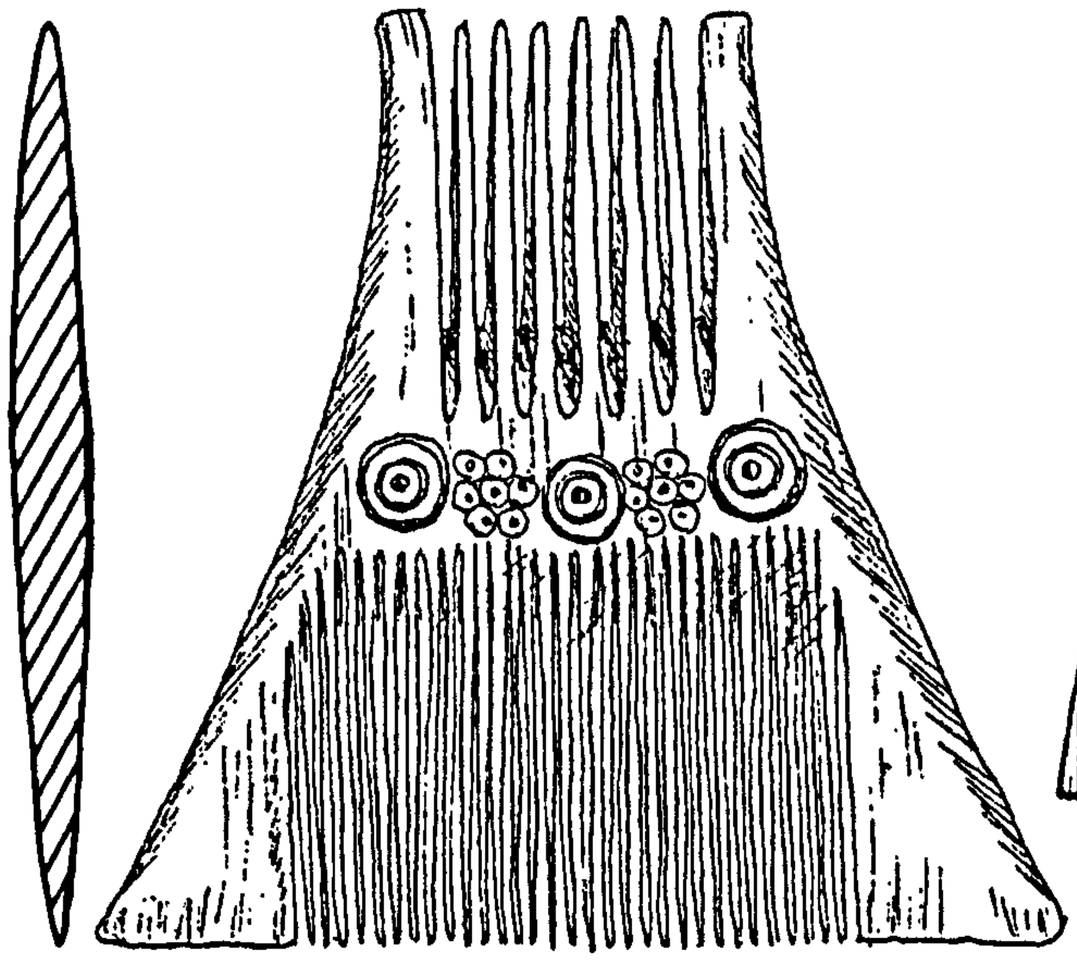

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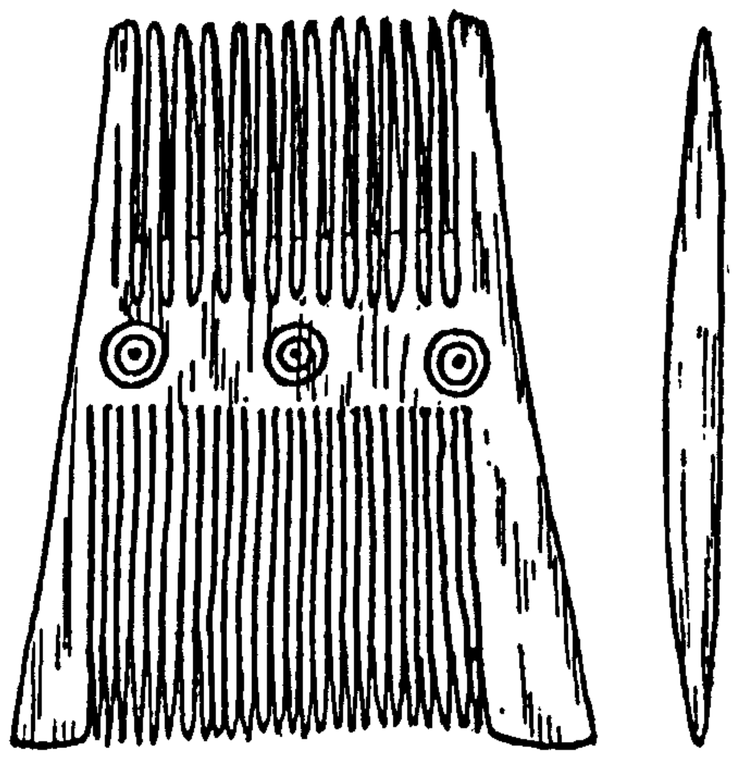

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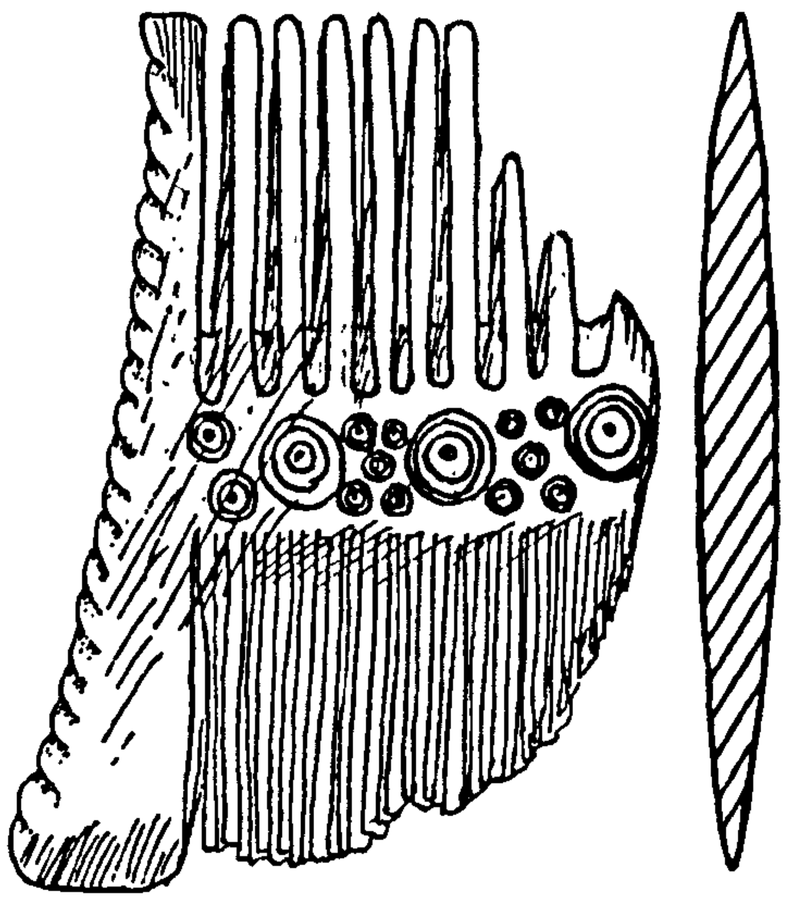

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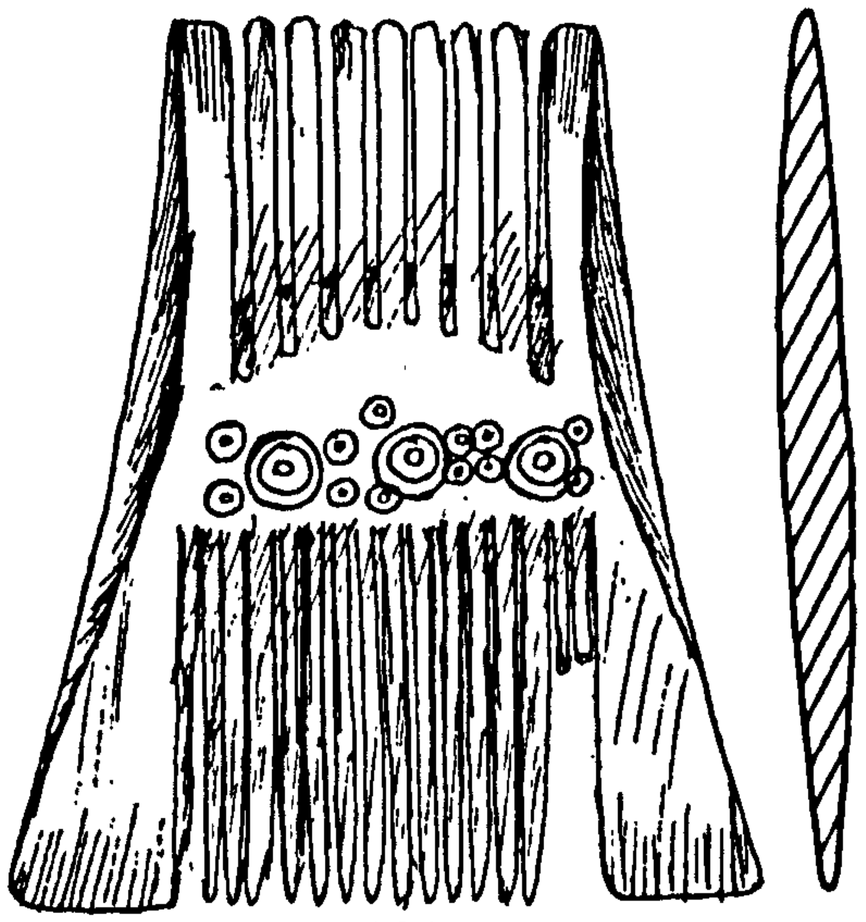
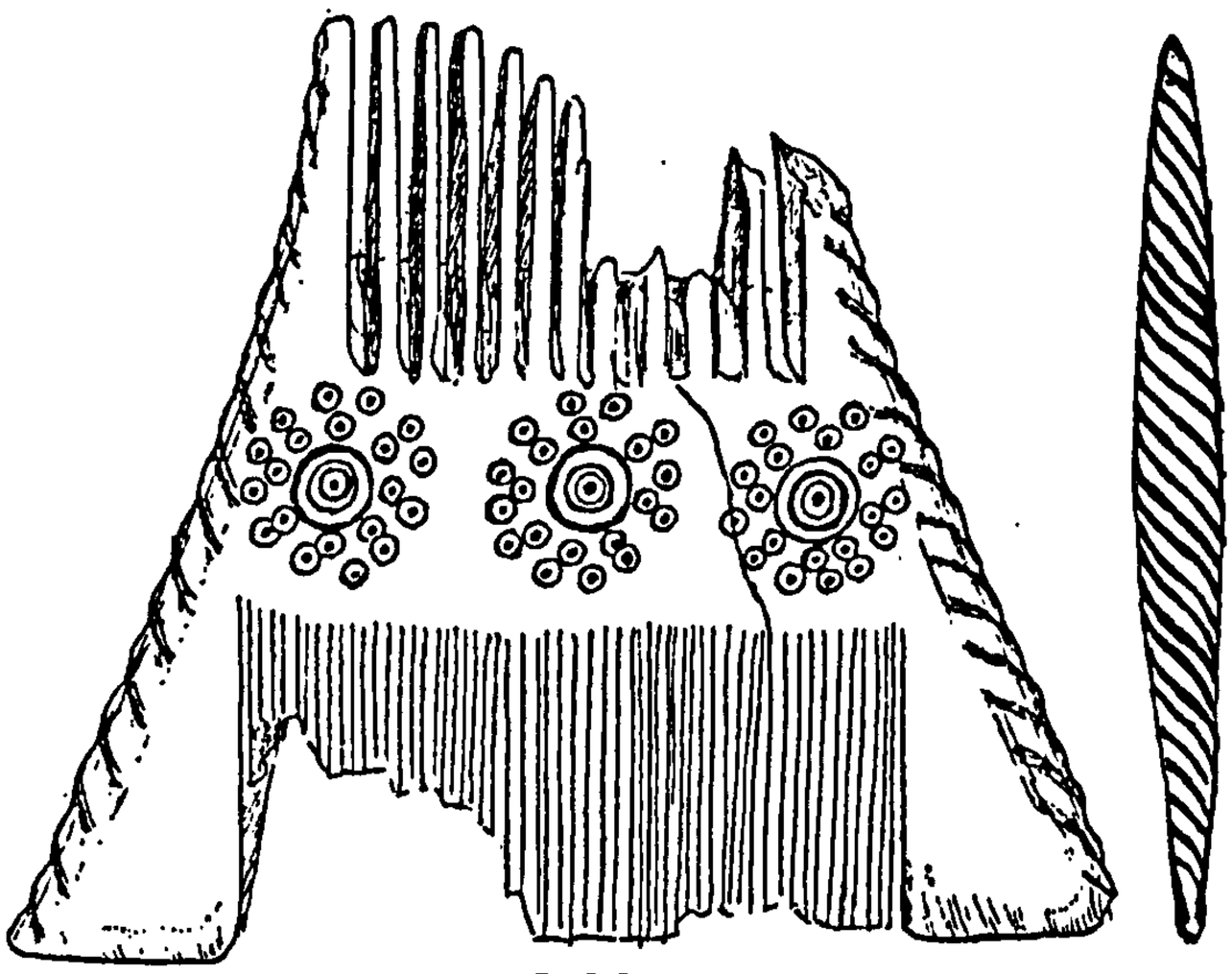


B1082

Fig. 4.47 Simple combs featuring central zones with RDF patterns



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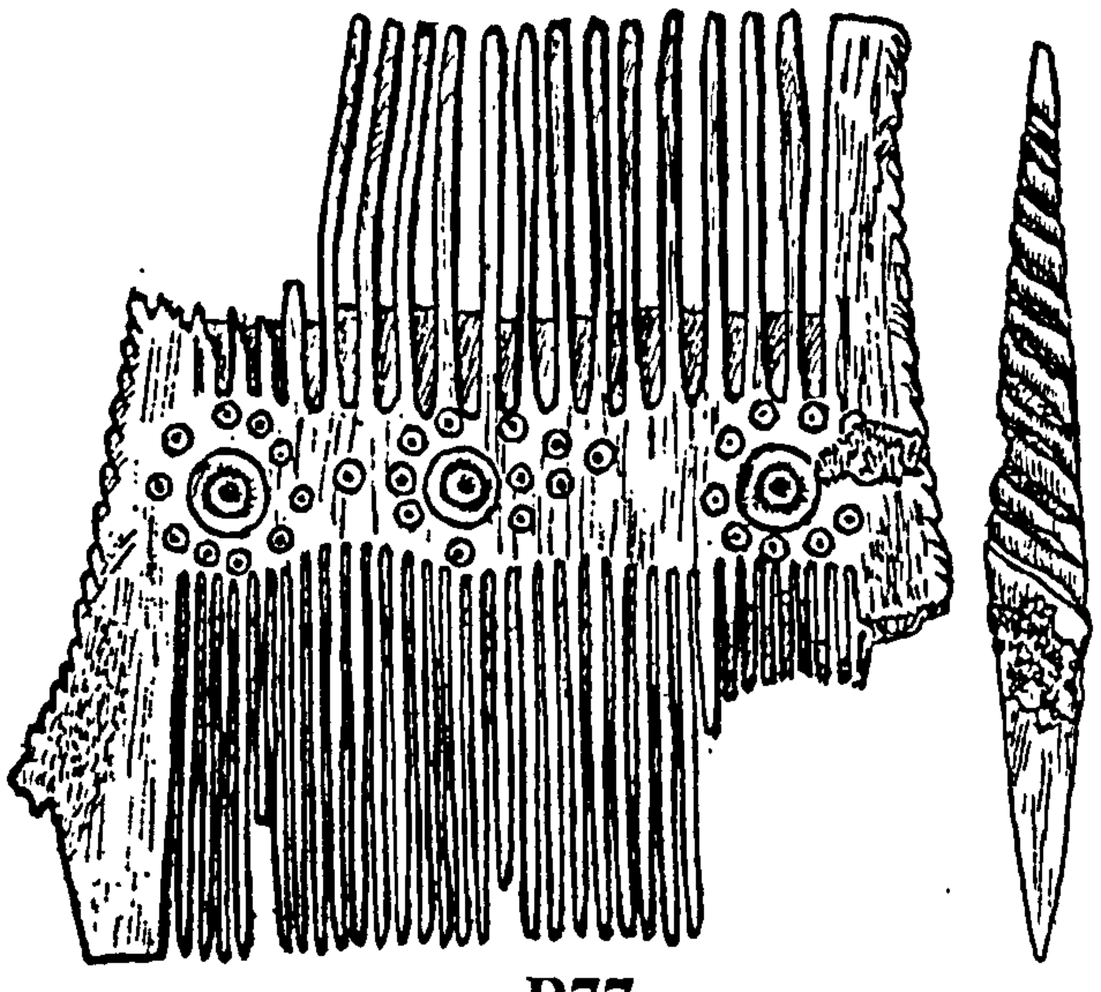

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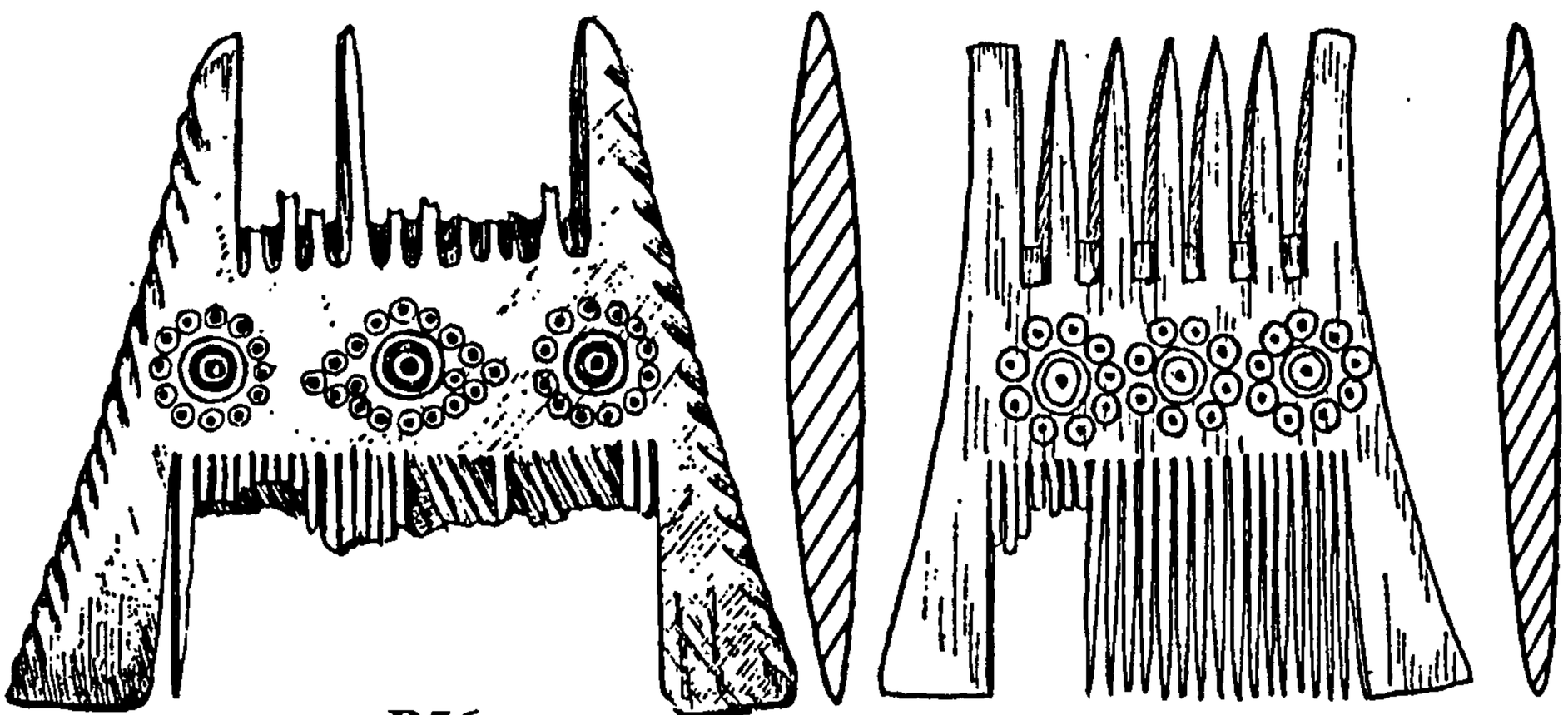
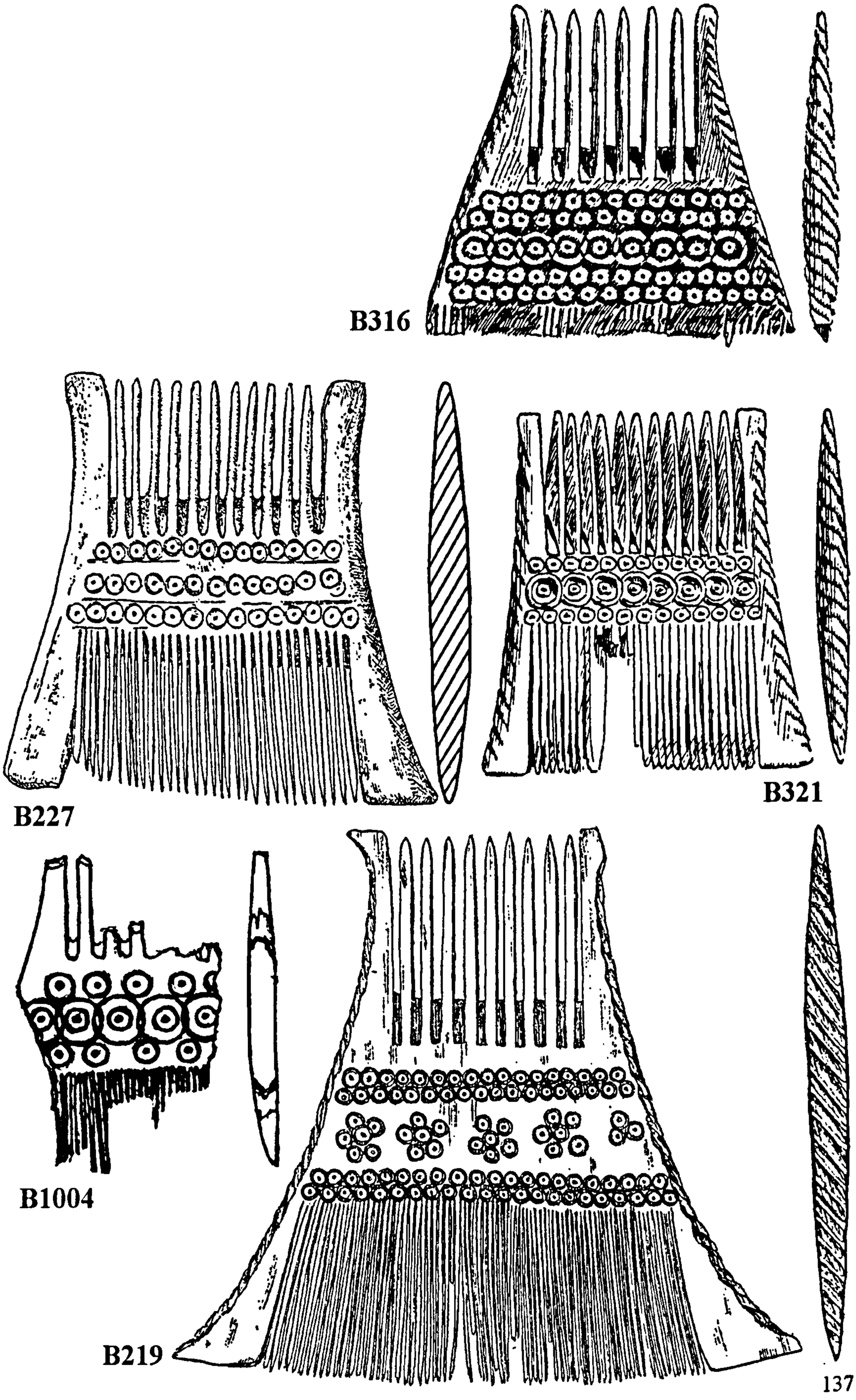


B56

B202

Fig. 4.48 Simple combs featuring central zones with RDC patterns



B316

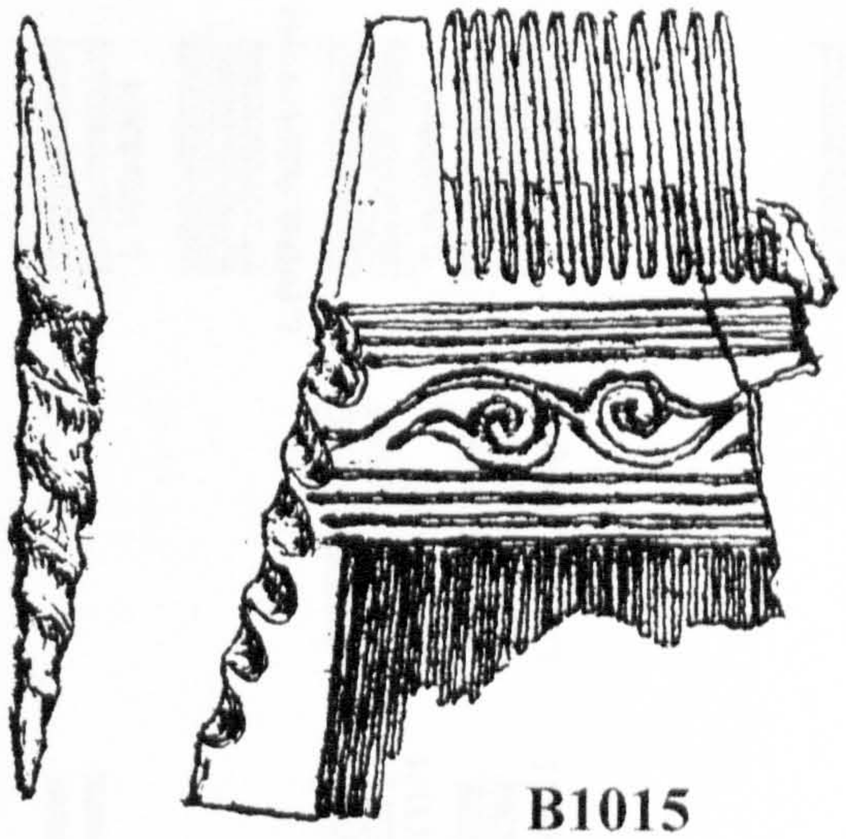
B227

B321

B1004

B219

Fig. 4.49 Rare types of decorative motifs and patterns on simple combs in skeletal materials



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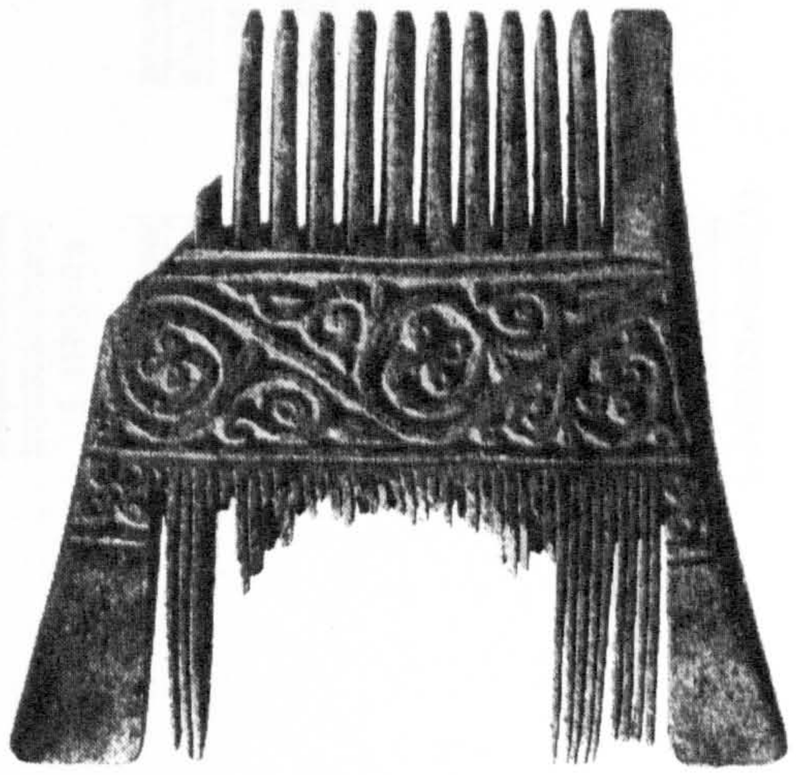

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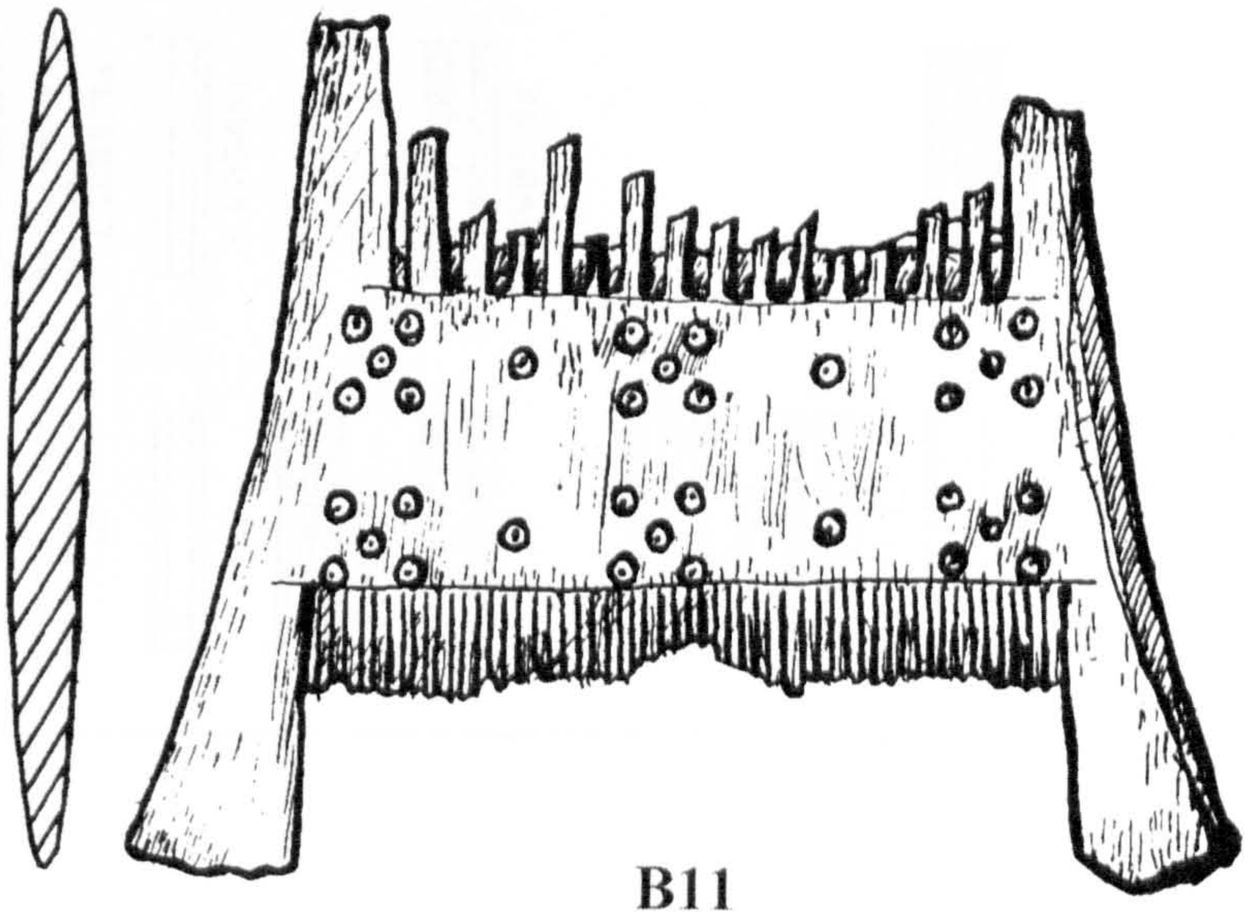

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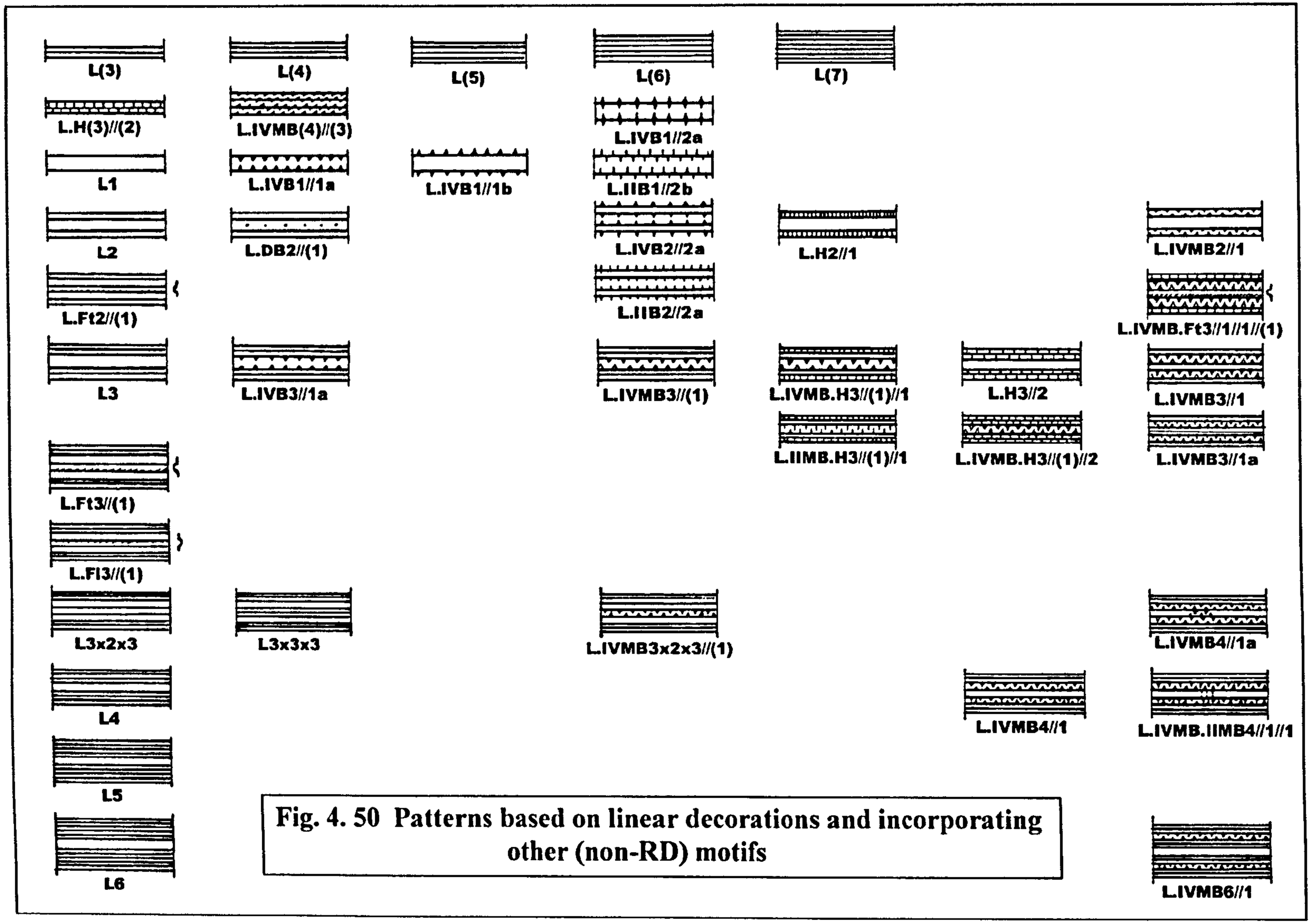


Fig. 4. 50 Patterns based on linear decorations and incorporating other (non-RD) motifs

Fig. 4.51 Patterns incorporating linear and RDE decorations (L.RDE patterns)

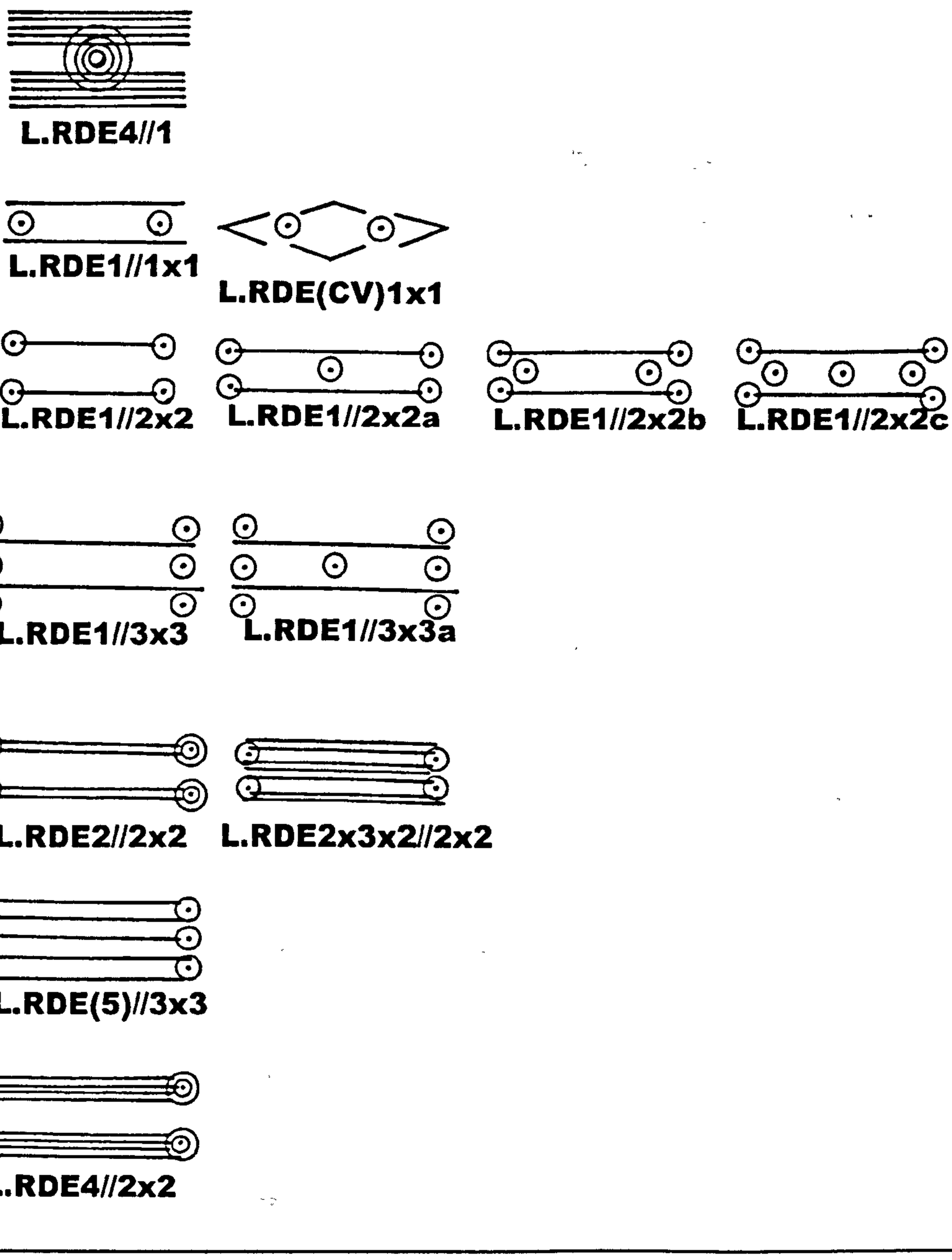


Fig. 4.52 Patterns incorporating linear and RDB decorations (L.RDB patterns)

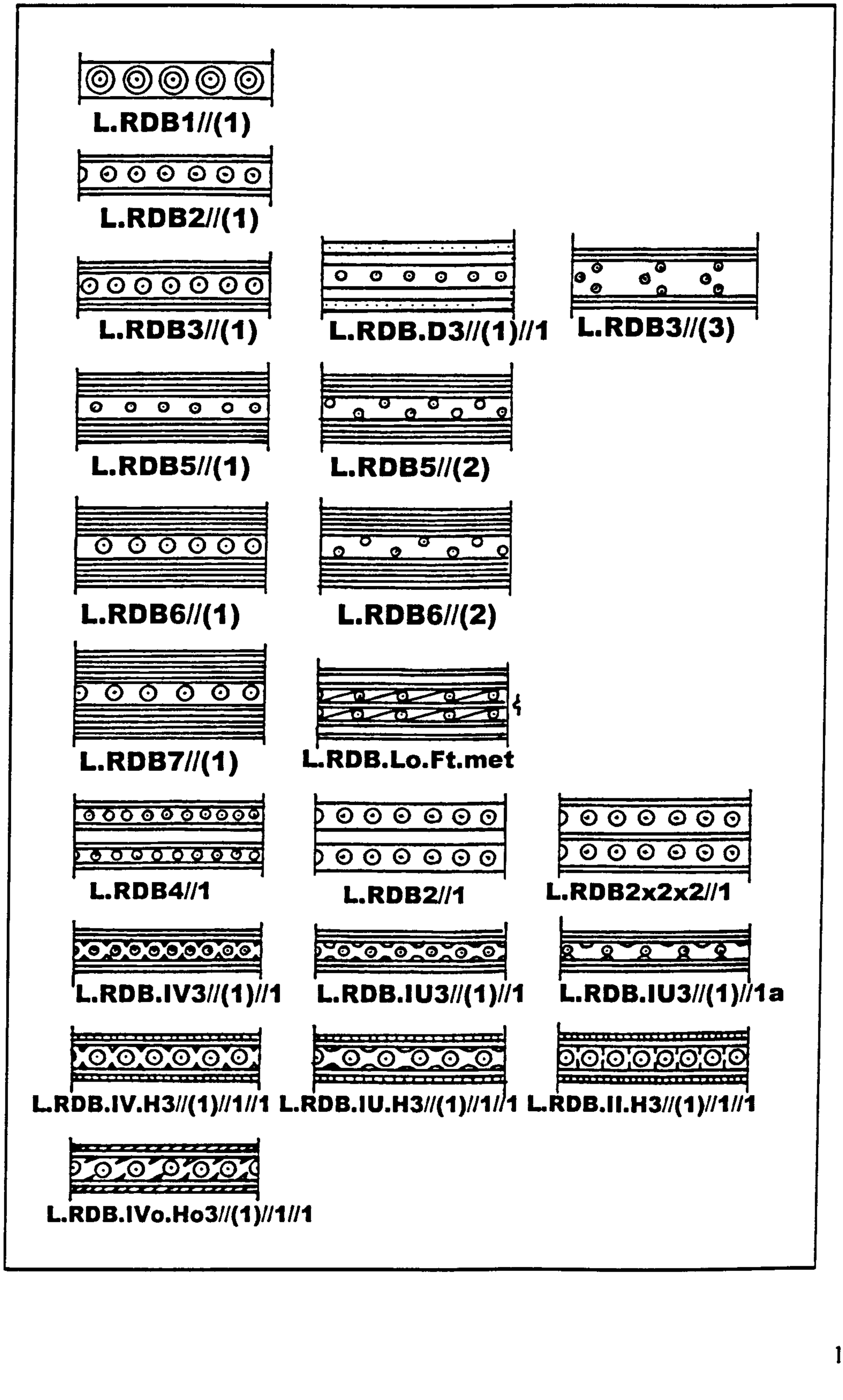


Fig. 4.53 RDE patterns

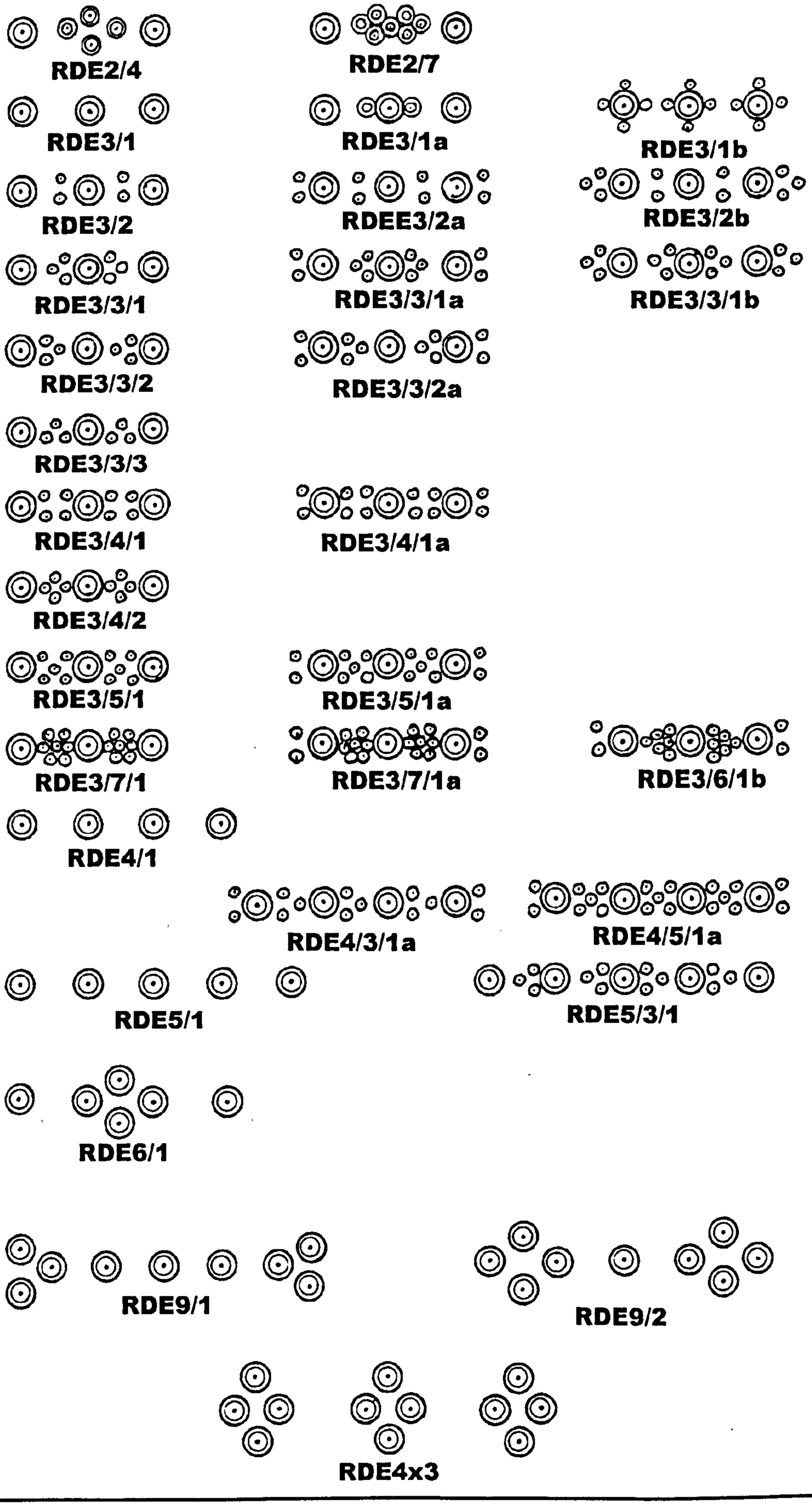


Fig. 4.54 RDF patterns

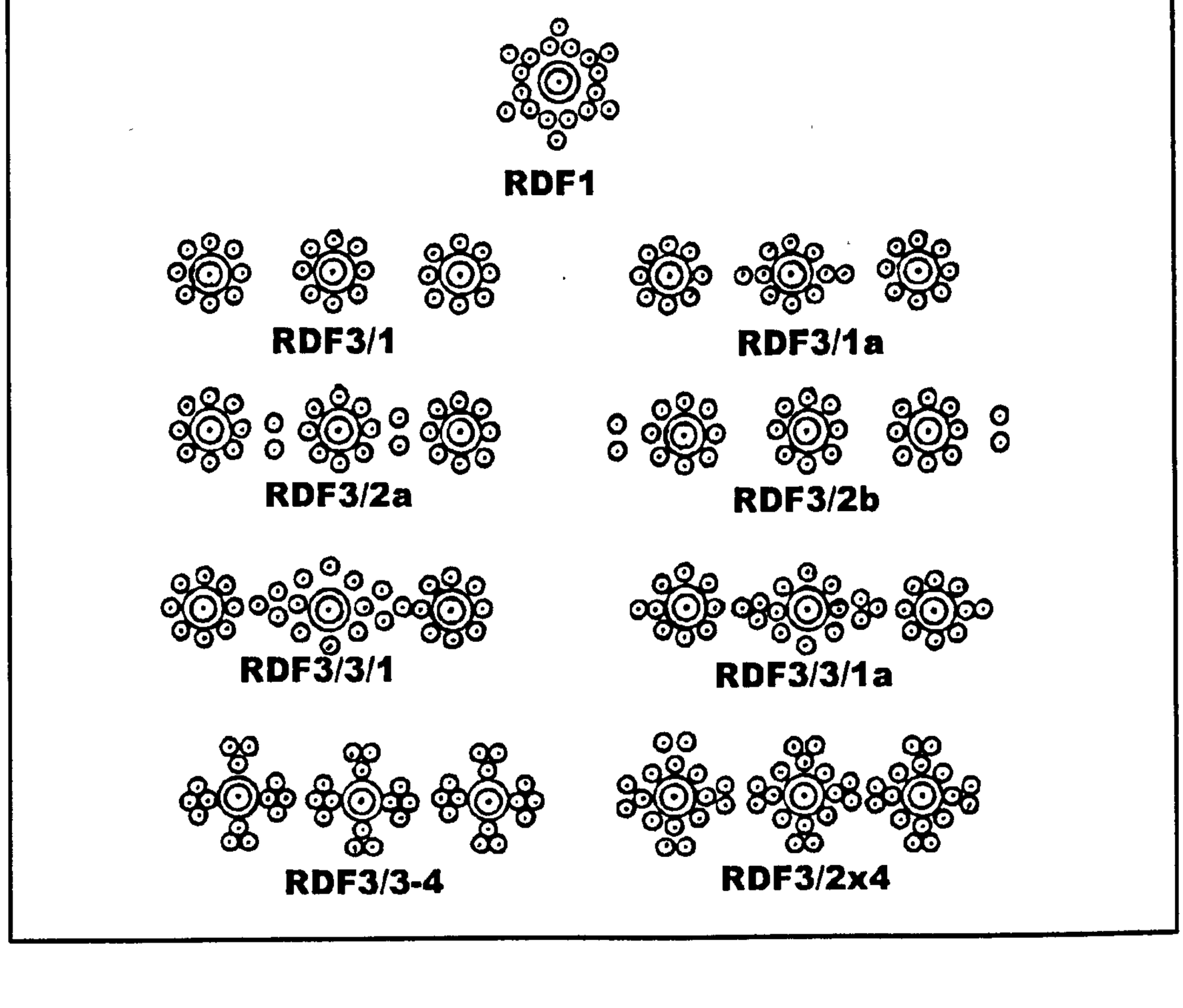


Fig. 4.55 RDC patterns

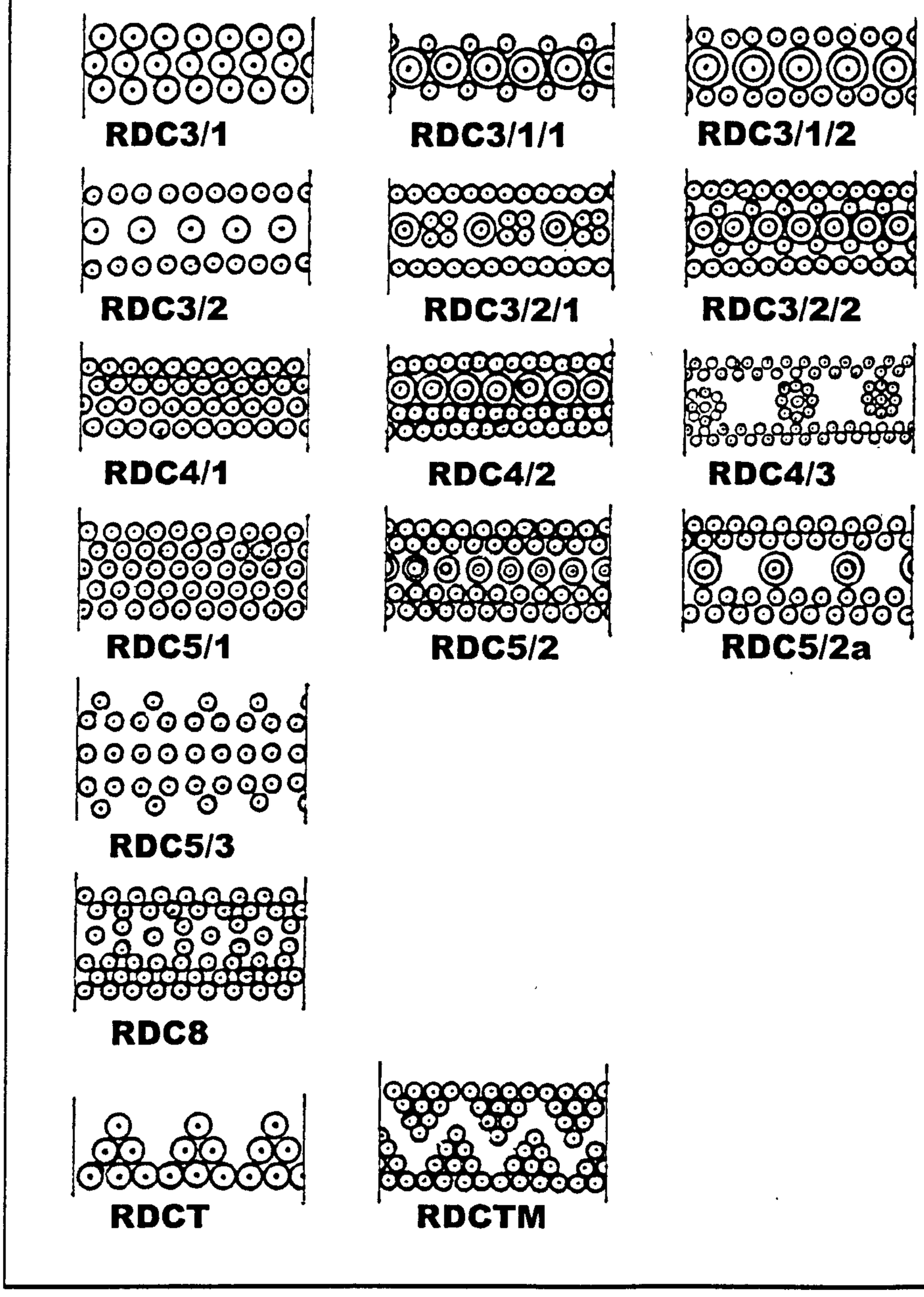


Fig. 4.56 Forms of simple combs featuring central zones with ornamental patterns based on linear decorations

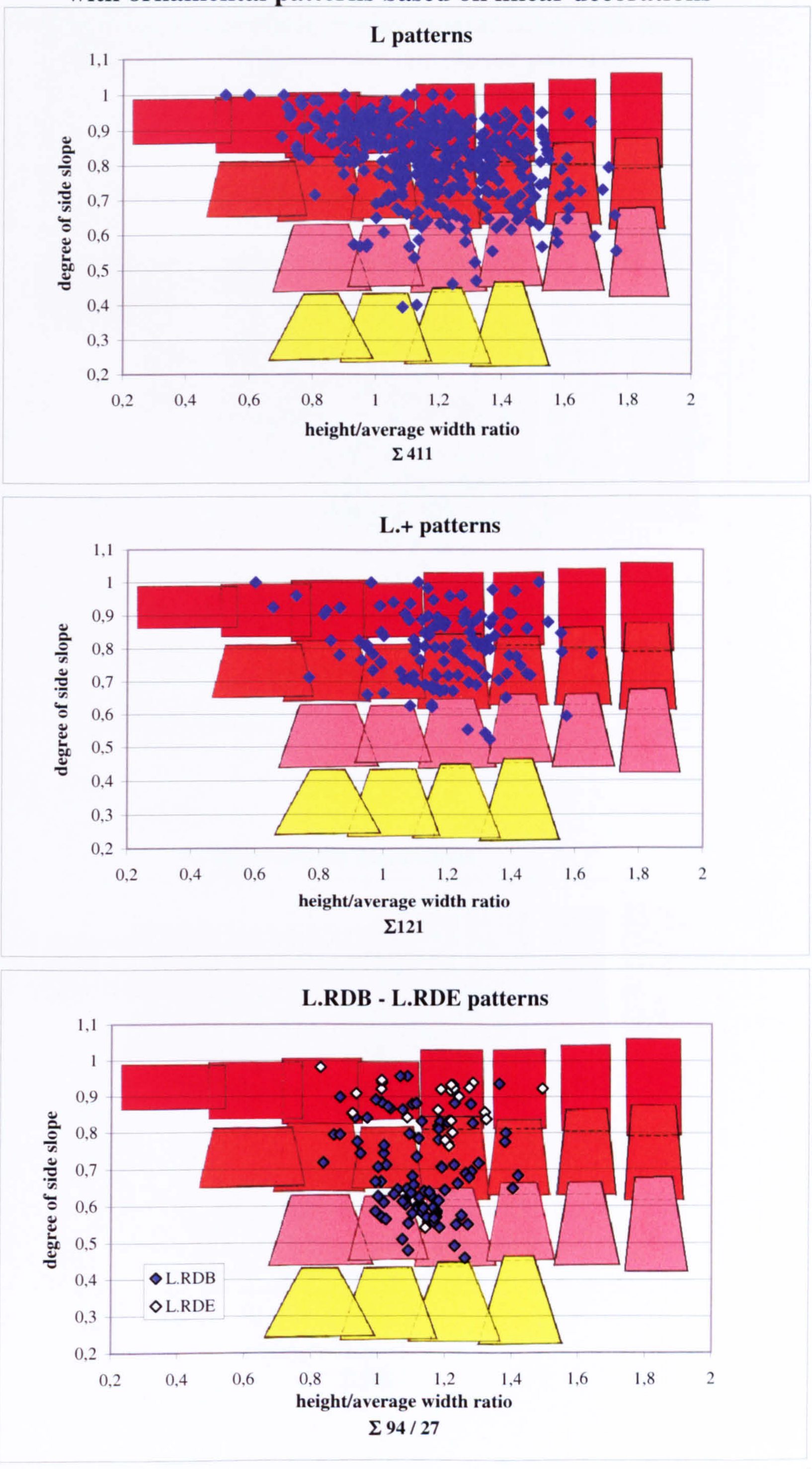
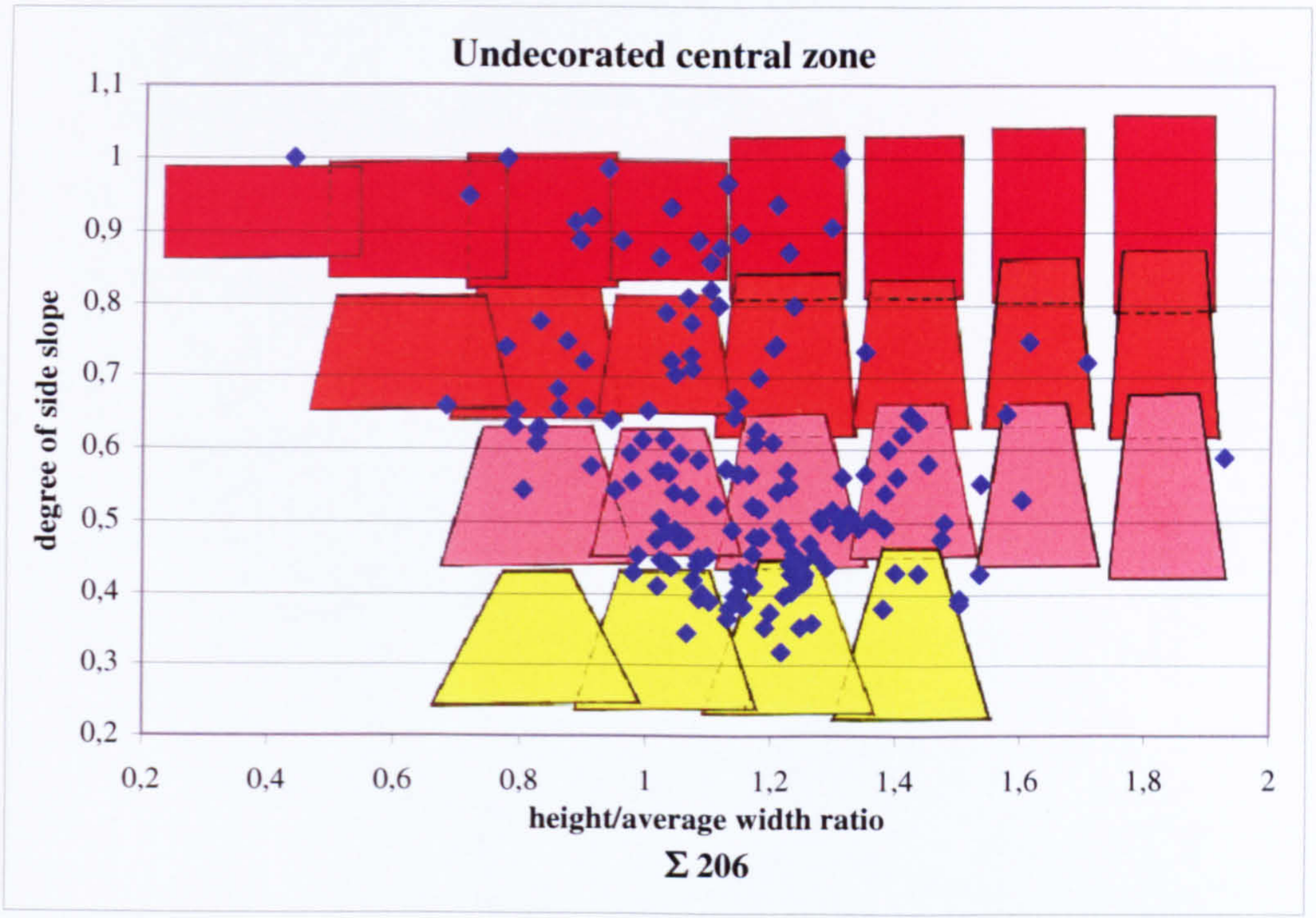


Fig. 4.57
Forms of simple combs featuring central zones with no decoration or ring-and-dot non-linear patterns



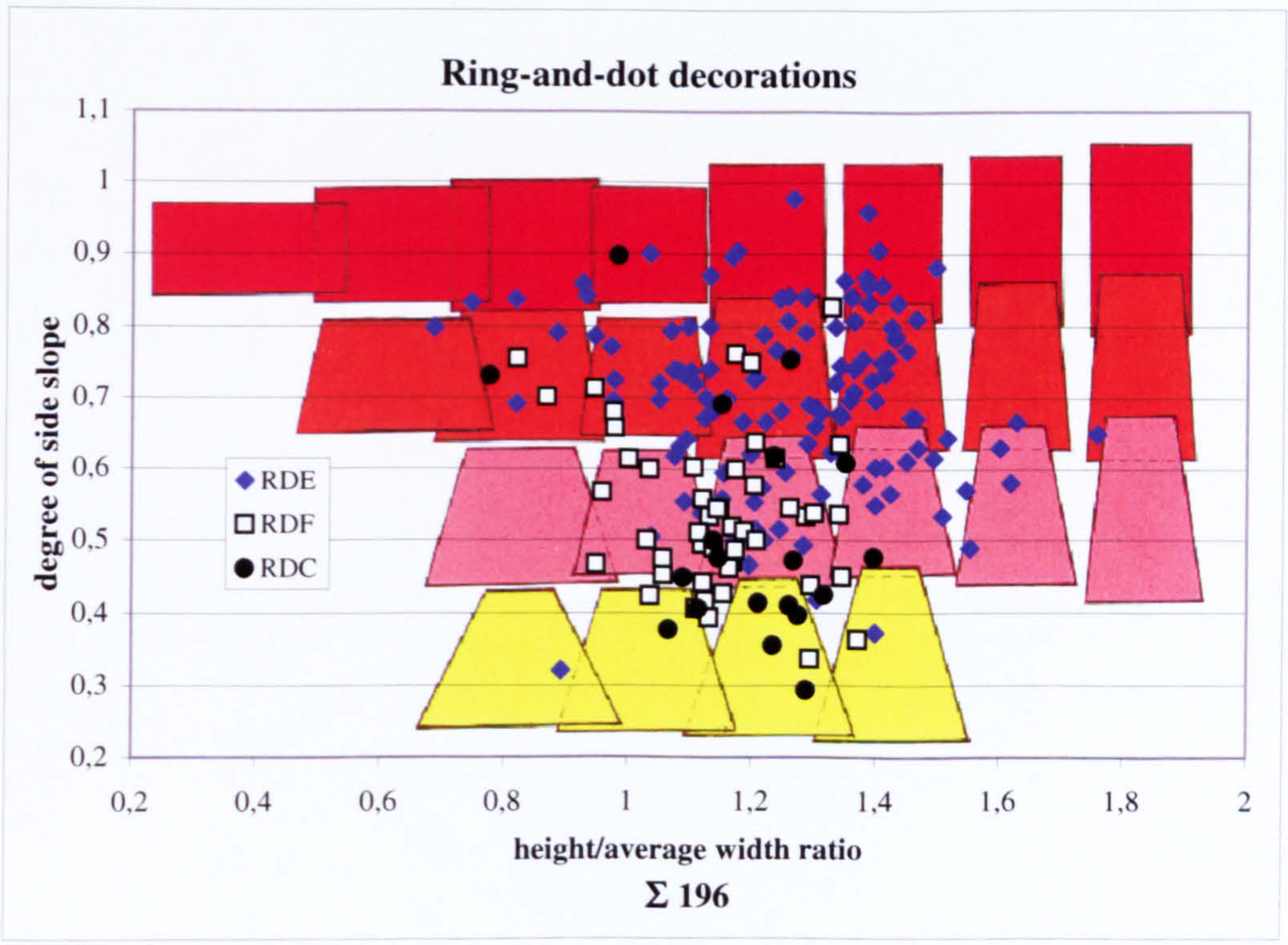
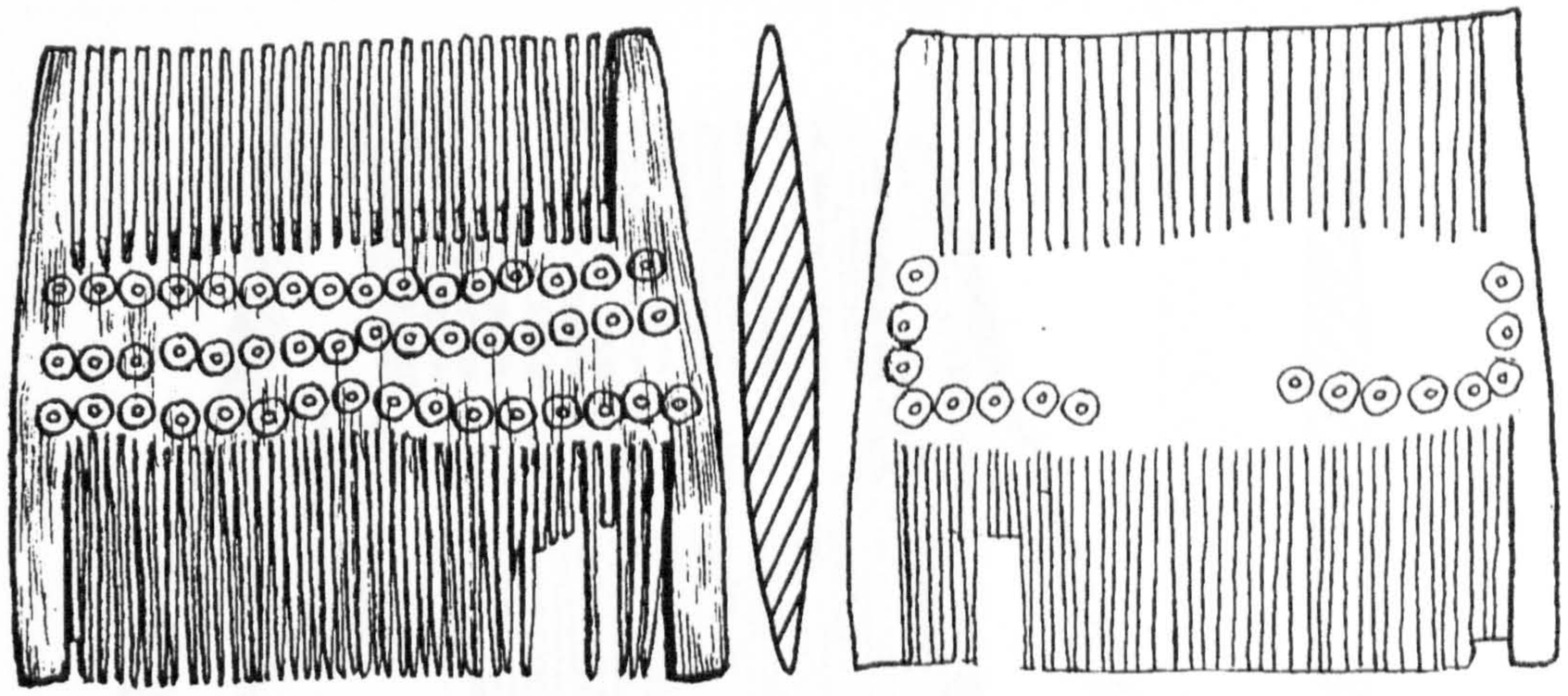


Fig. 4.58 Combs featuring faces decorated differently



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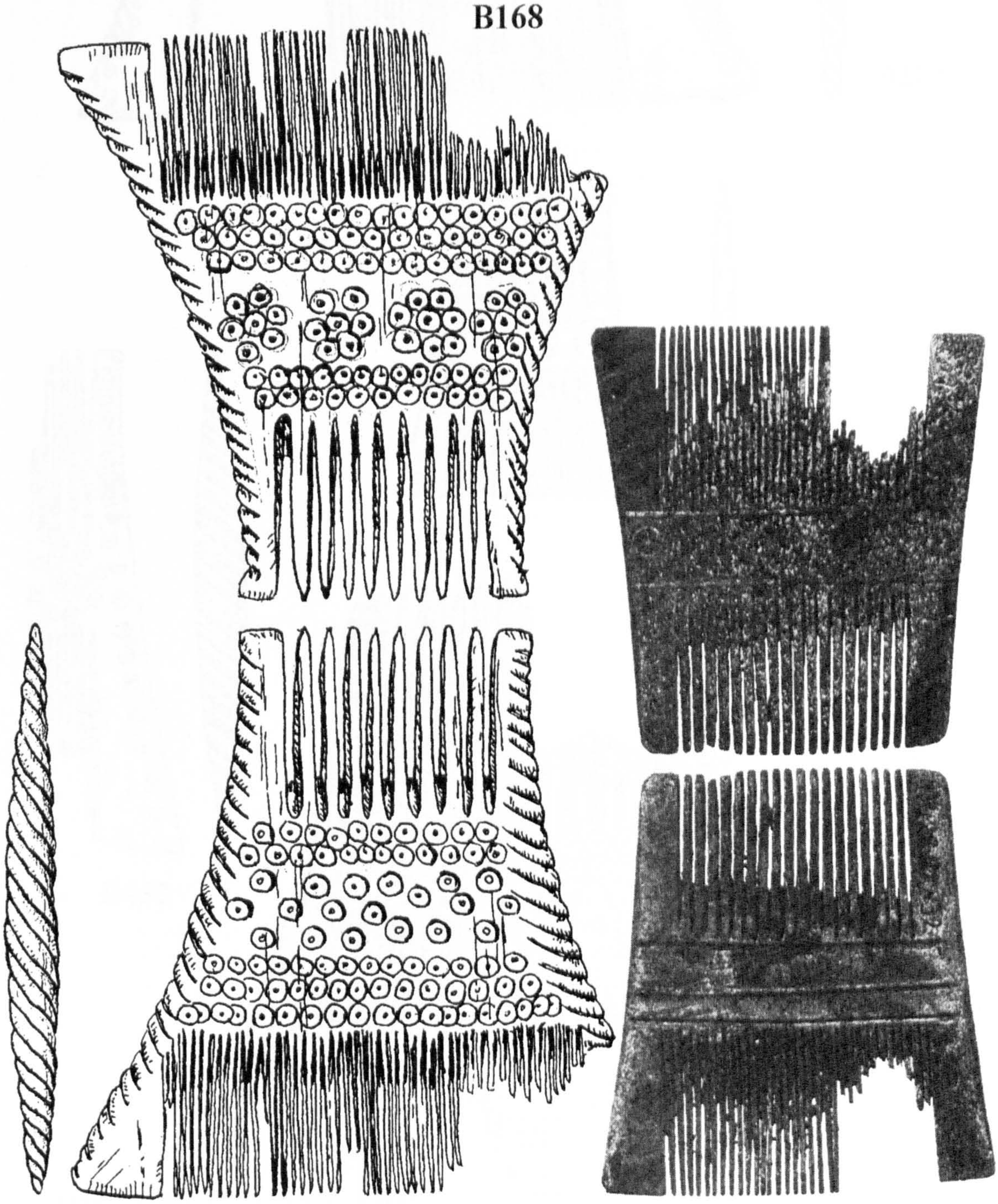
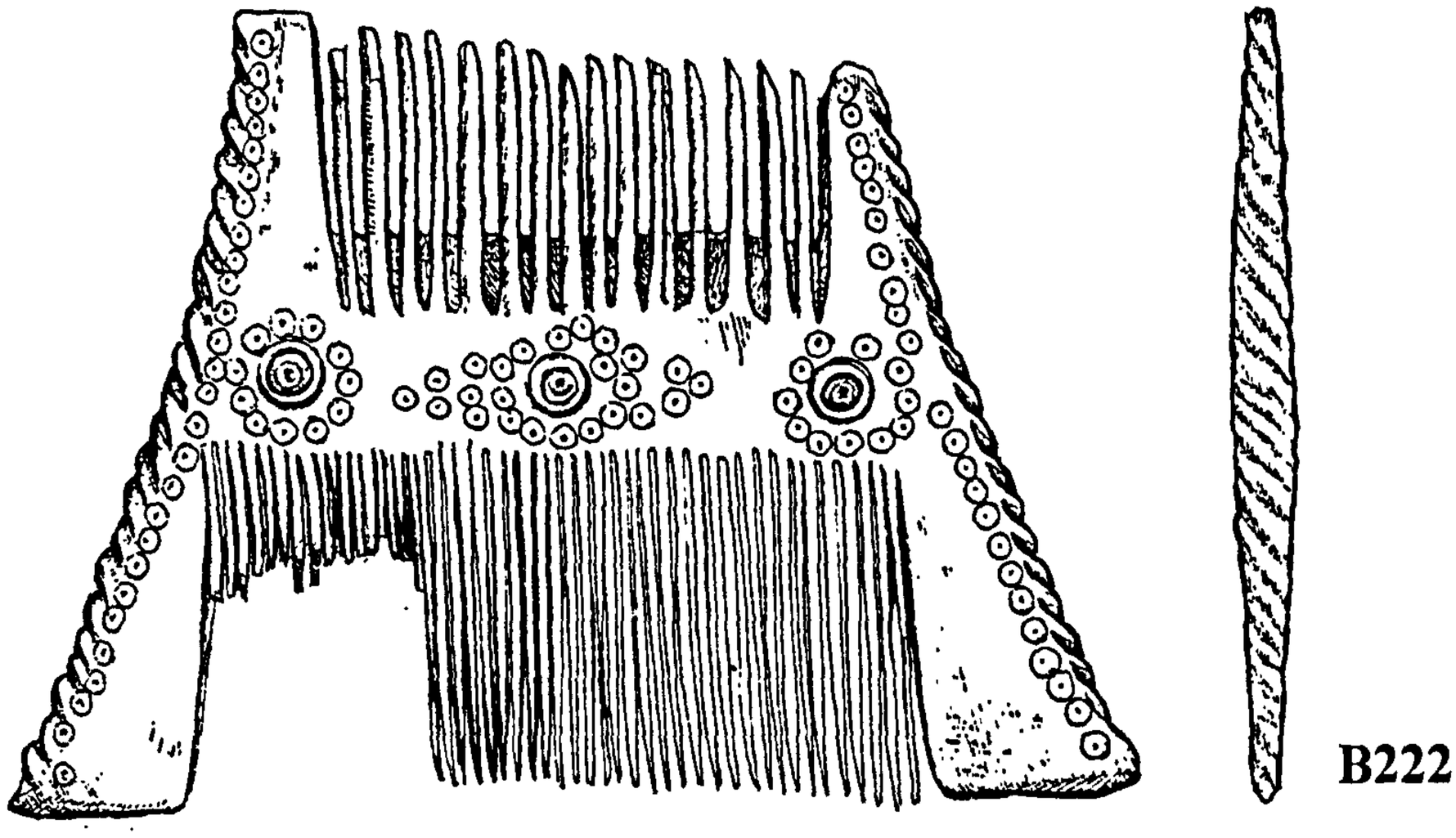


B1088

B1227

Fig. 4.59 Combs with decorated sides of faces



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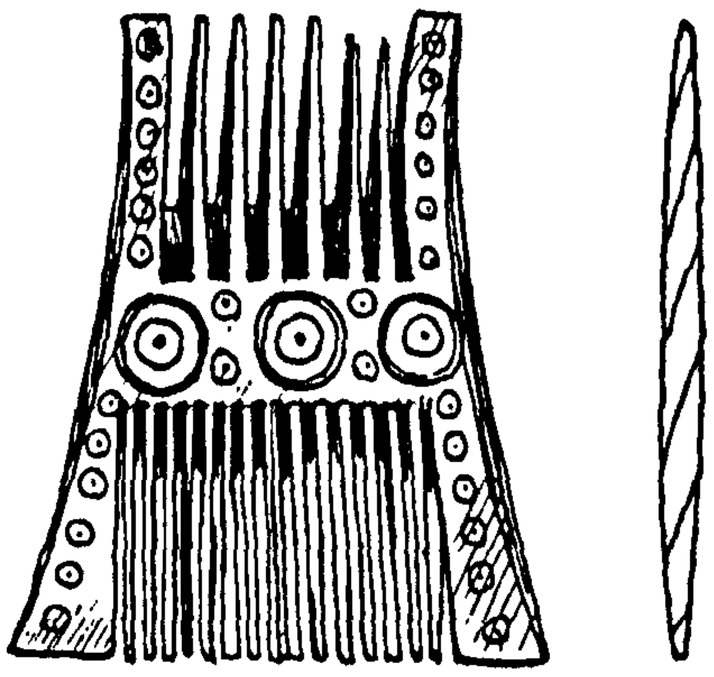

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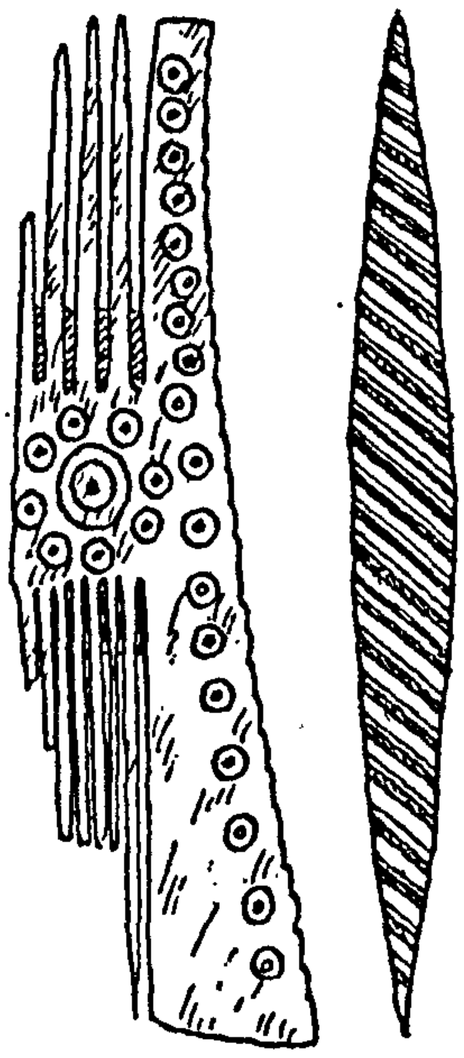

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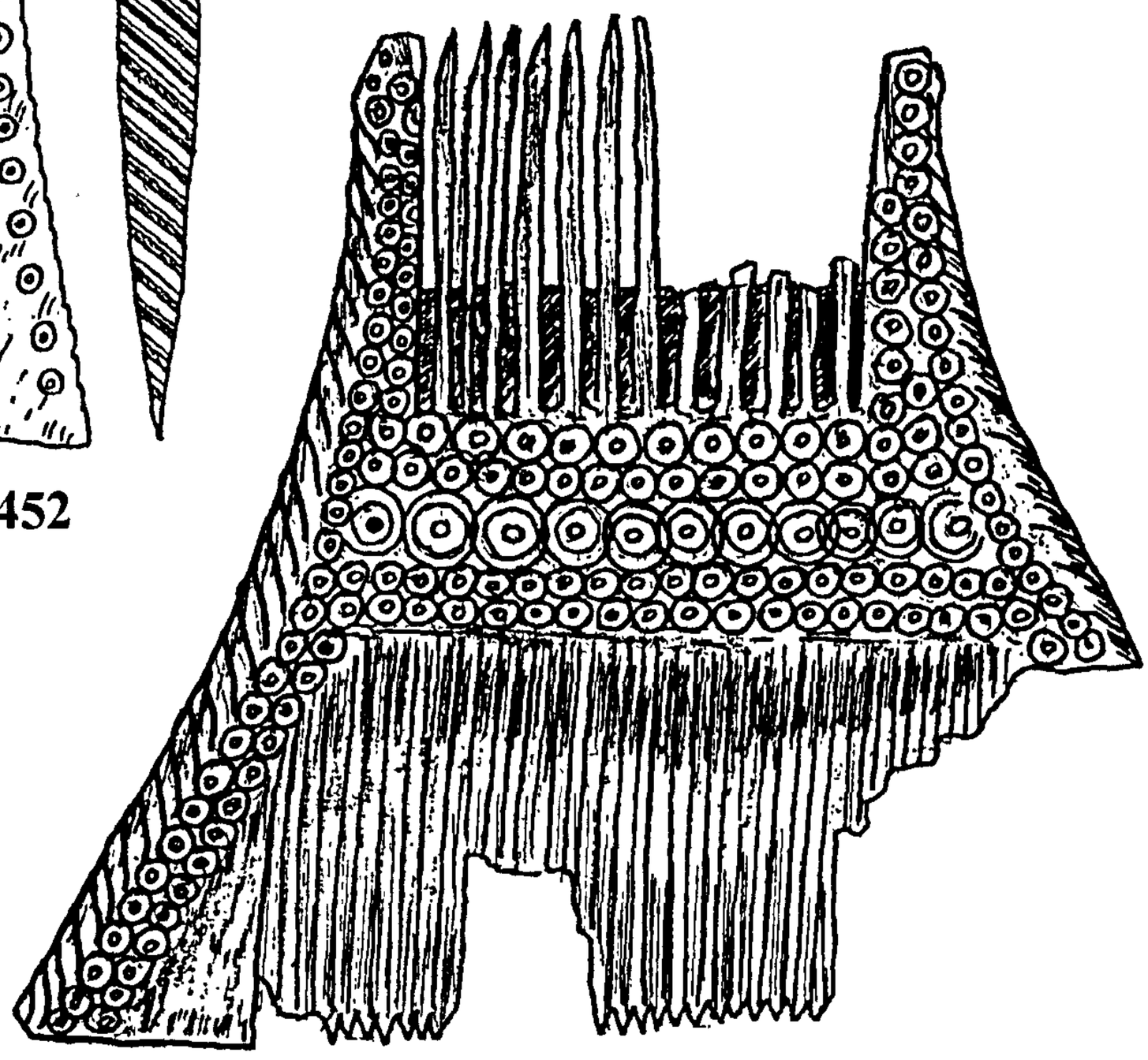


B267

Fig. 4.60 Types of side edge decoration

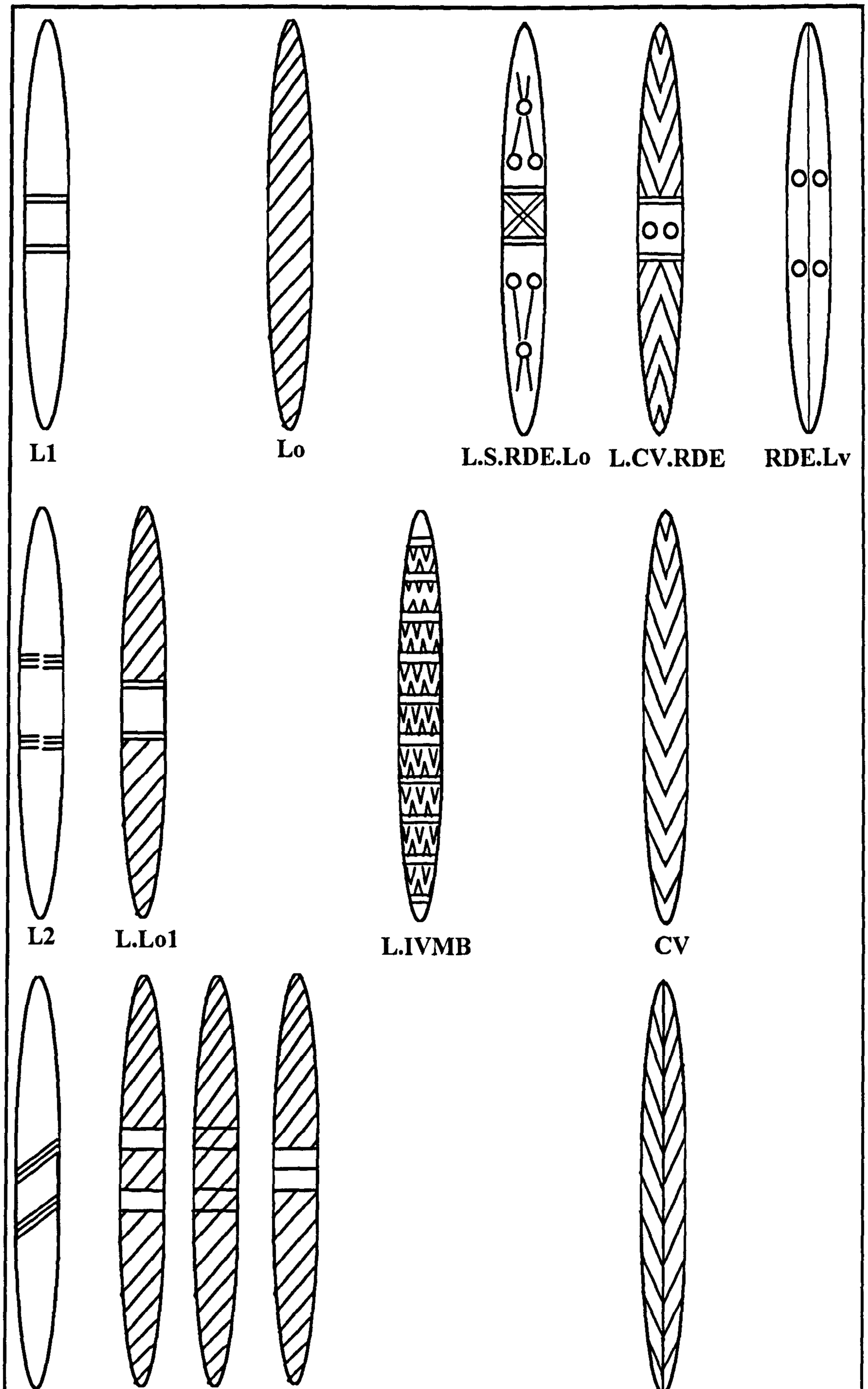


Fig. 4.61 Elk antlers at different stages of maturity and forms of atler parts suitable for sawing comb blanks

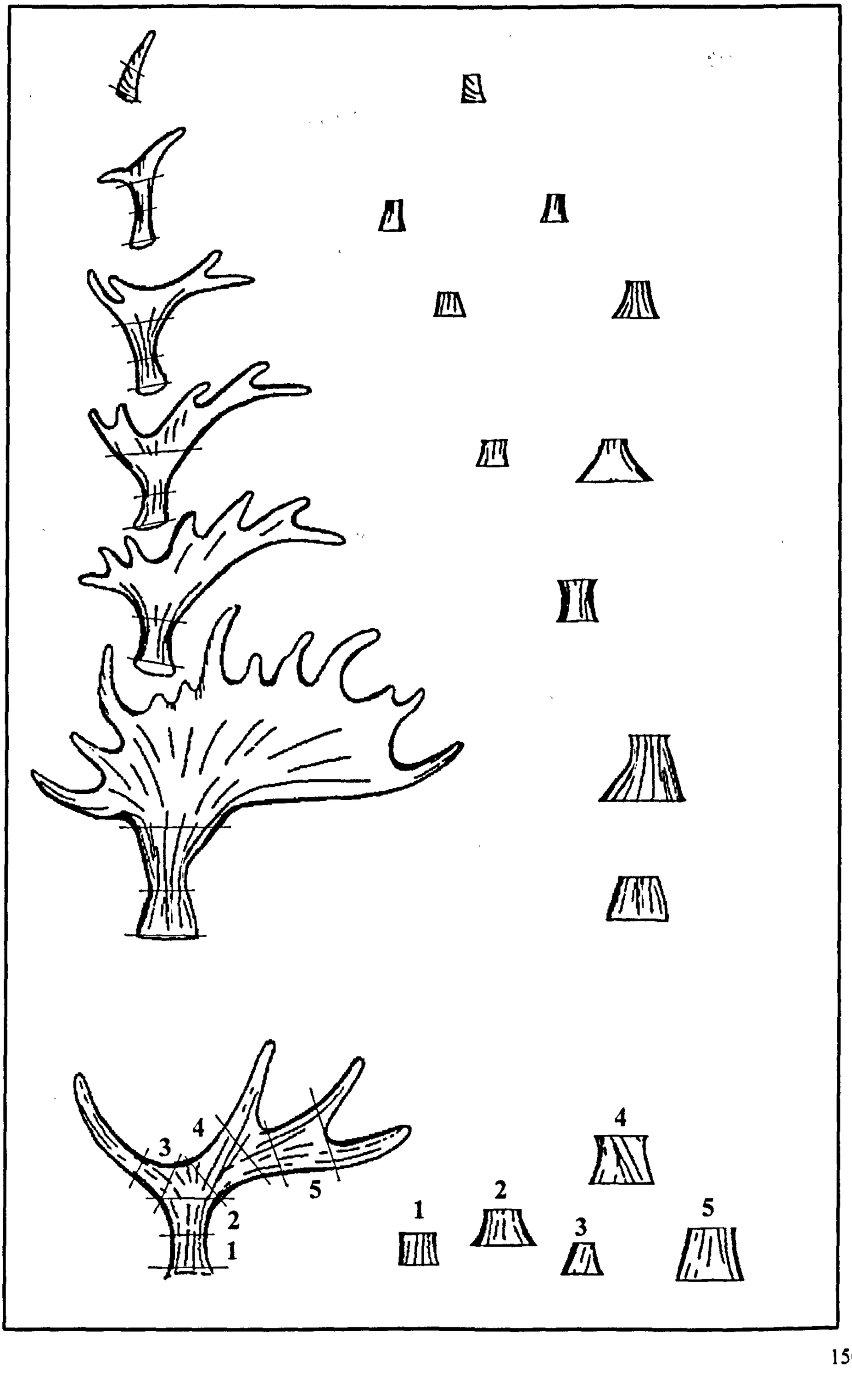
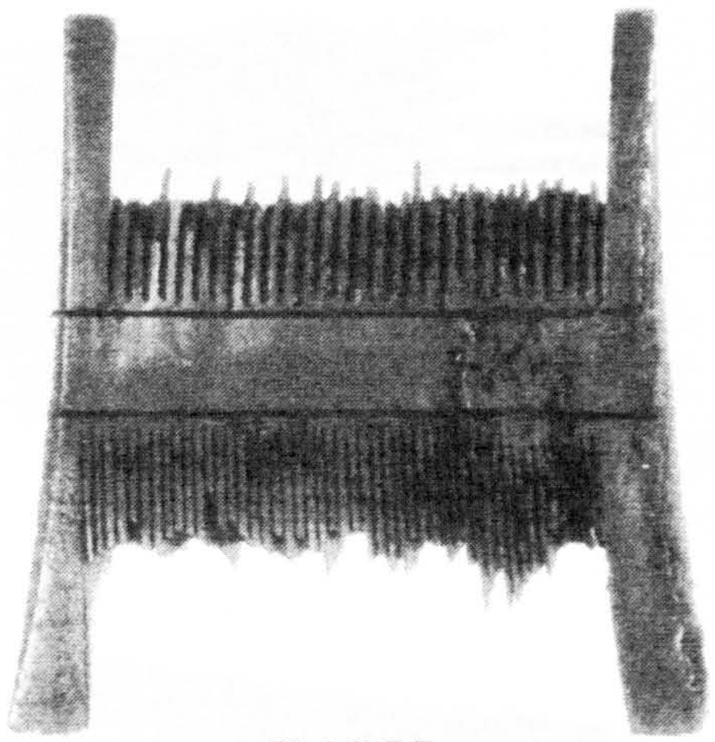


Fig. 4.62 12th century simple combs in walrus ivory from the Fedorovsky site



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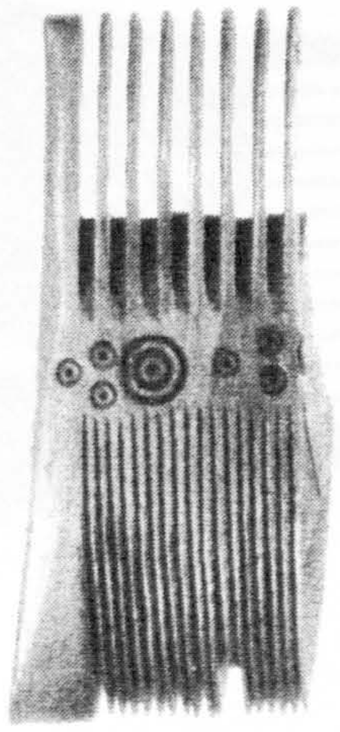

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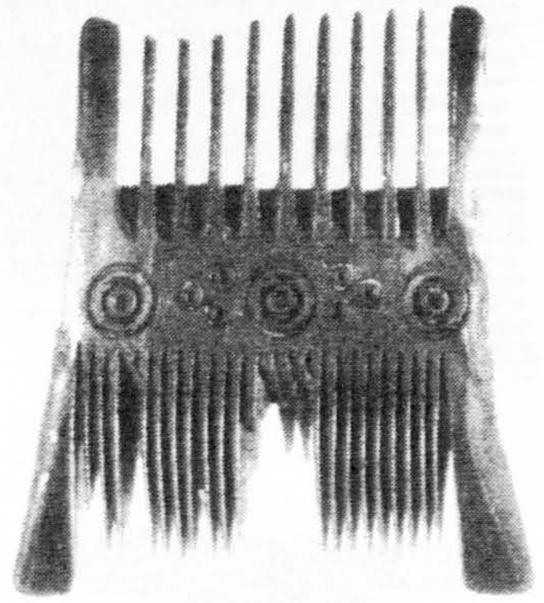

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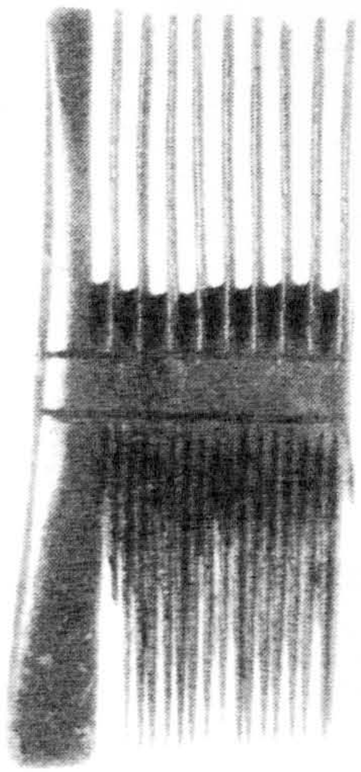

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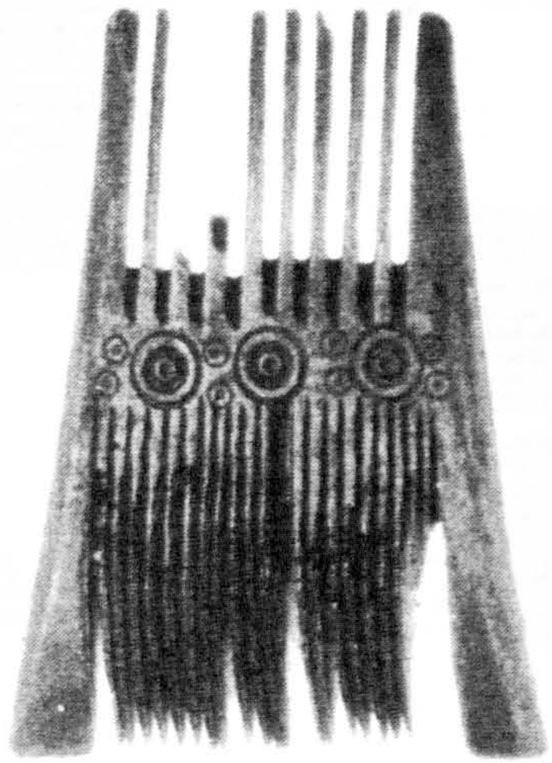

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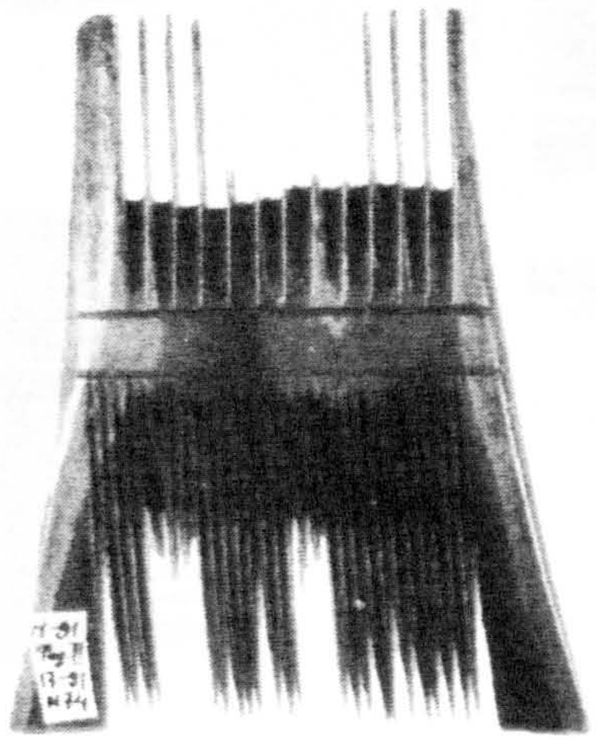

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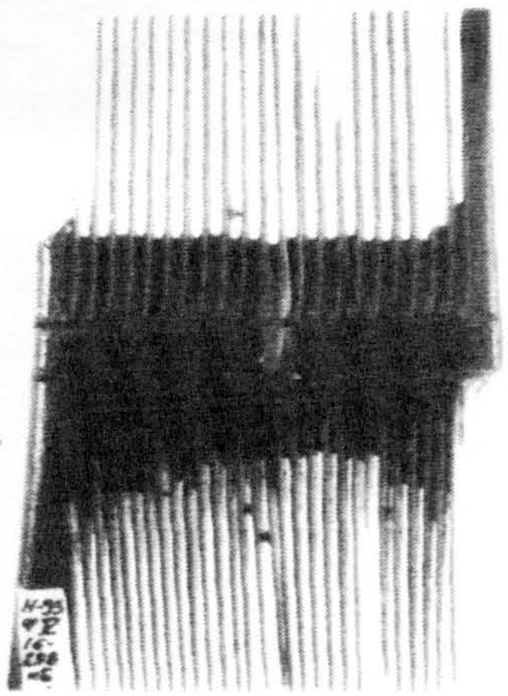

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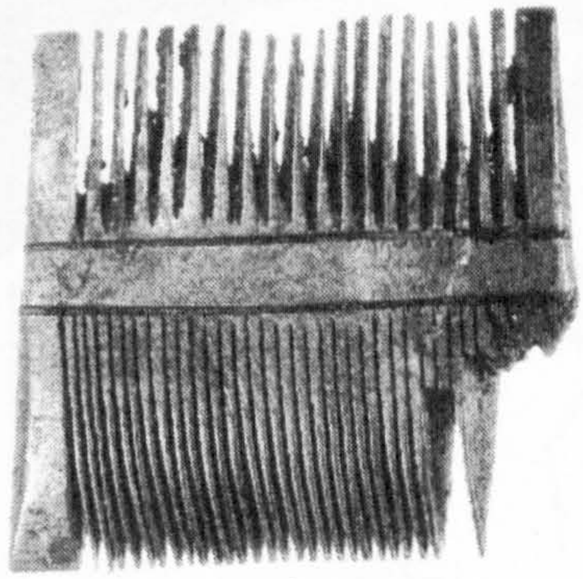
Fig. 4.63 11th-13th century simple combs in walrus ivory from the Nerevsky site



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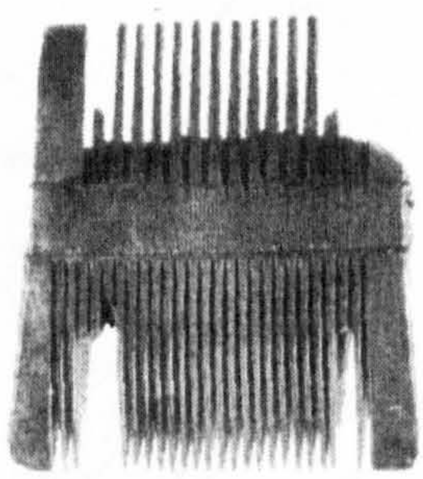

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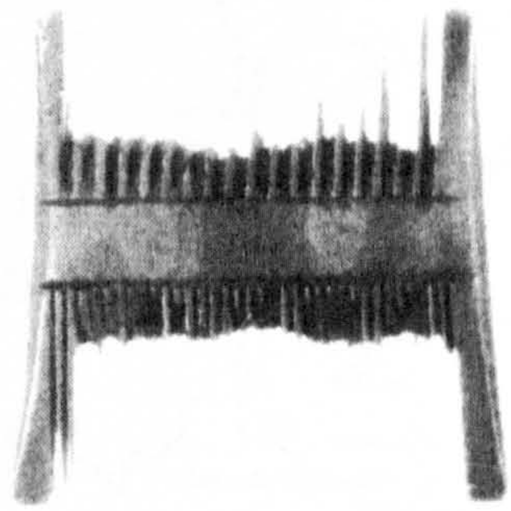

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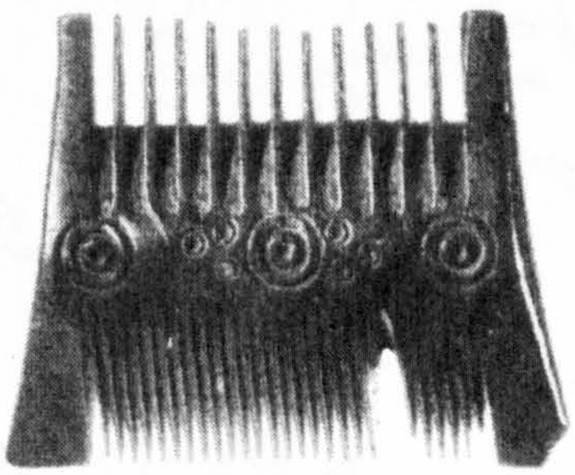

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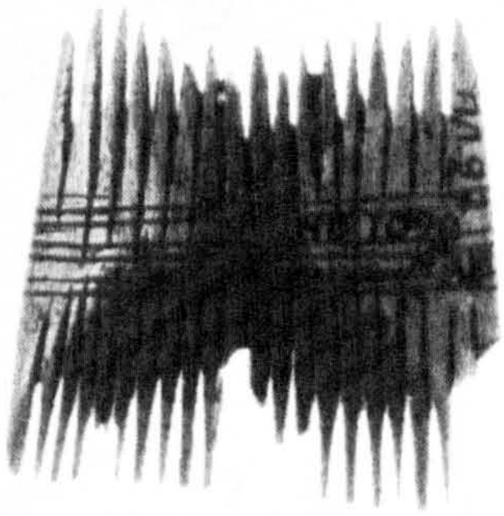

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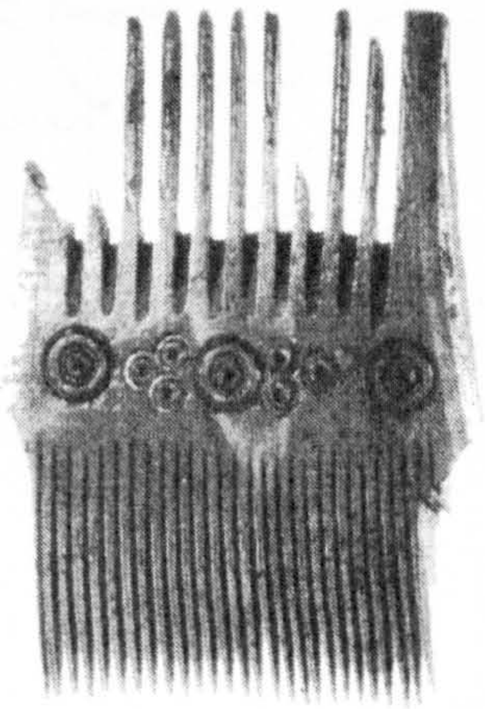

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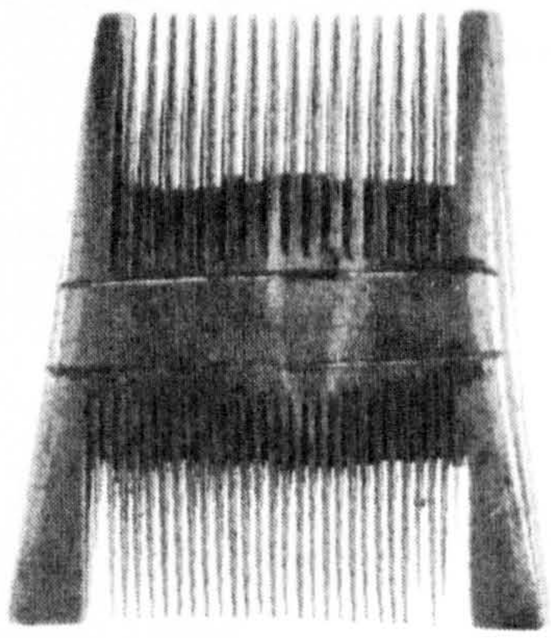


B523

B554

Fig. 4.64 Rus settlements in the 11th and 12th centuries (after Franklin and Shepard 1996)

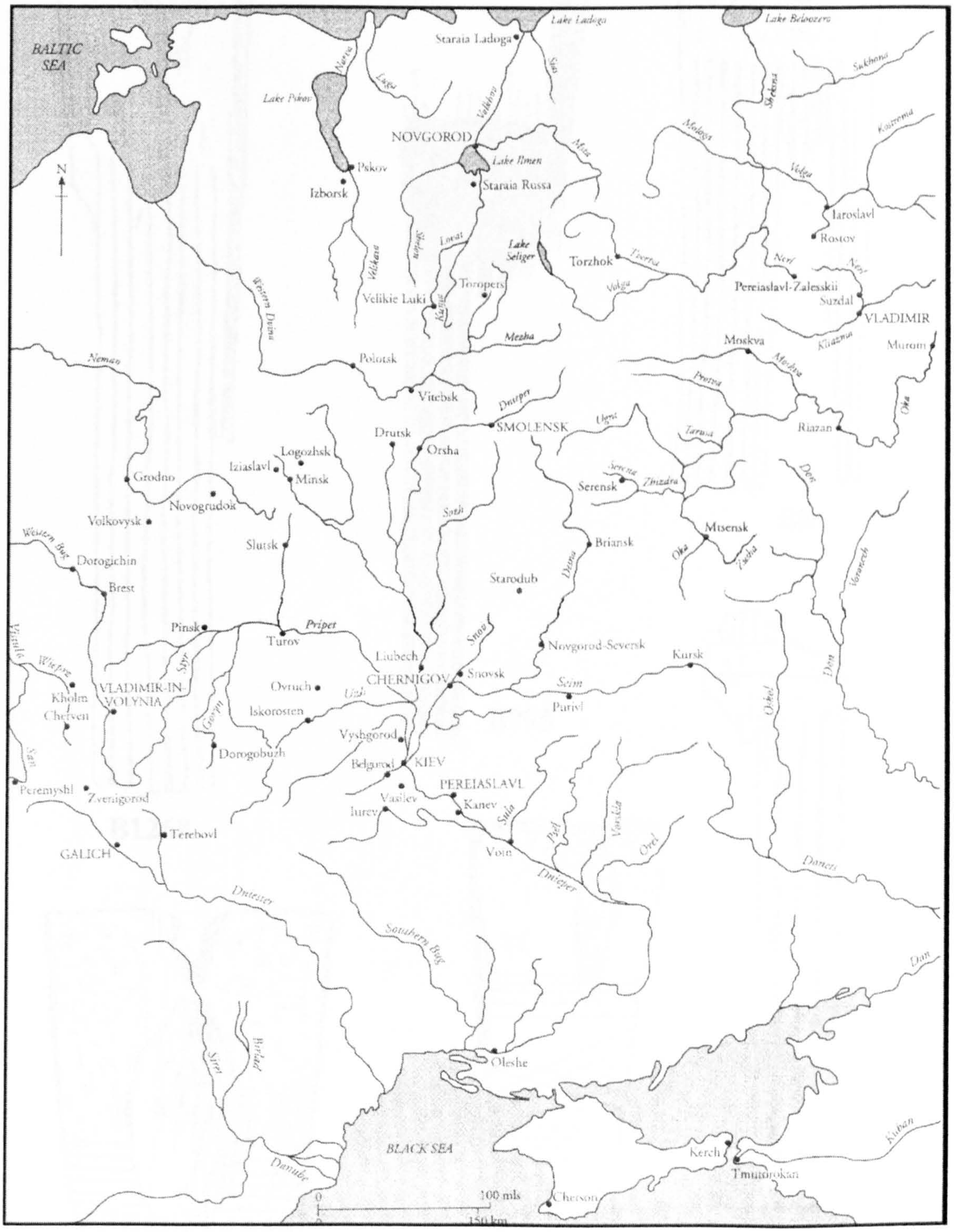
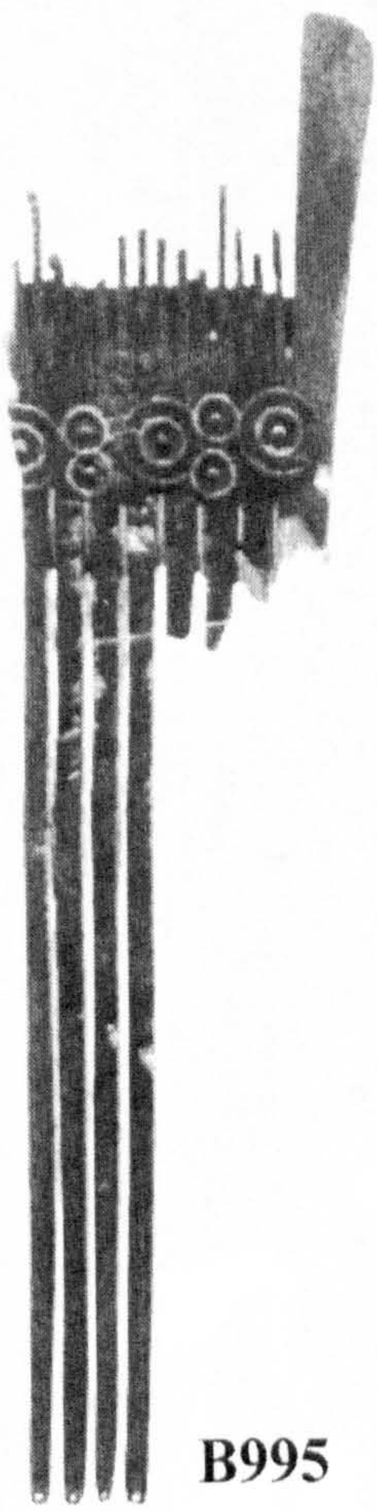


Fig. 4.65 Long-toothed combs

B1268



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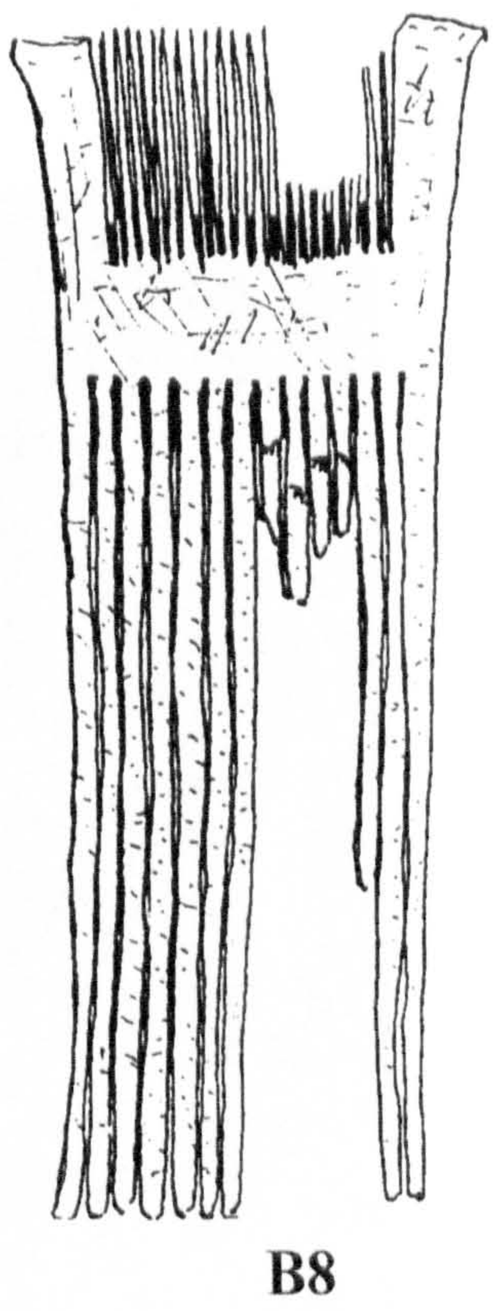

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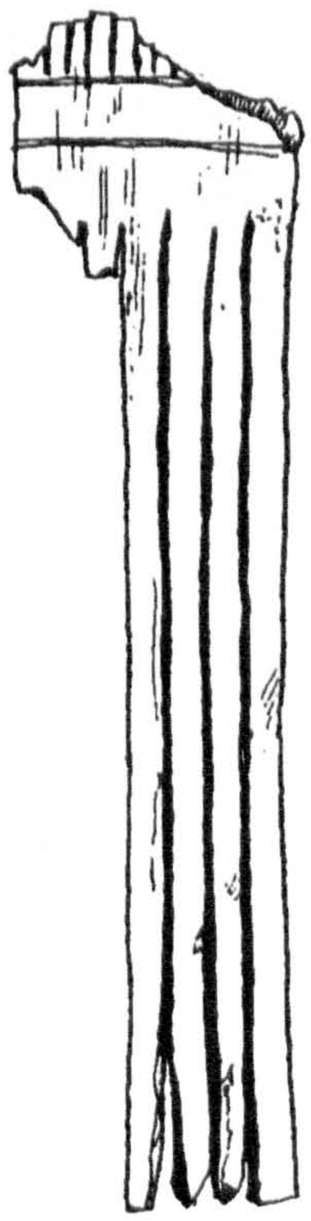

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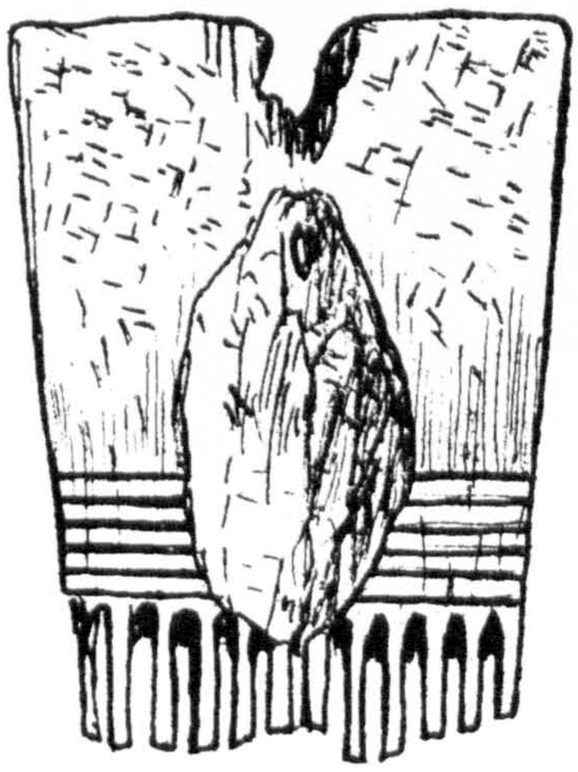

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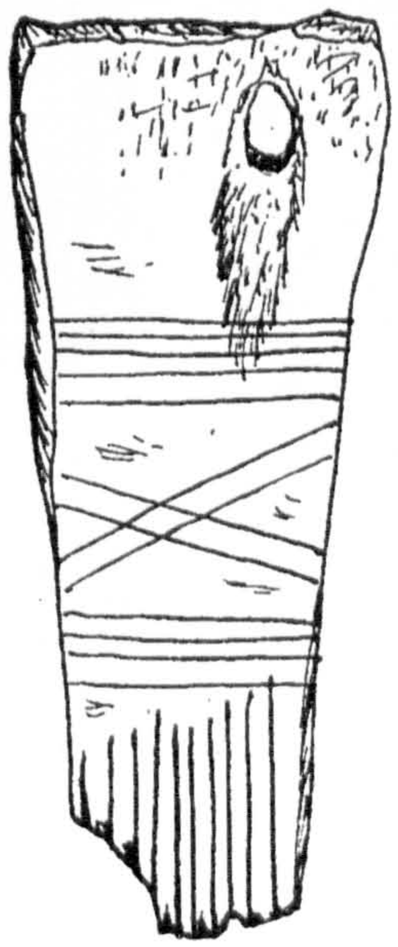


B171

Fig. 4.66 Novgorod territory in the 13th century (after Fennel 1983)

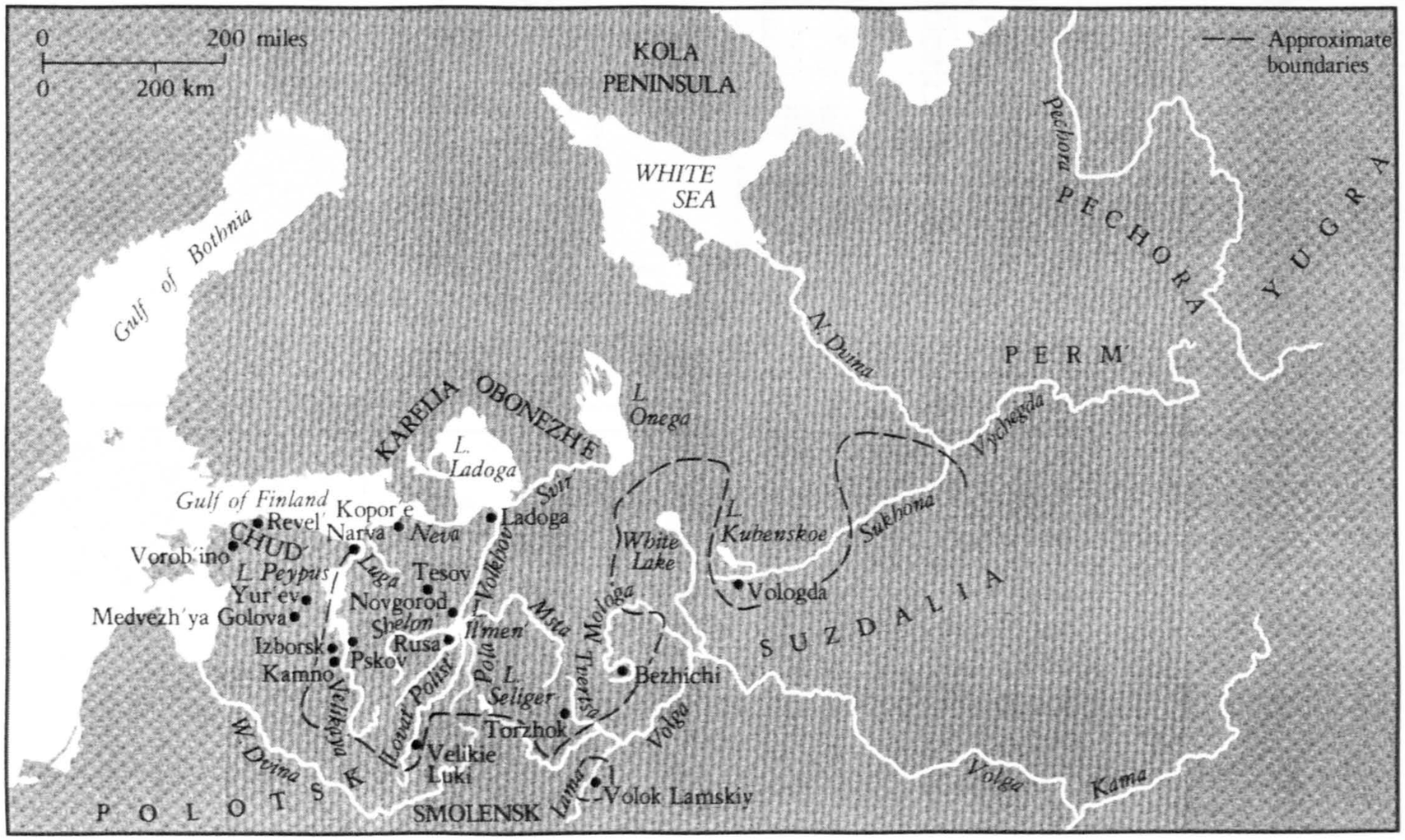


Fig. 4.67 Chronological and spatial distribution of class 2a combs on the properties of the Nerevsky End (Nerevsky site)

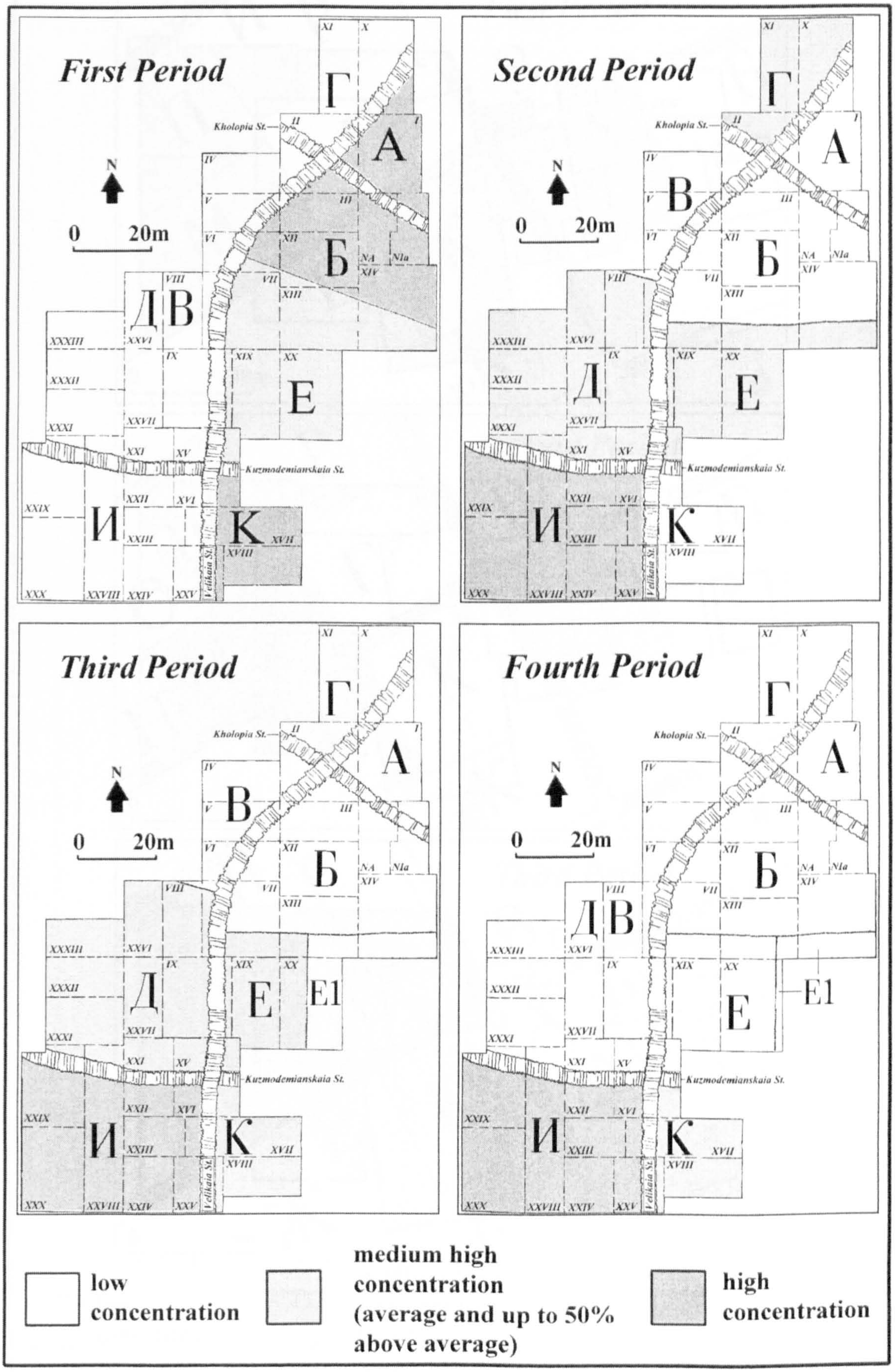
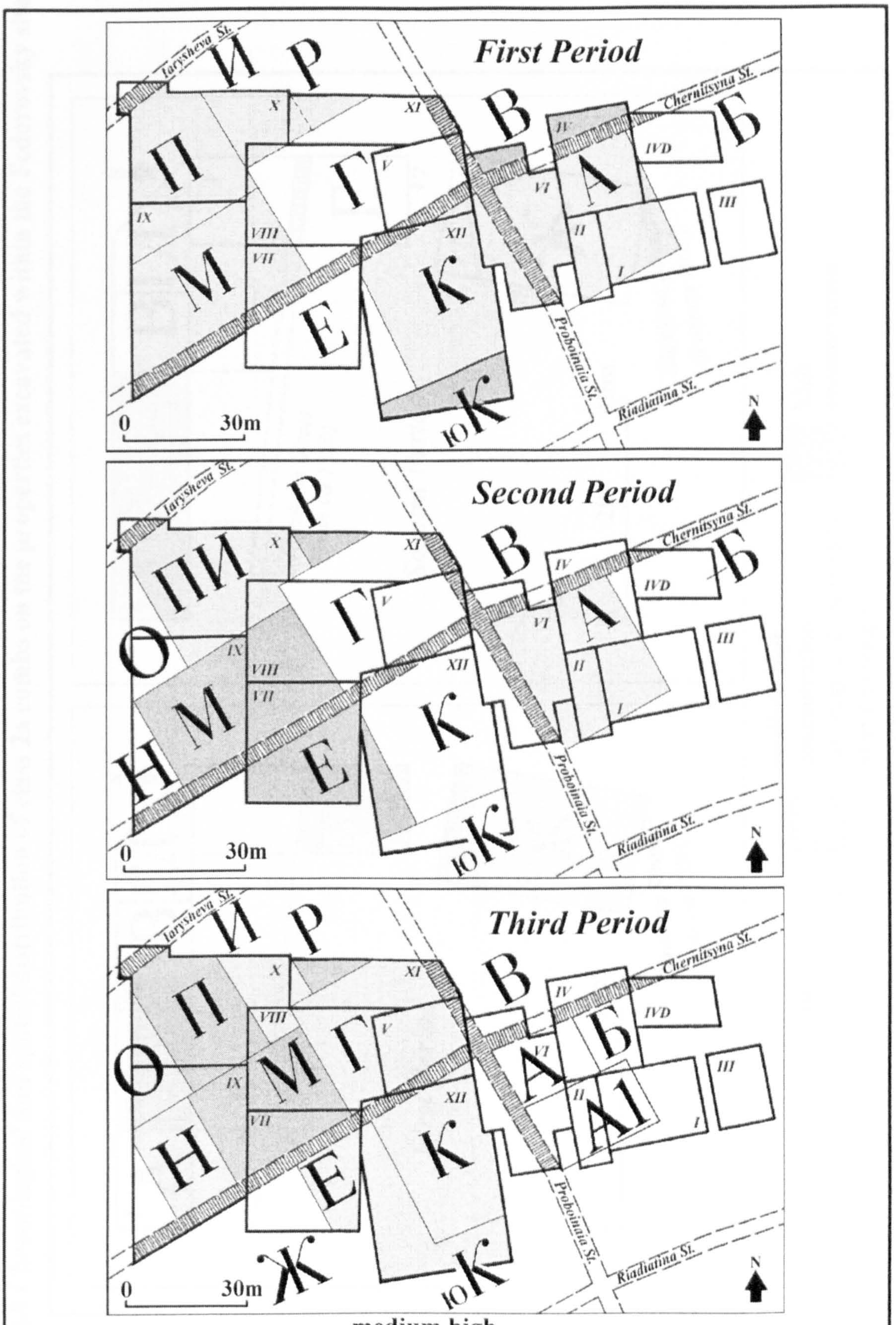


Fig. 4.68 Chronological and spatial distribution of class 2a combs on the properties of the Liudin End (Troitsky site)



low concentration

medium high concentration (average and up to 50% above average)

high concentration

Fig. 4.69 Chronological and spatial distribution of class 2a combs on the properties excavated within the Fedorovsky site

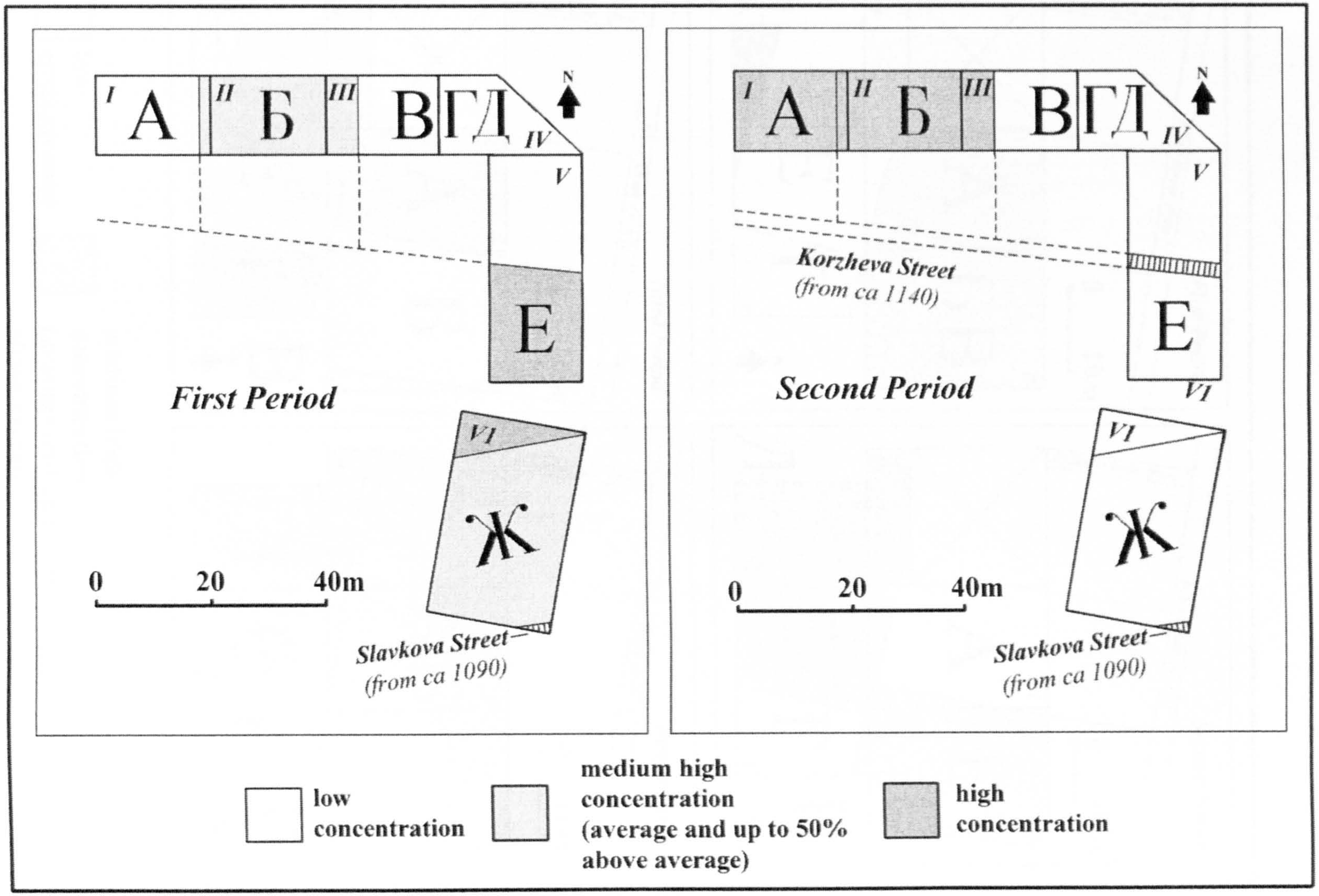


Fig. 4.70 Spatial distribution of class 2a combs on the properties of the Slavensky End (Il'insky site) within the four Periods (based on the revised chronology)

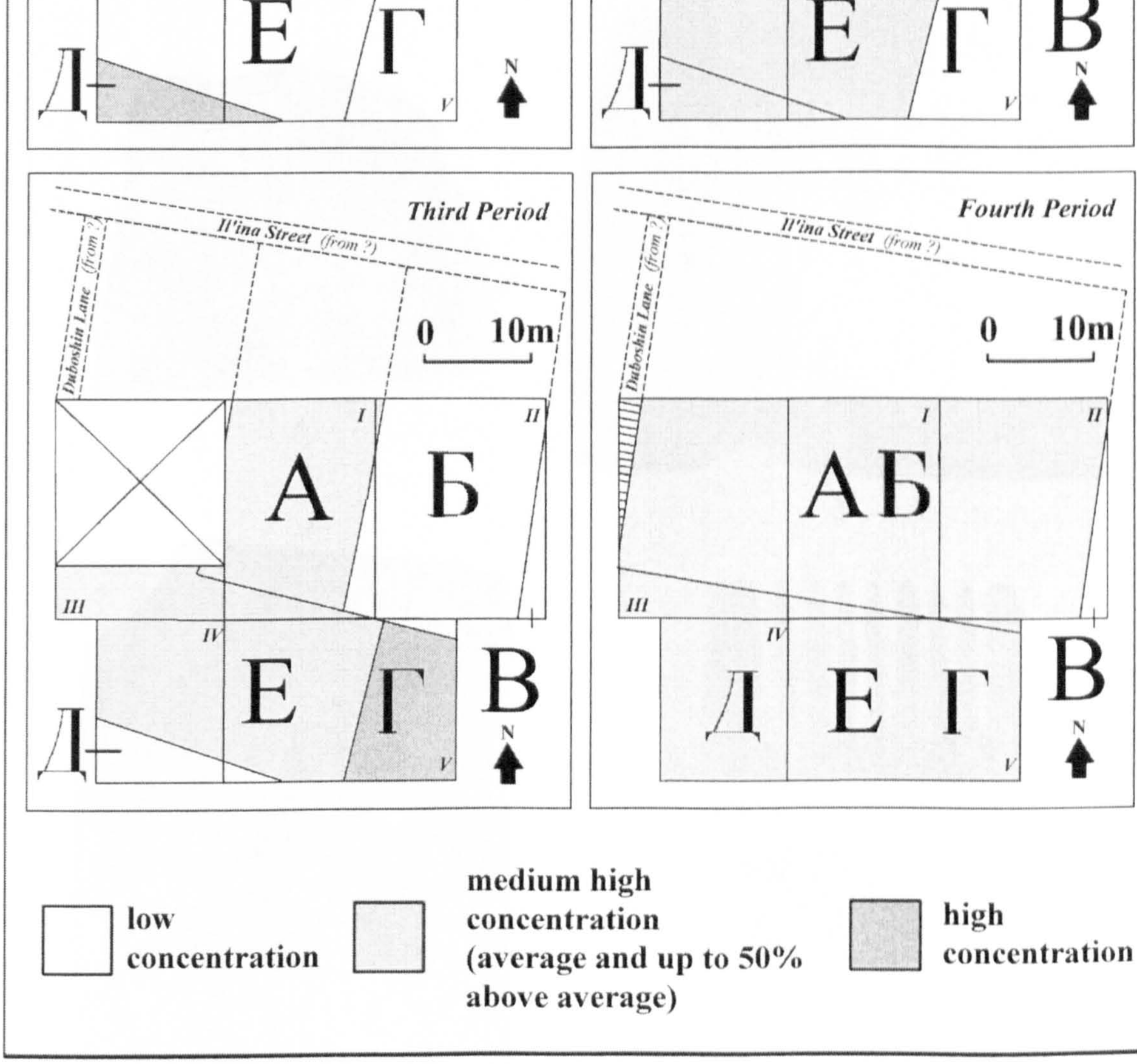
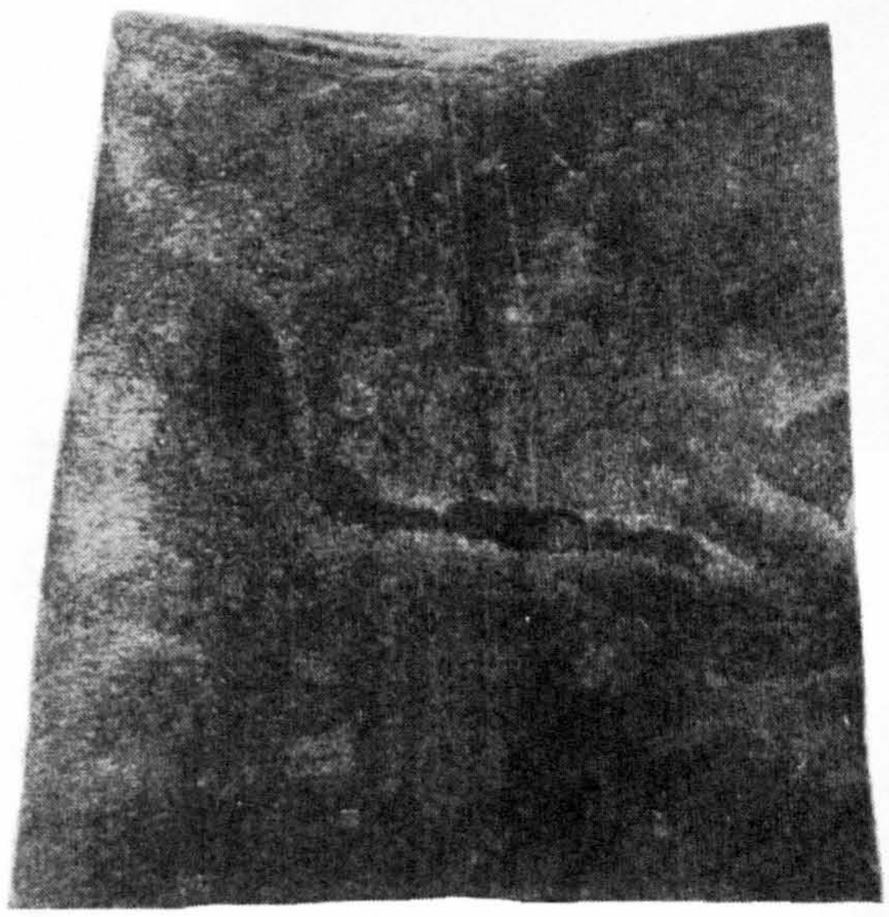


Fig. 4.71 Comb blanks from the Troitsky site (1-4) and single finds of a comb and a comb blank (5) from the Dmitrievsky site



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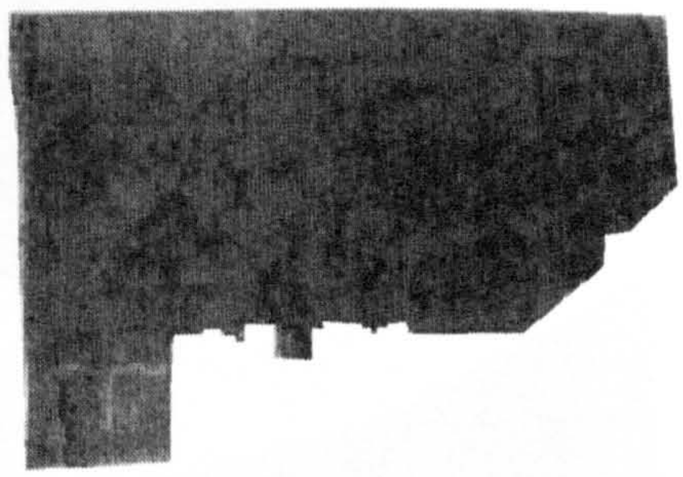

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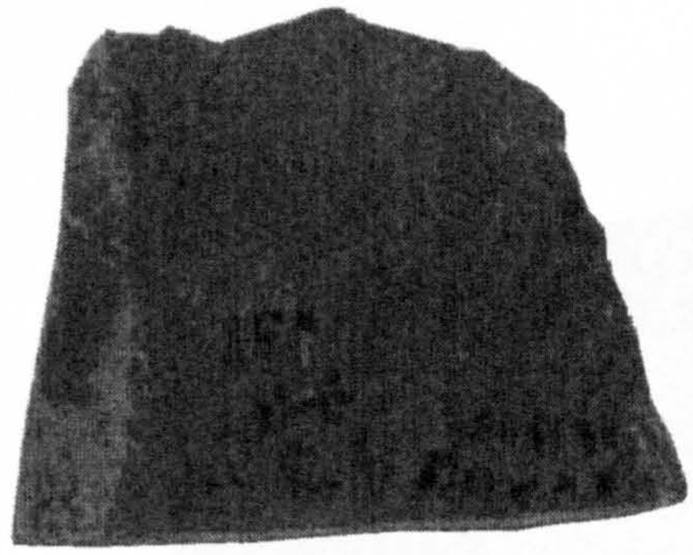

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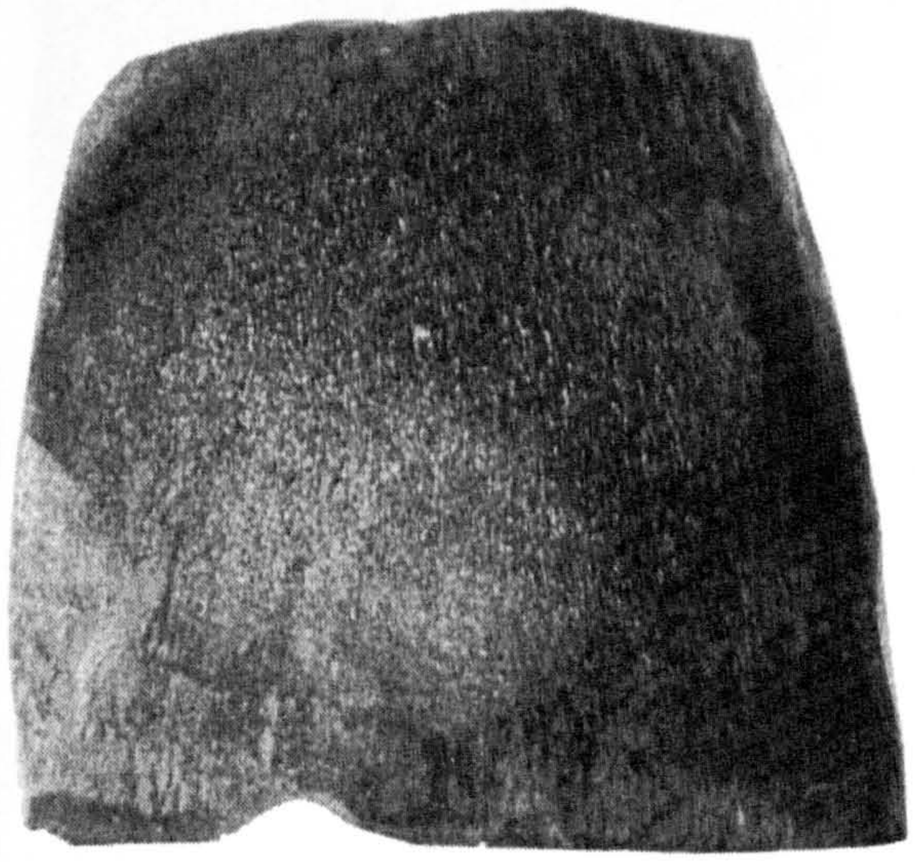

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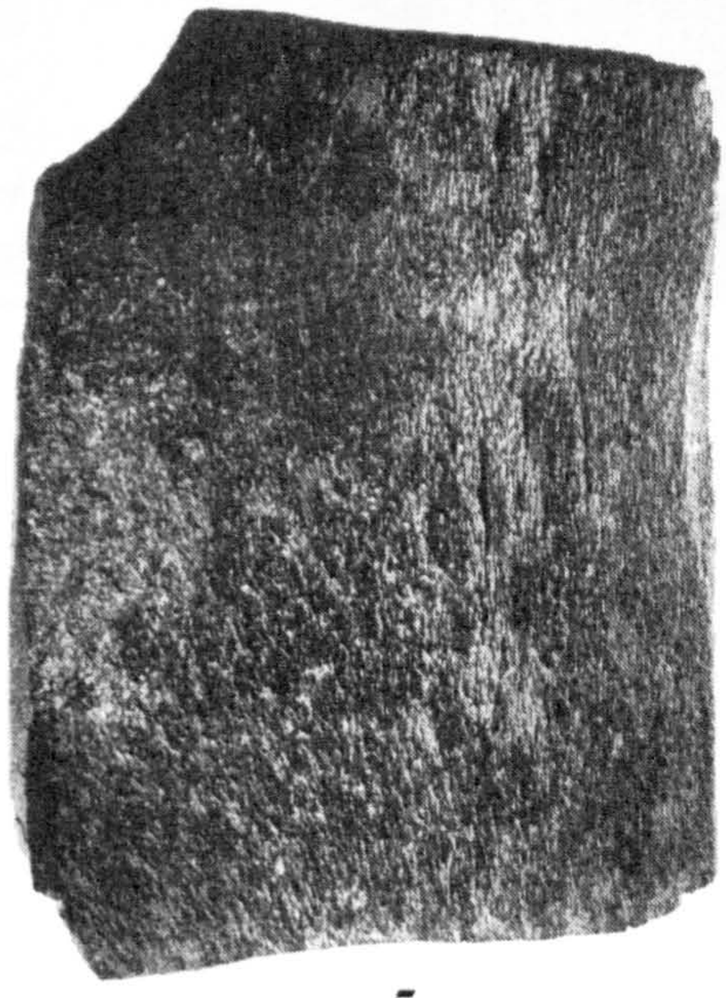

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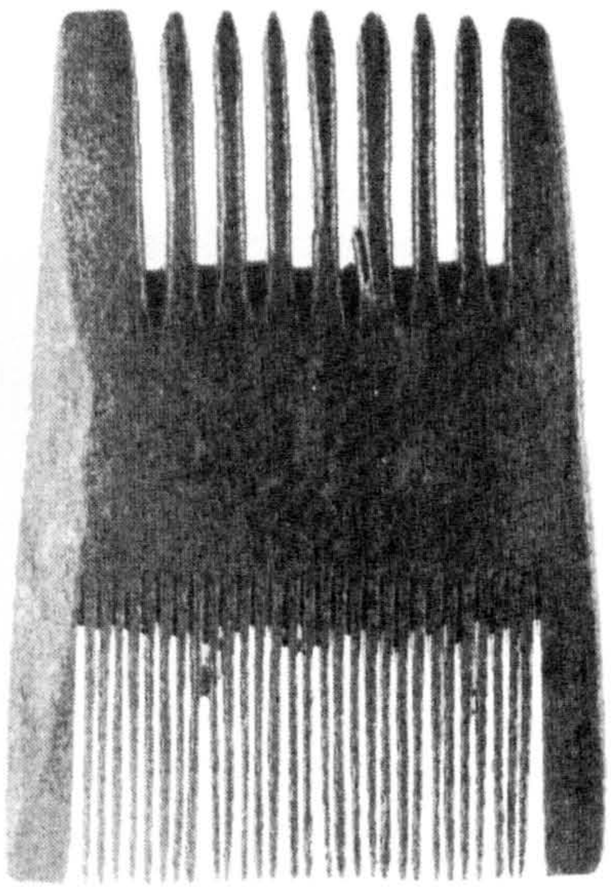
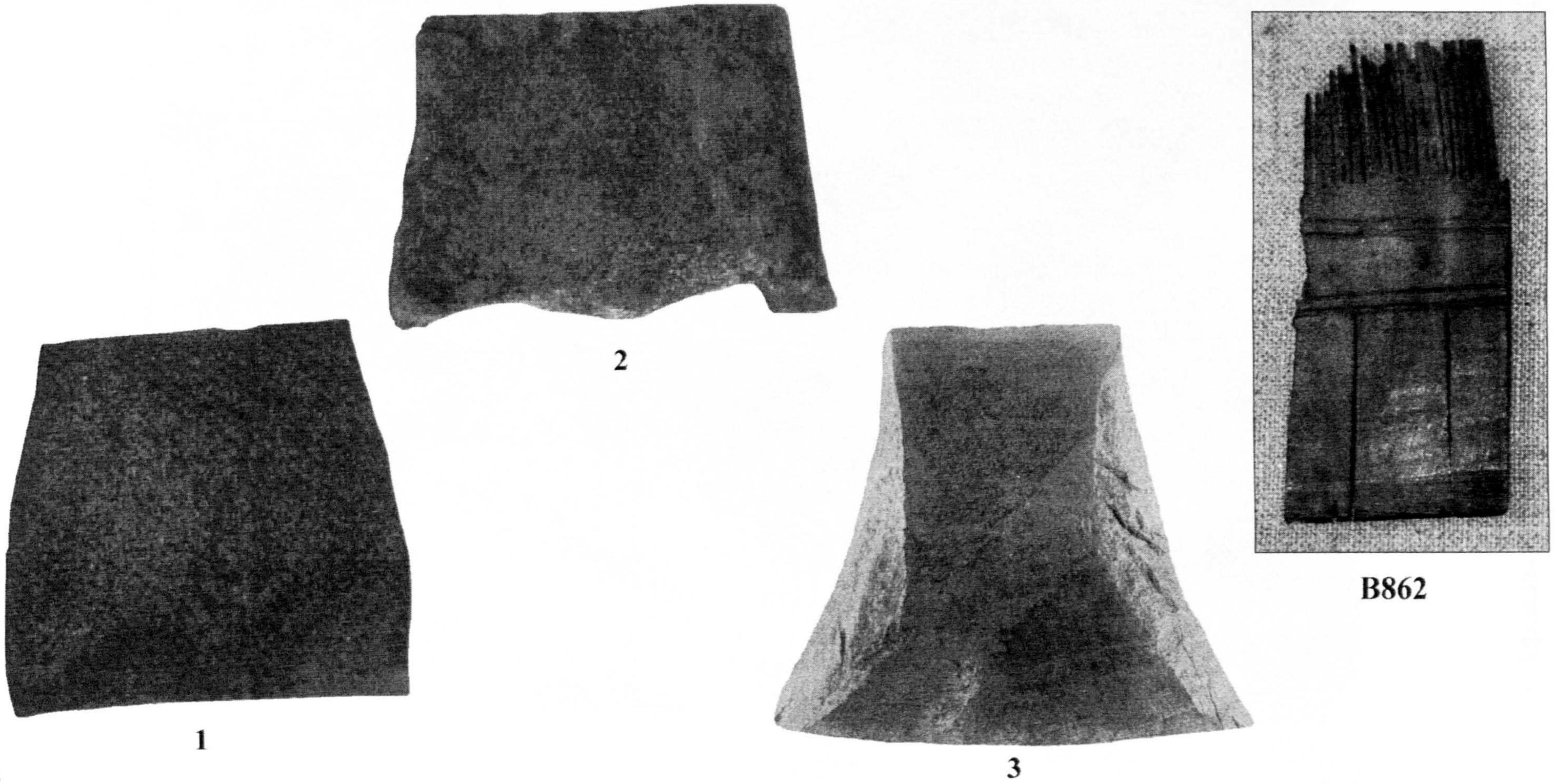


B1335

Fig. 4.72 Comb blanks and the unfinished comb from the Nerevsky site



1

2

3

B862

Fig. 4.73 12th century walrus ivory waste from the Nerevsky site

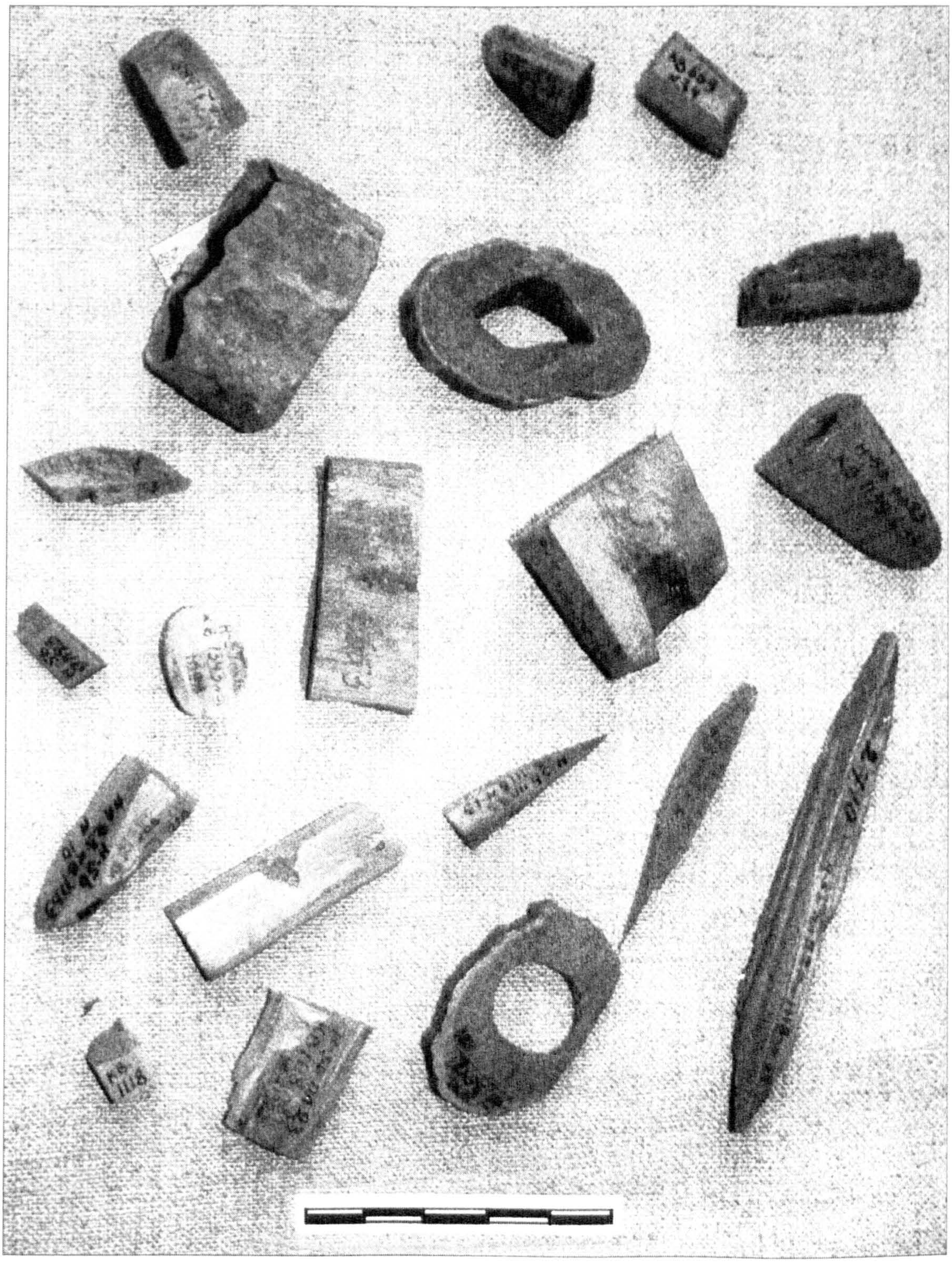


Fig. 4.74 12th century walrus ivory waste from the Fedorovsky site

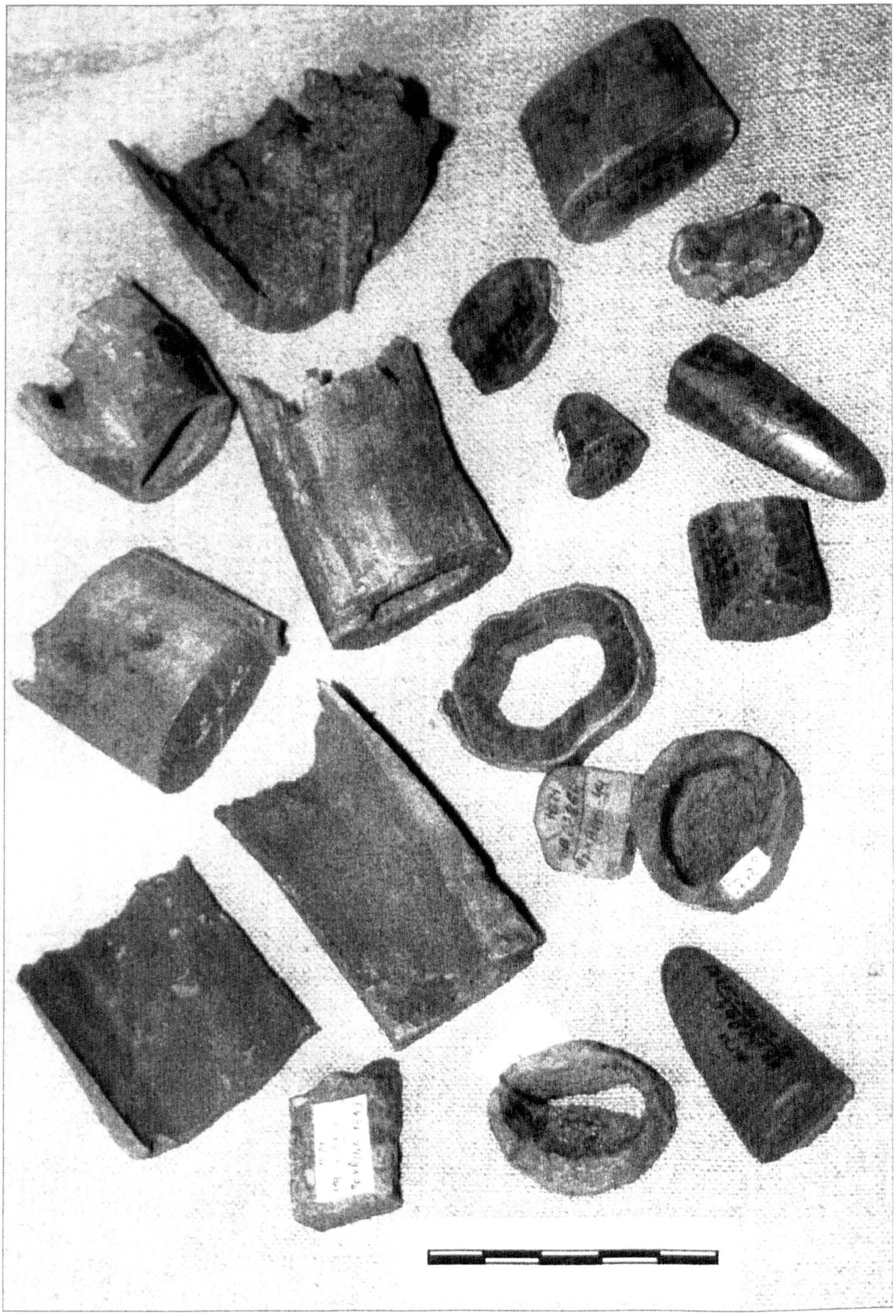
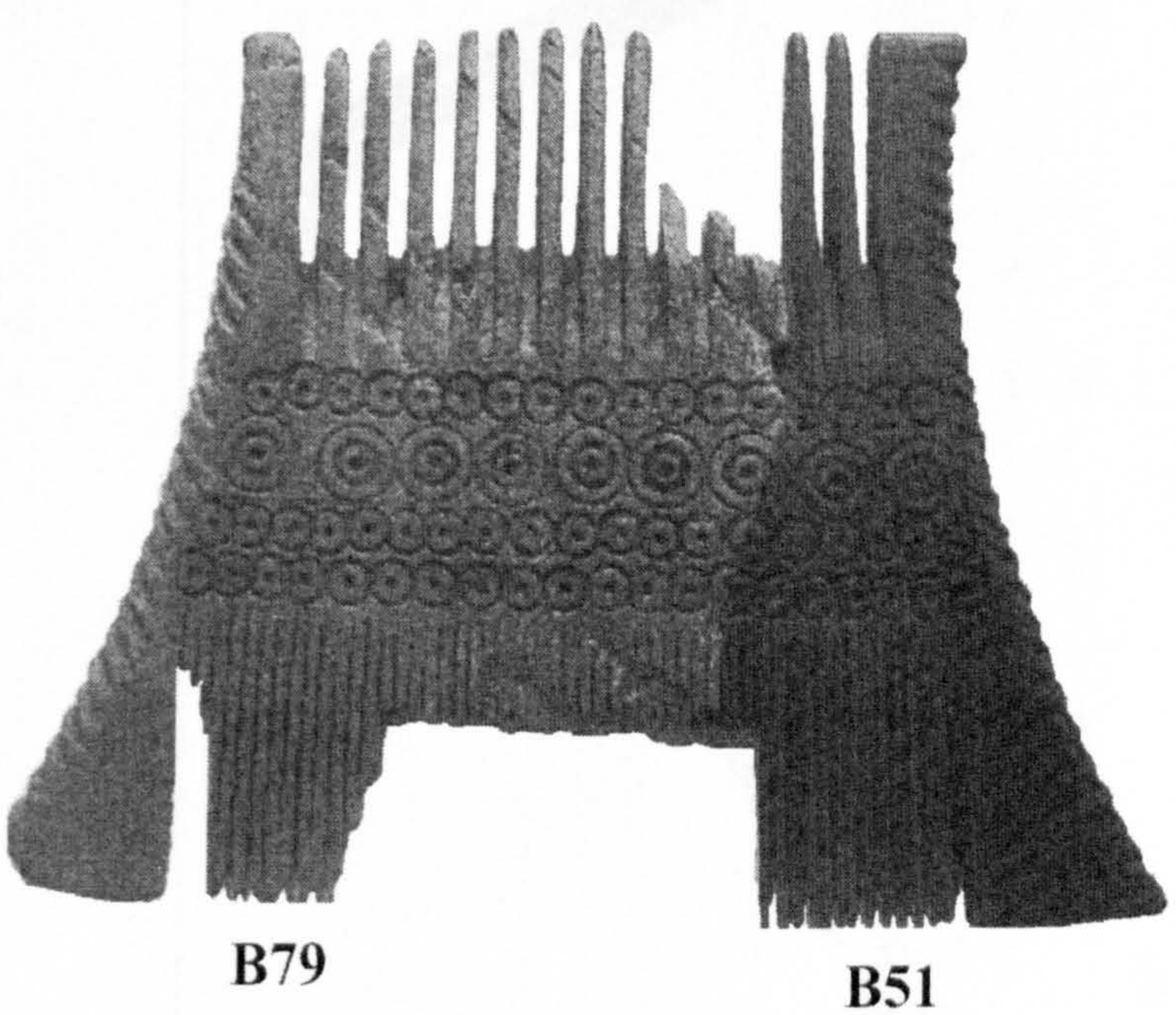
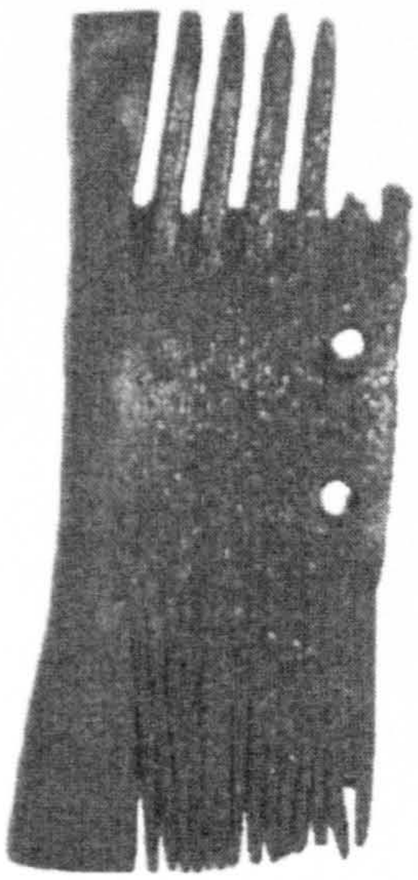


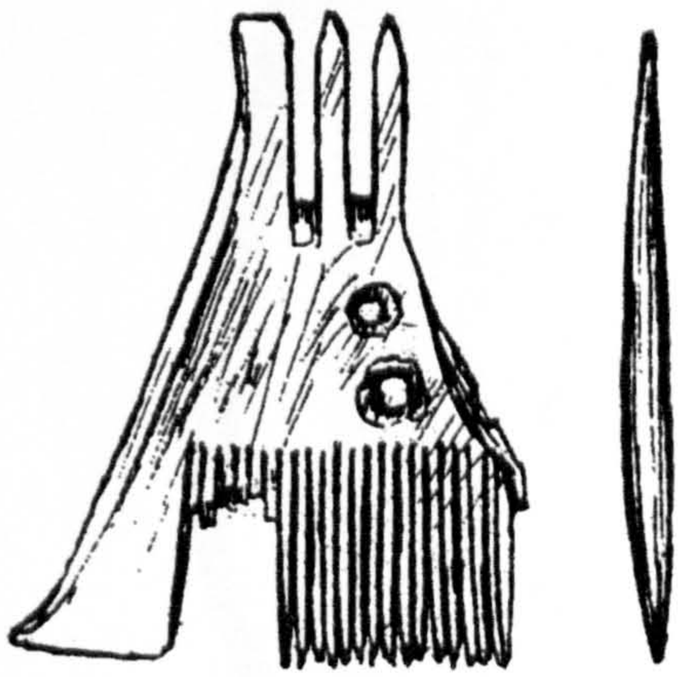
Fig. 4.75 Repaired and unrepaired combs ruptured and split along the grain



B79

B51

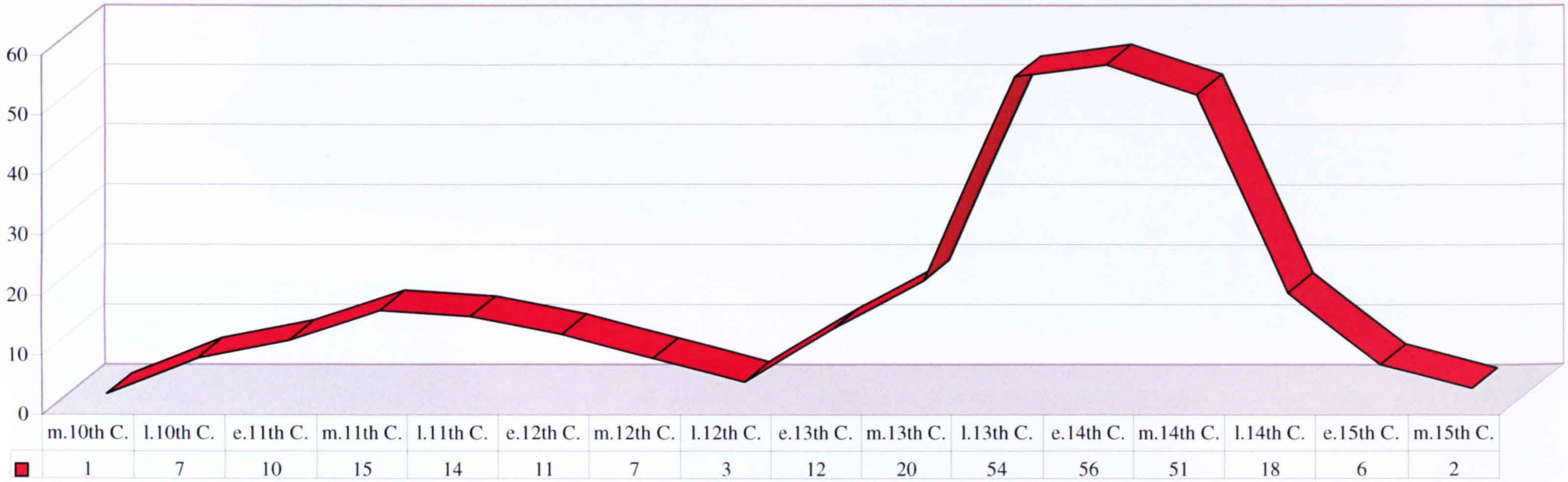




B298

B971

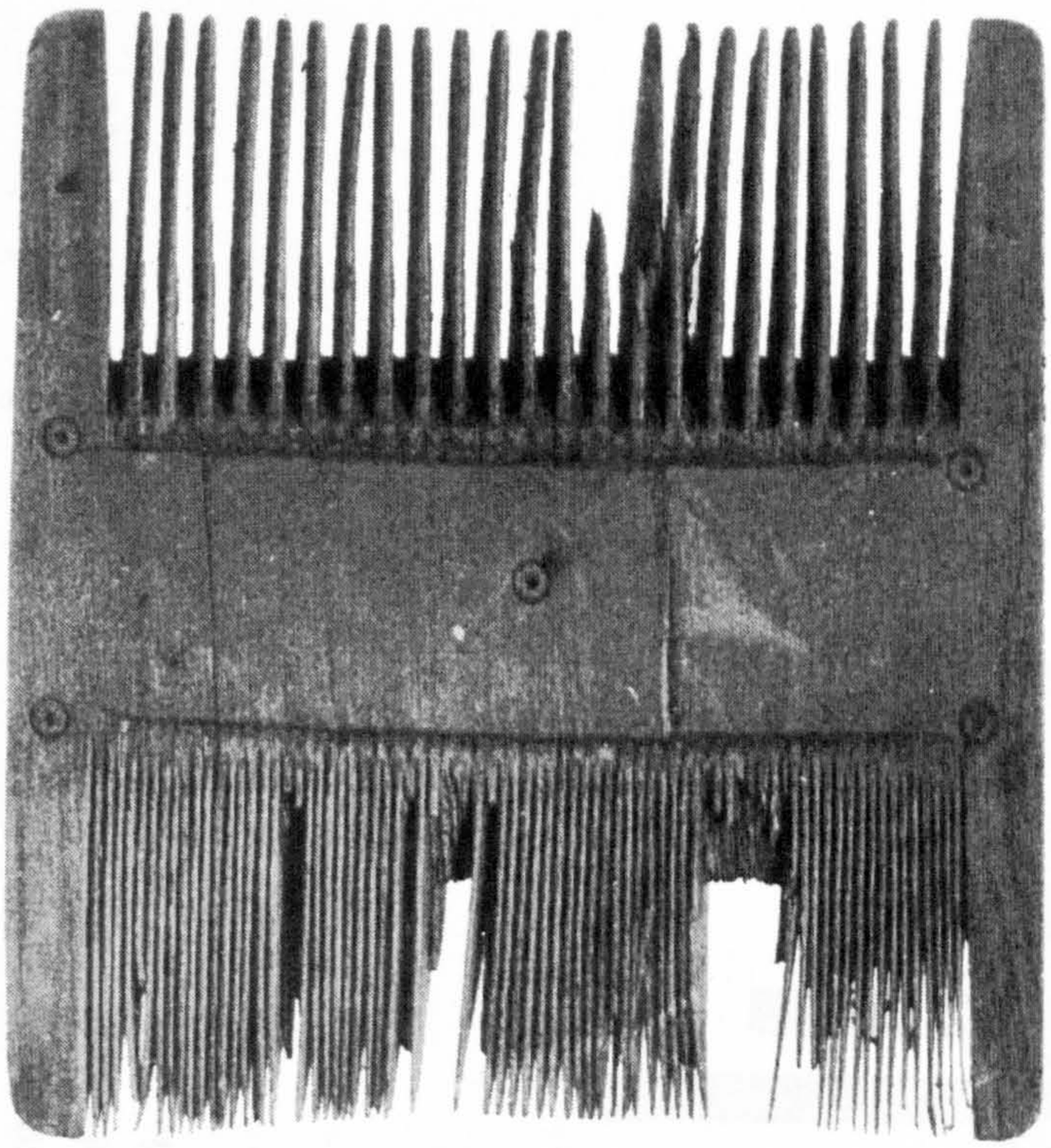
Fig. 5.1 Chronological distribution of class 2b combs from Novgorod (evidence from the excavations of the 1970s-1990s)



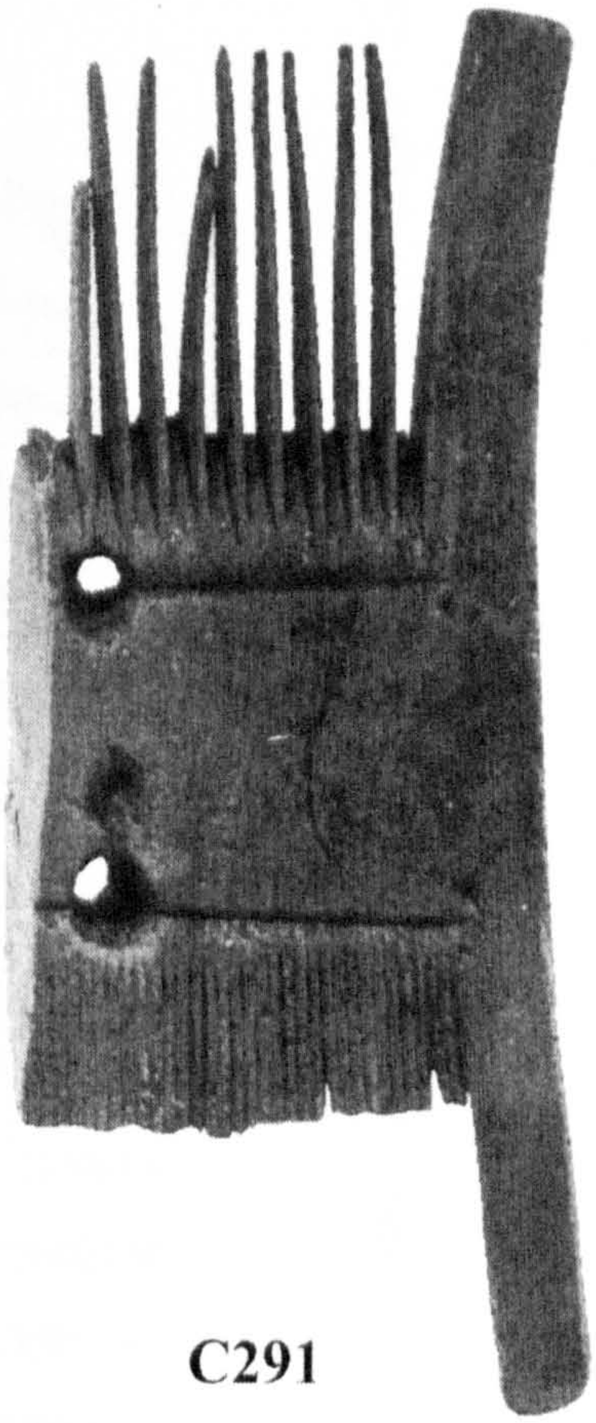
	m.10th C.	l.10th C.	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.	m.15th C.
■	1	7	10	15	14	11	7	3	12	20	54	56	51	18	6	2

Σ 287

Fig. 5.2 Simple combs in wood from the 11th-12th century deposits on the Troitsky, Nutny and Duboshin sites



C289



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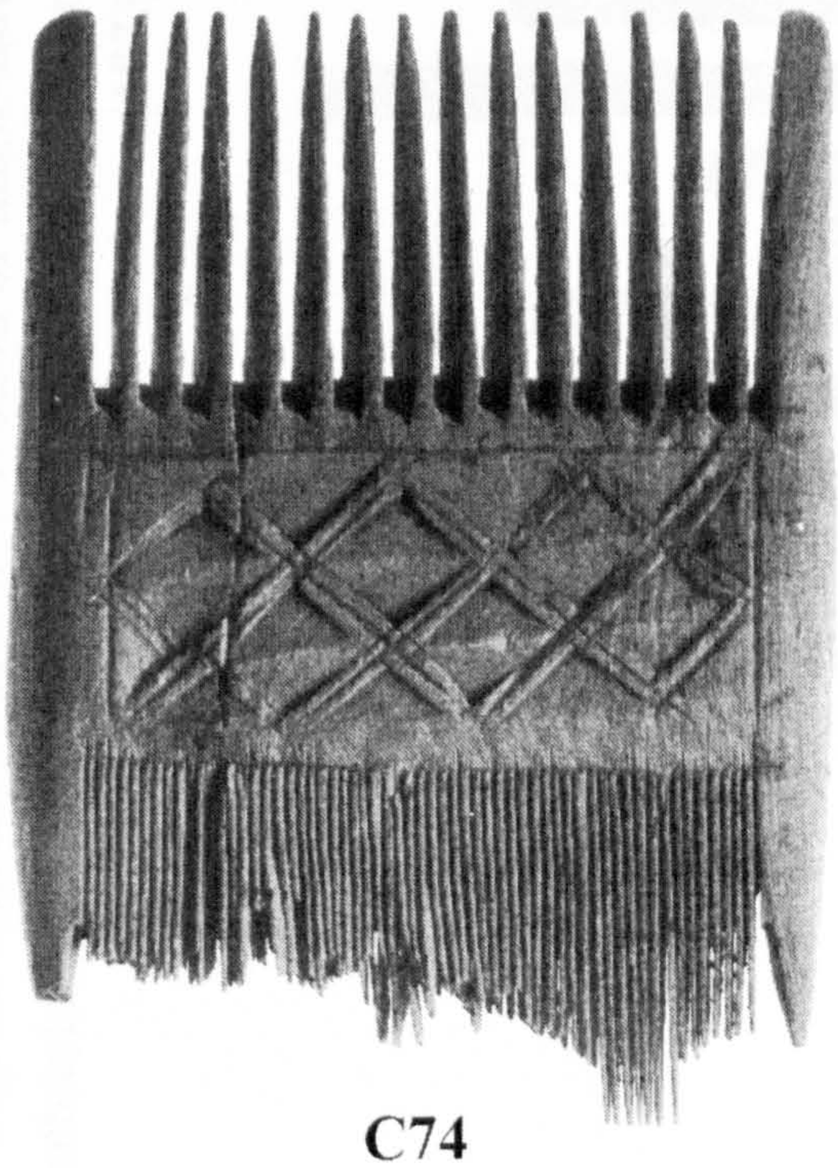
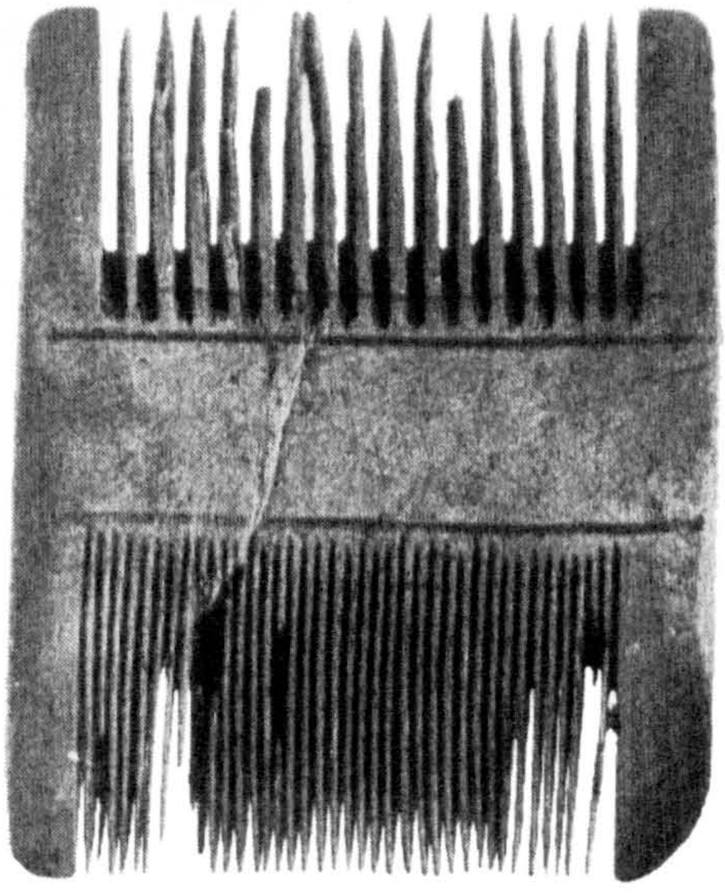
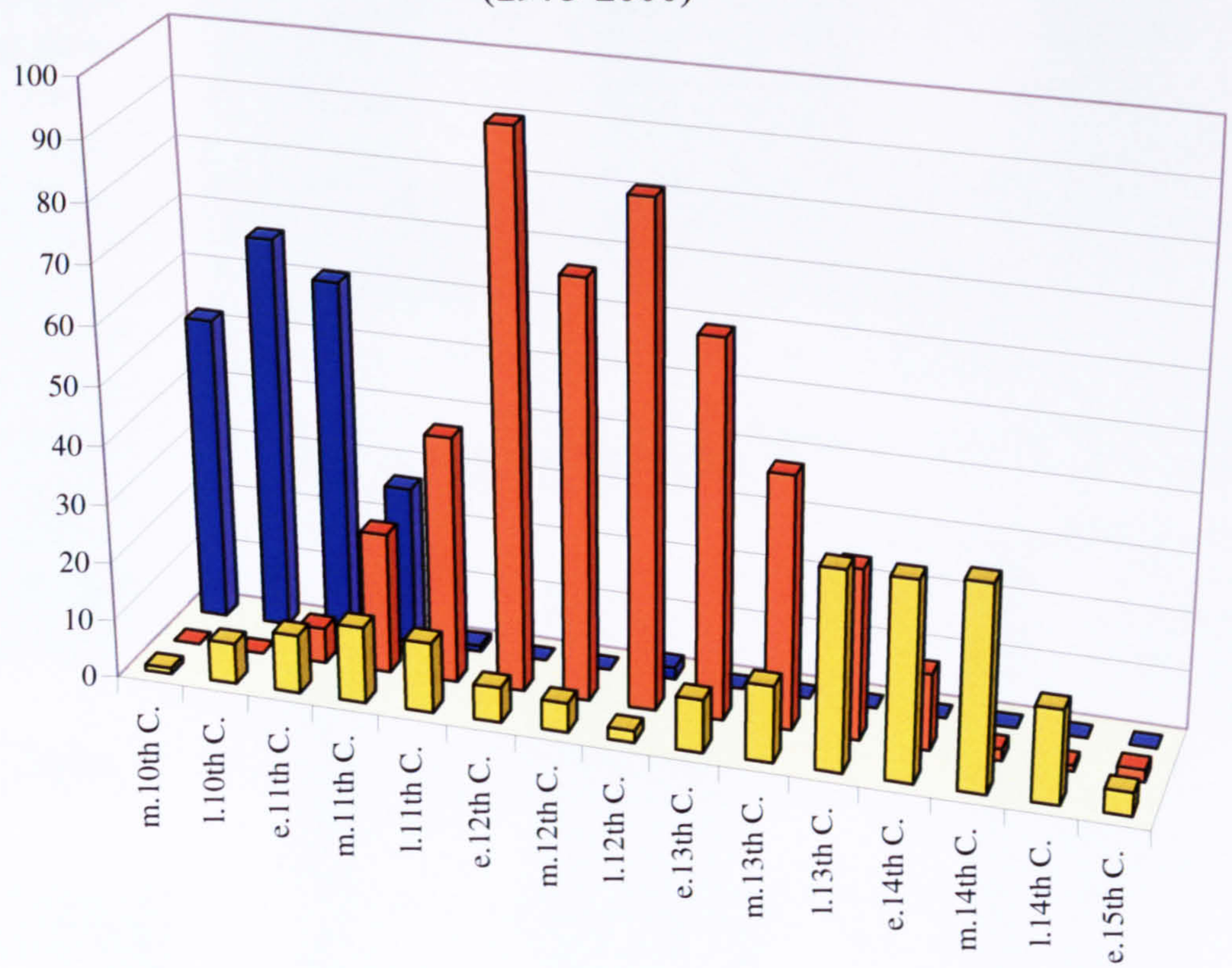


C74



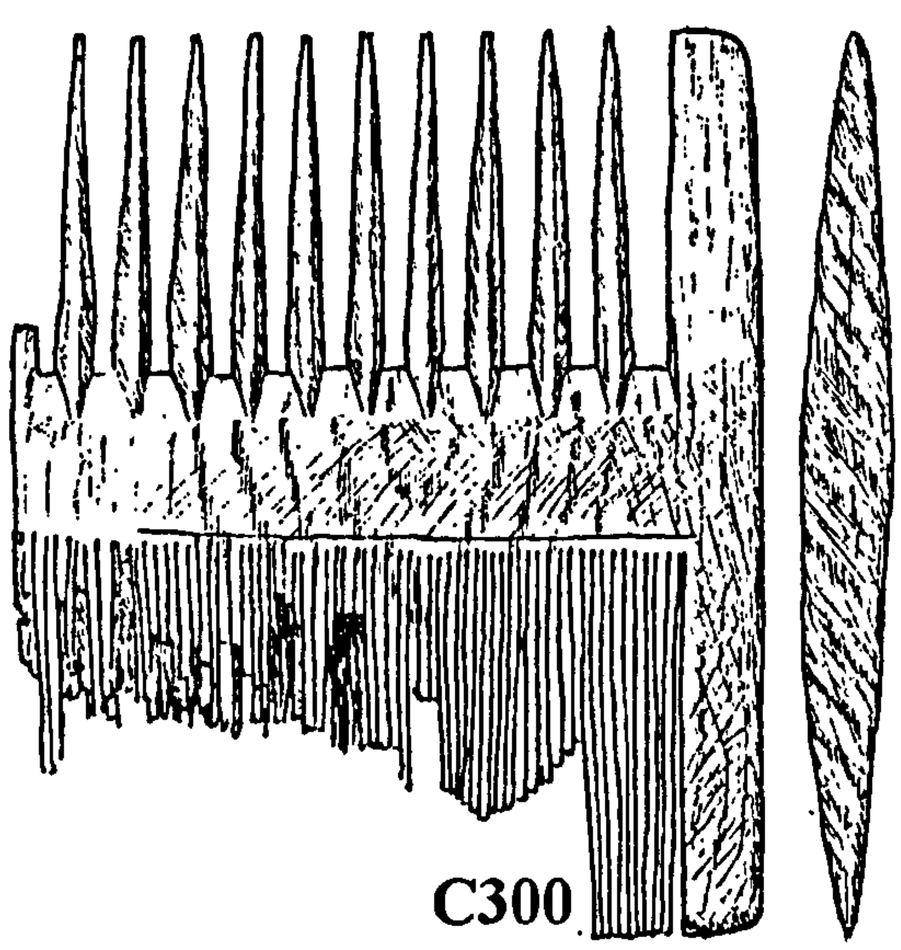
C280

Fig. 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)

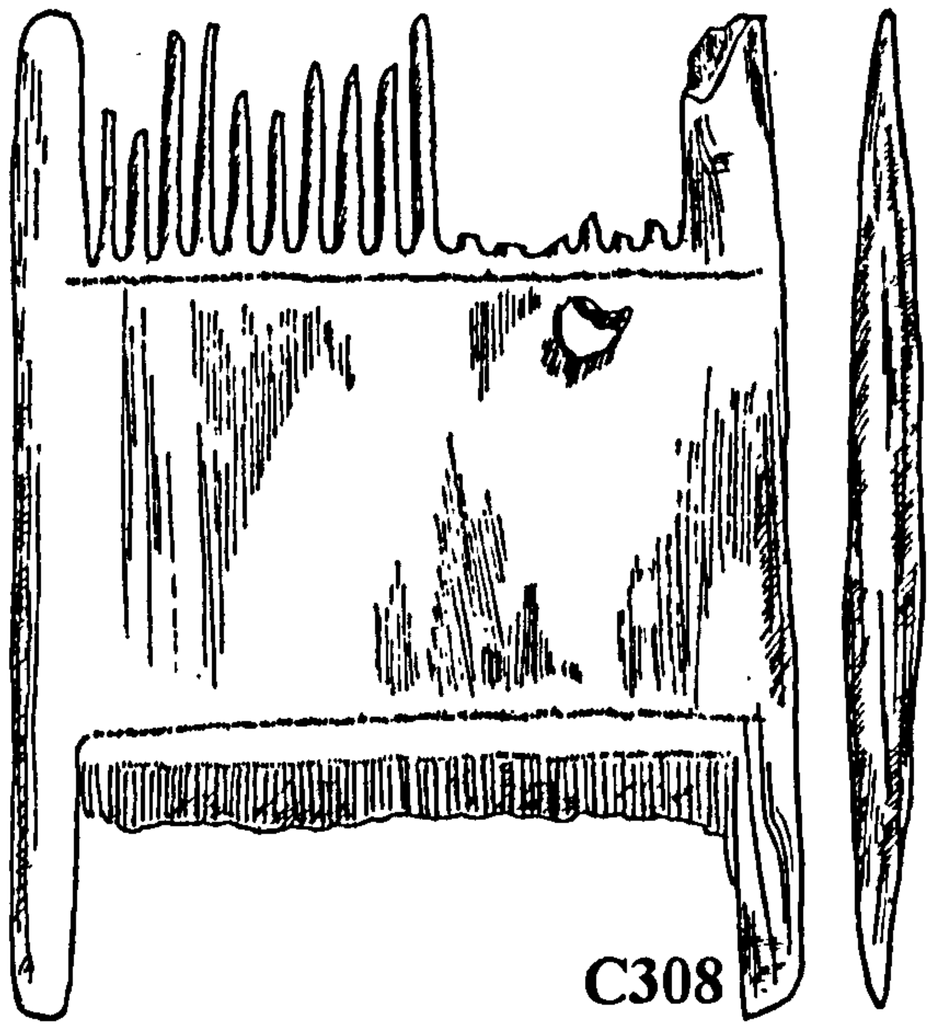


	m.10th C.	l.10th C.	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.
class 2b (201 items)	1	7	10	13	12	6	5	2	9	13	34	34	35	16	4
class 2a (476 items)	0	0	6	24	42	94	71	85	64	43	29	13	2	1	2
class 1 (210 items)	52	67	61	27	1	0	0	2	0	0	0	0	0	0	0

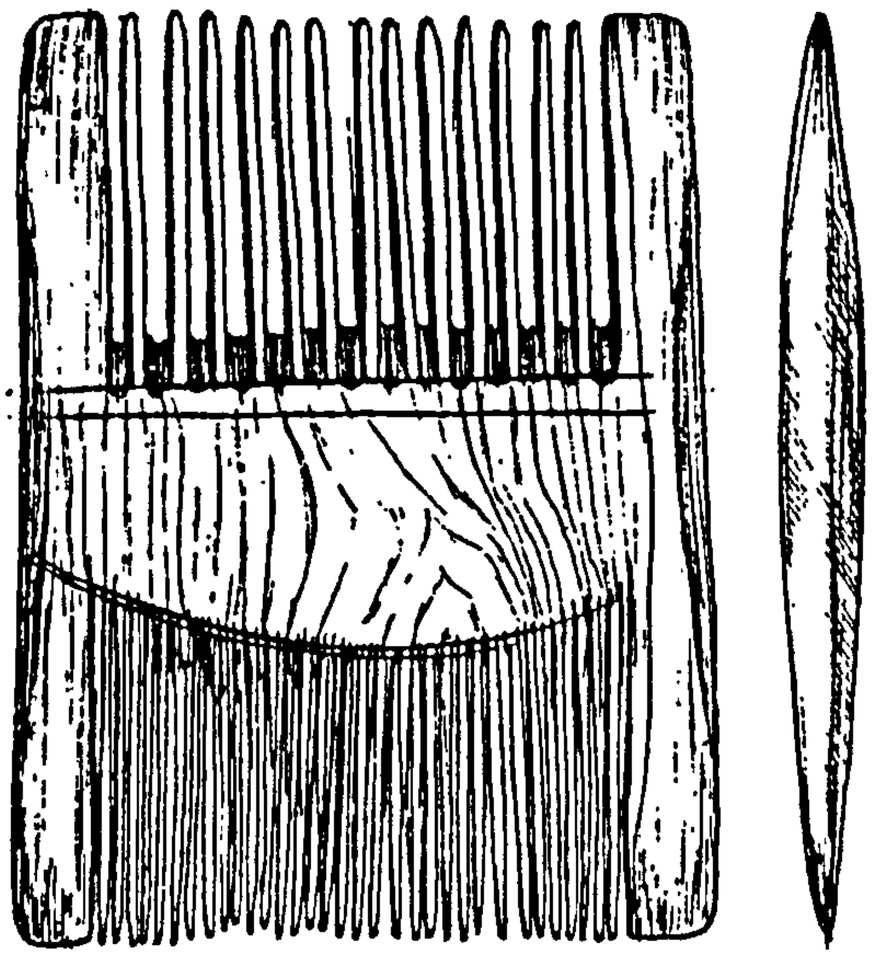
Fig. 5.4 Early class 2b combs from the Troitsky site



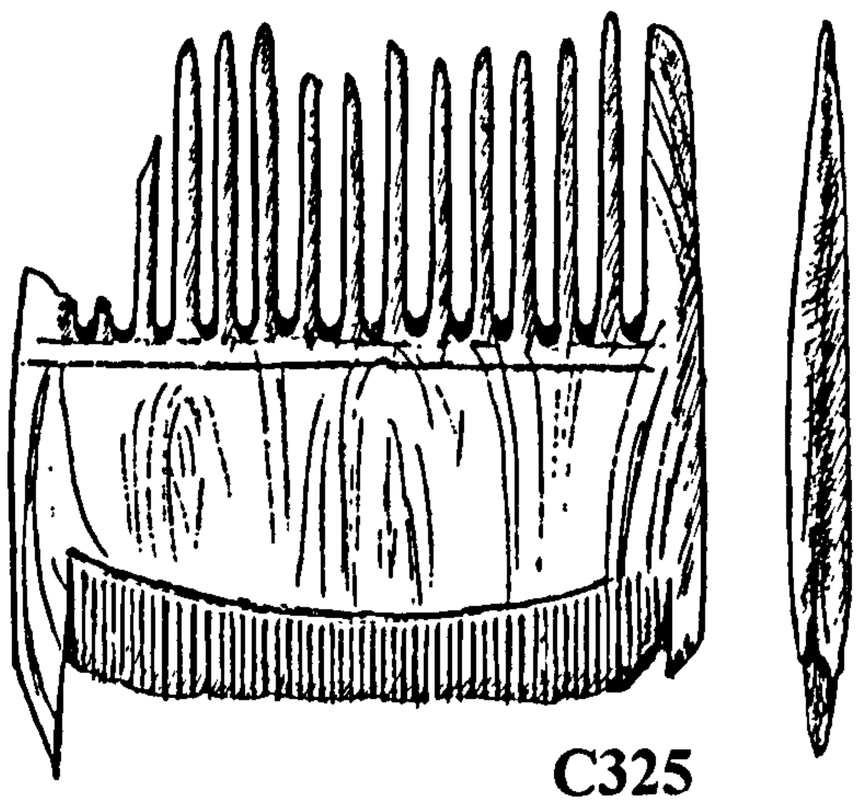
C300



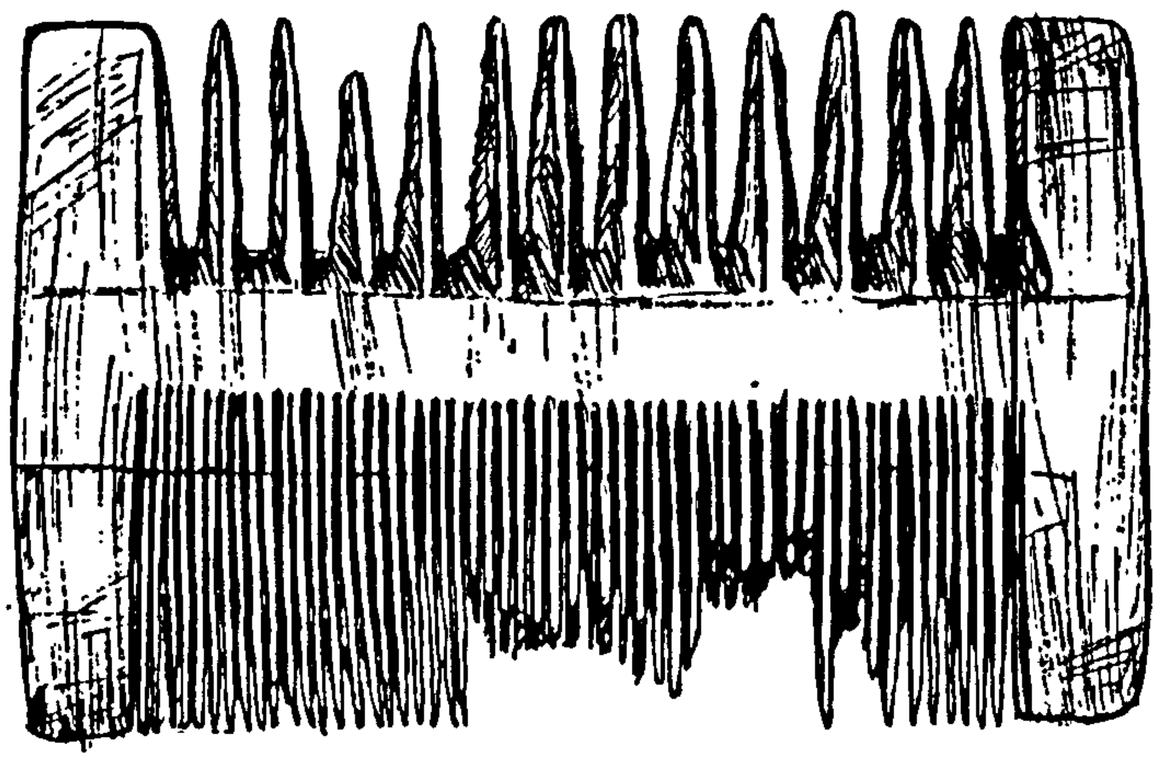
C308



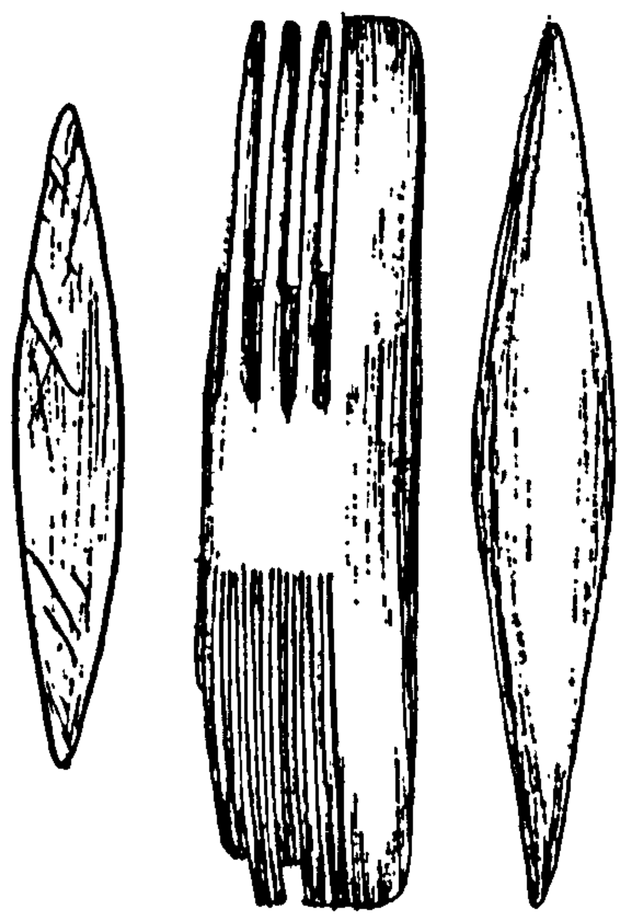
C85



C325



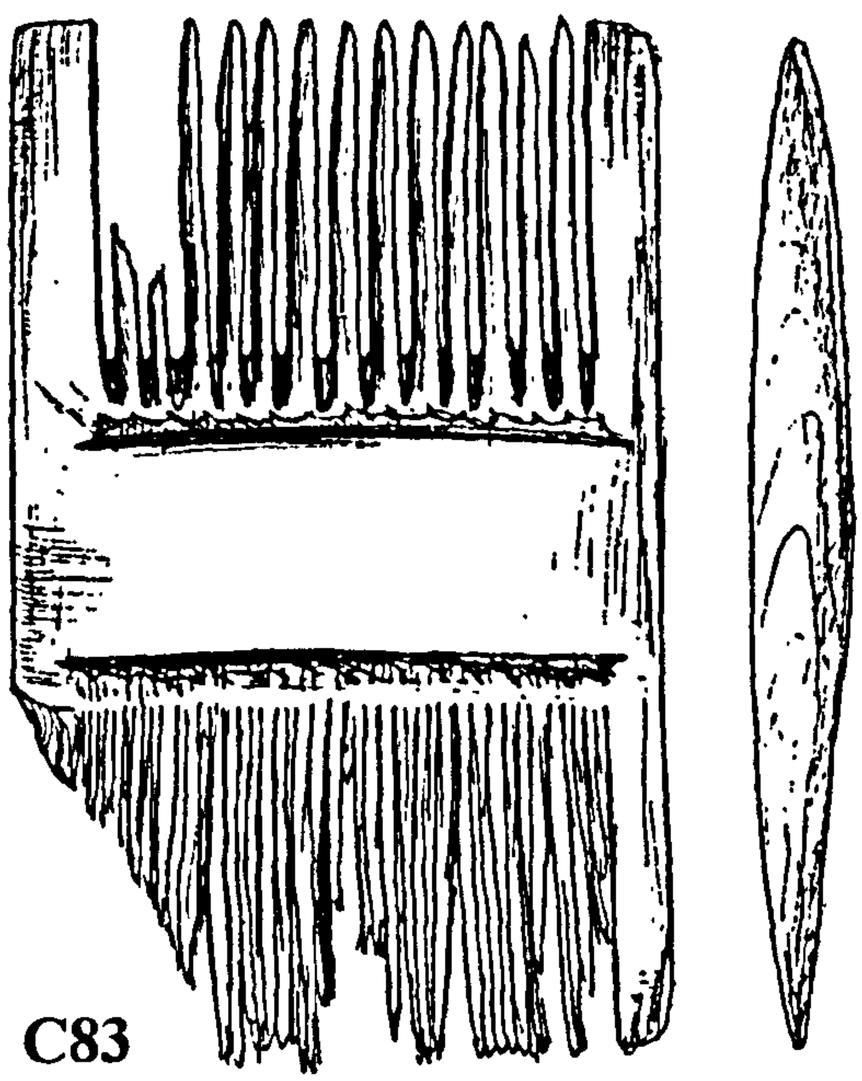
C30



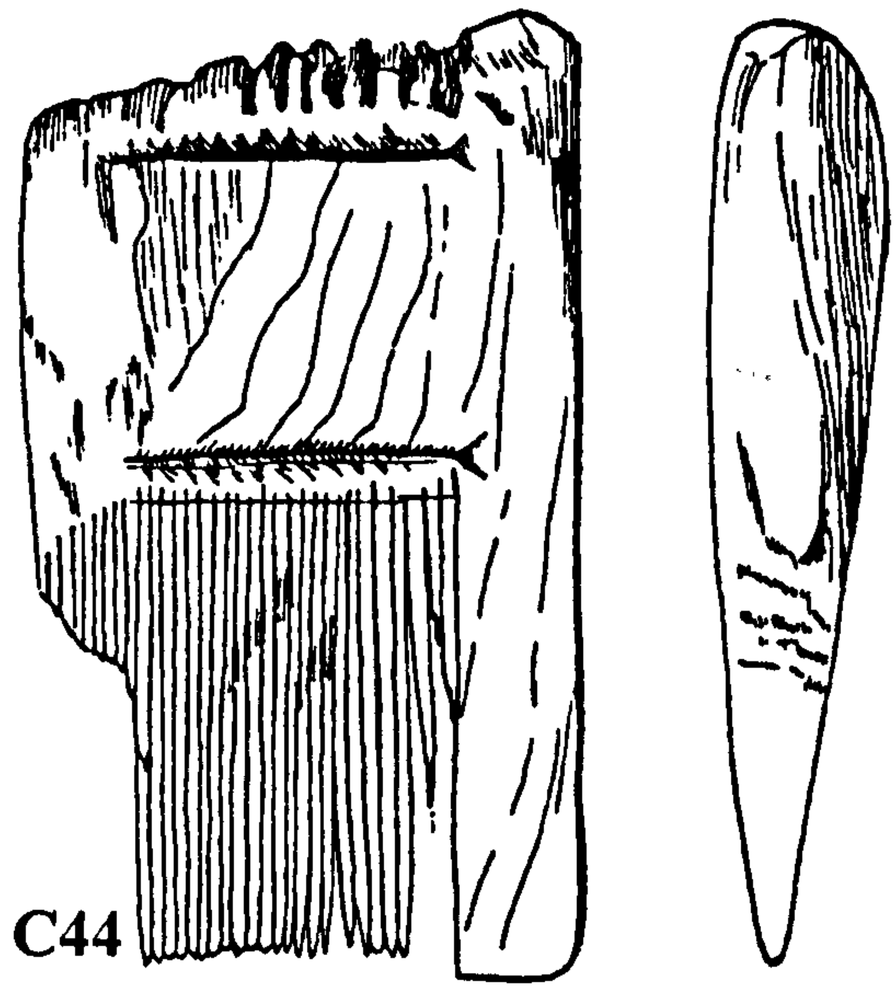
C75

Scale 3:4

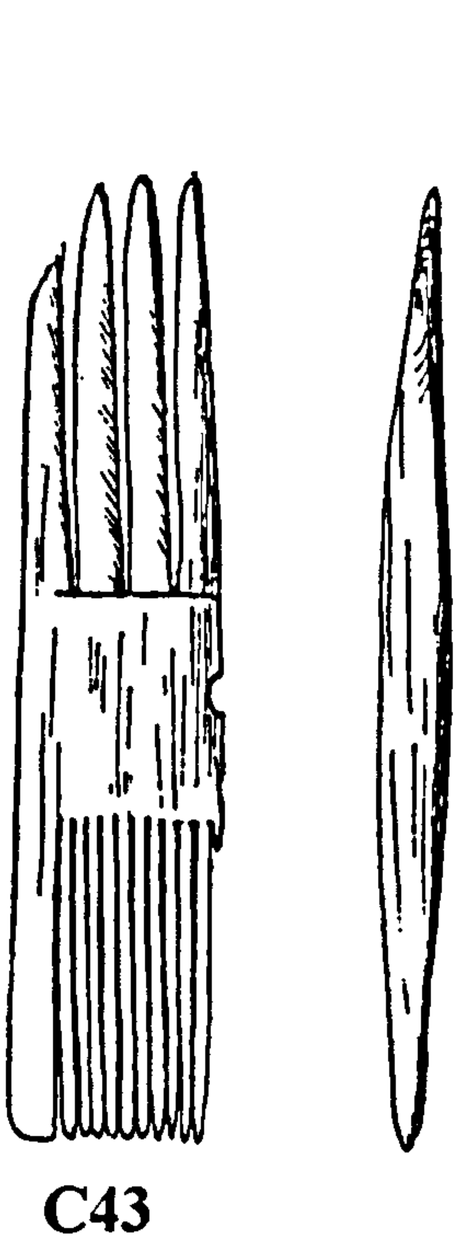
Fig. 5.5 Early class 2b combs from the Troitsky site



C83



C44



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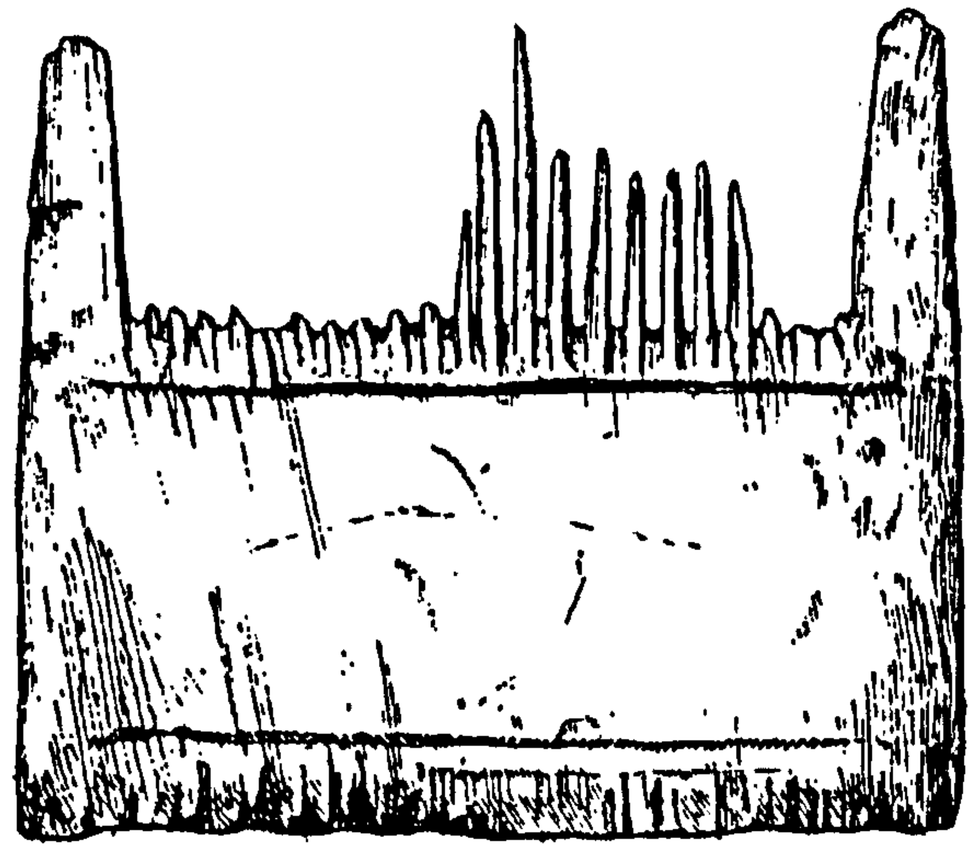
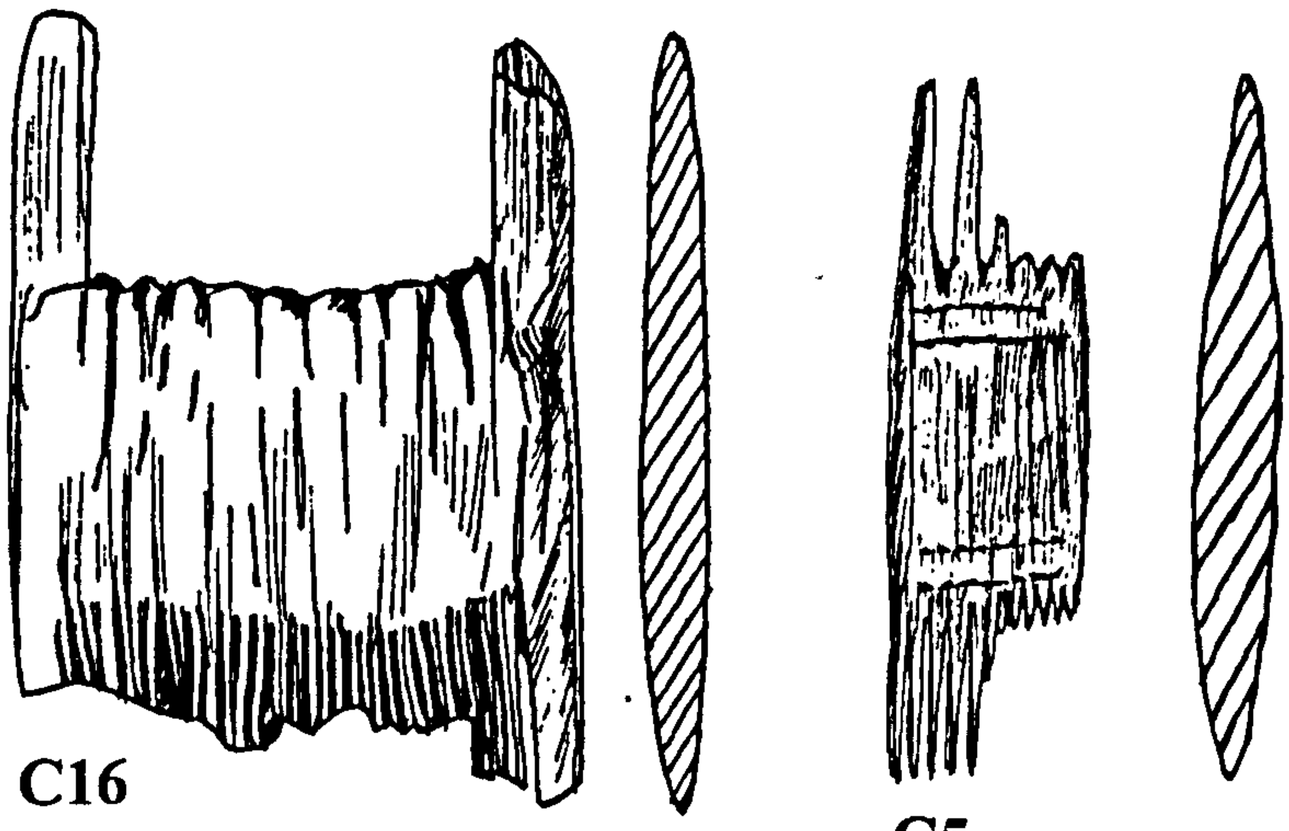


C166

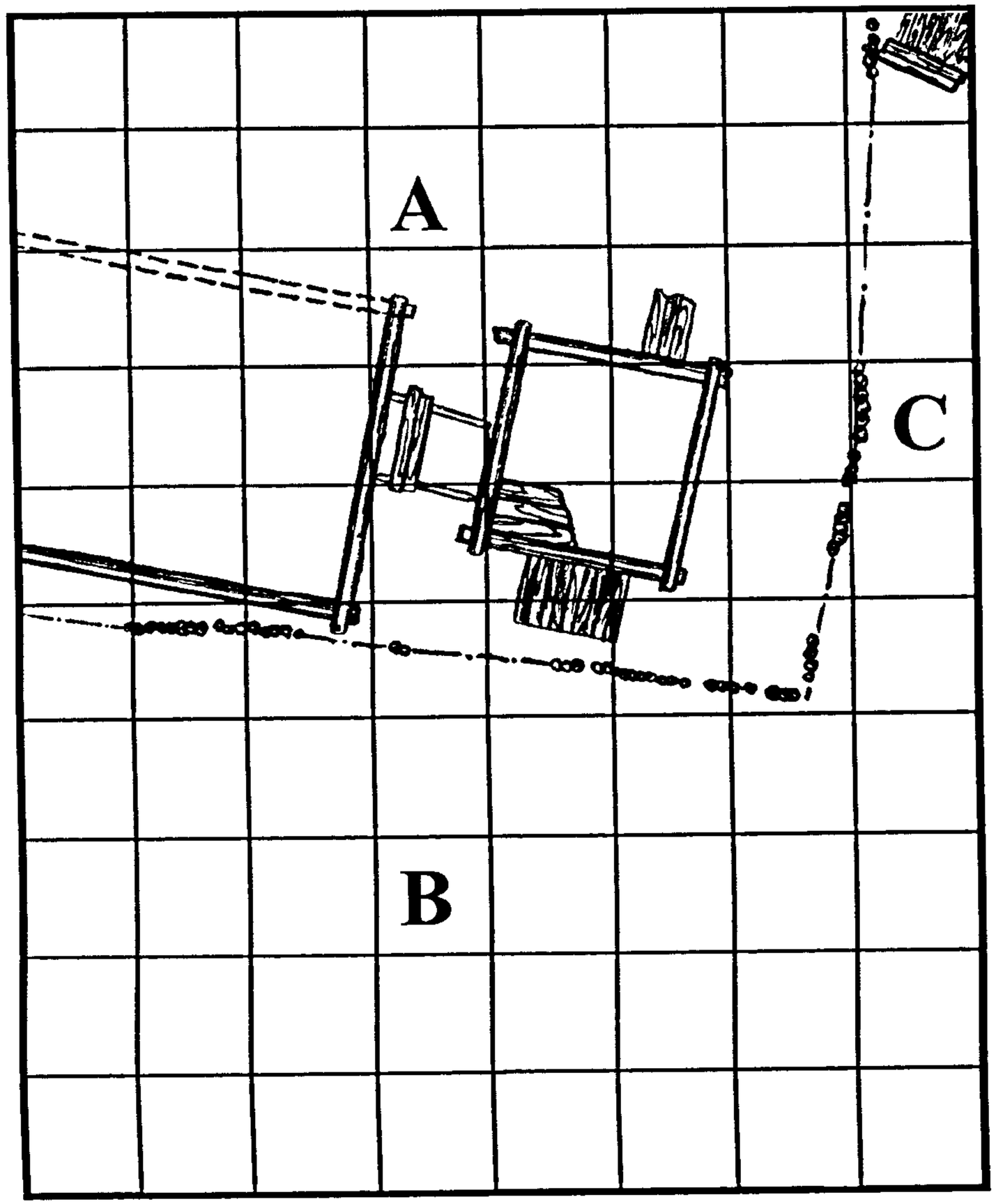


C16

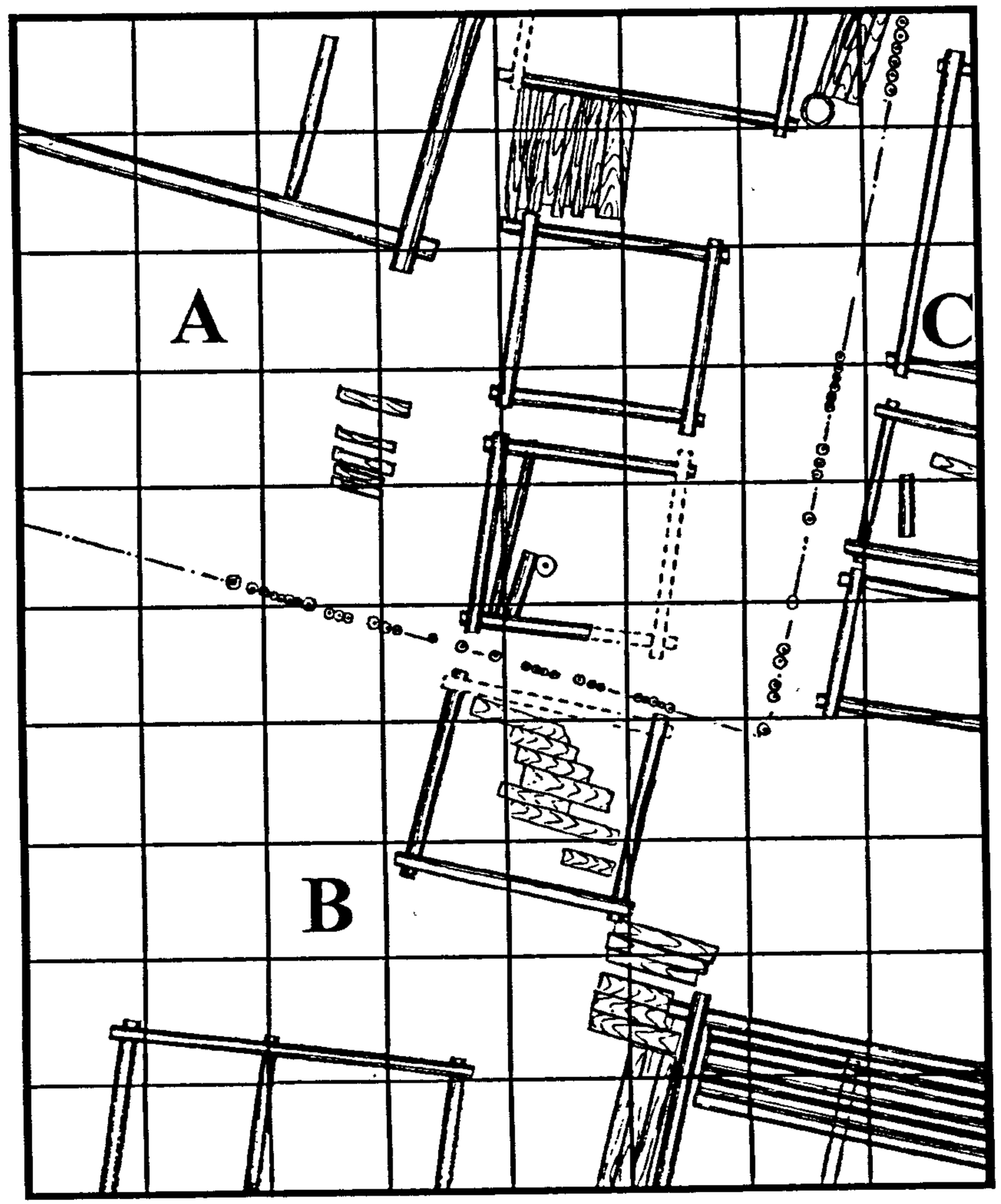
C5

Scale 4:5

Fig. 5.6 Kirovsky property A at the 14th century layers

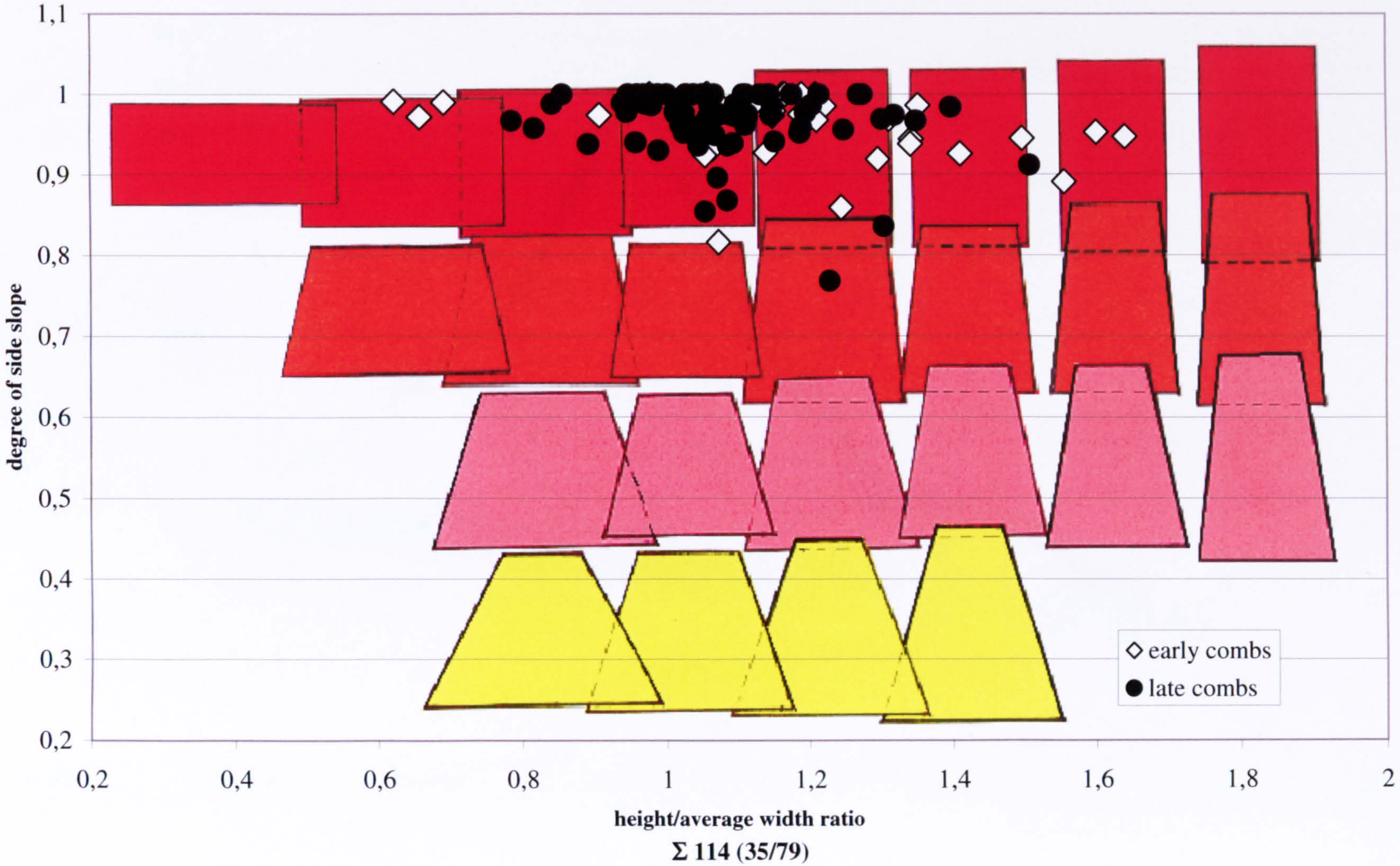


Construction horizon 6



Construction horizon 8

Fig. 5.7 Simple combs in in wood. Basic forms of early and late specimens



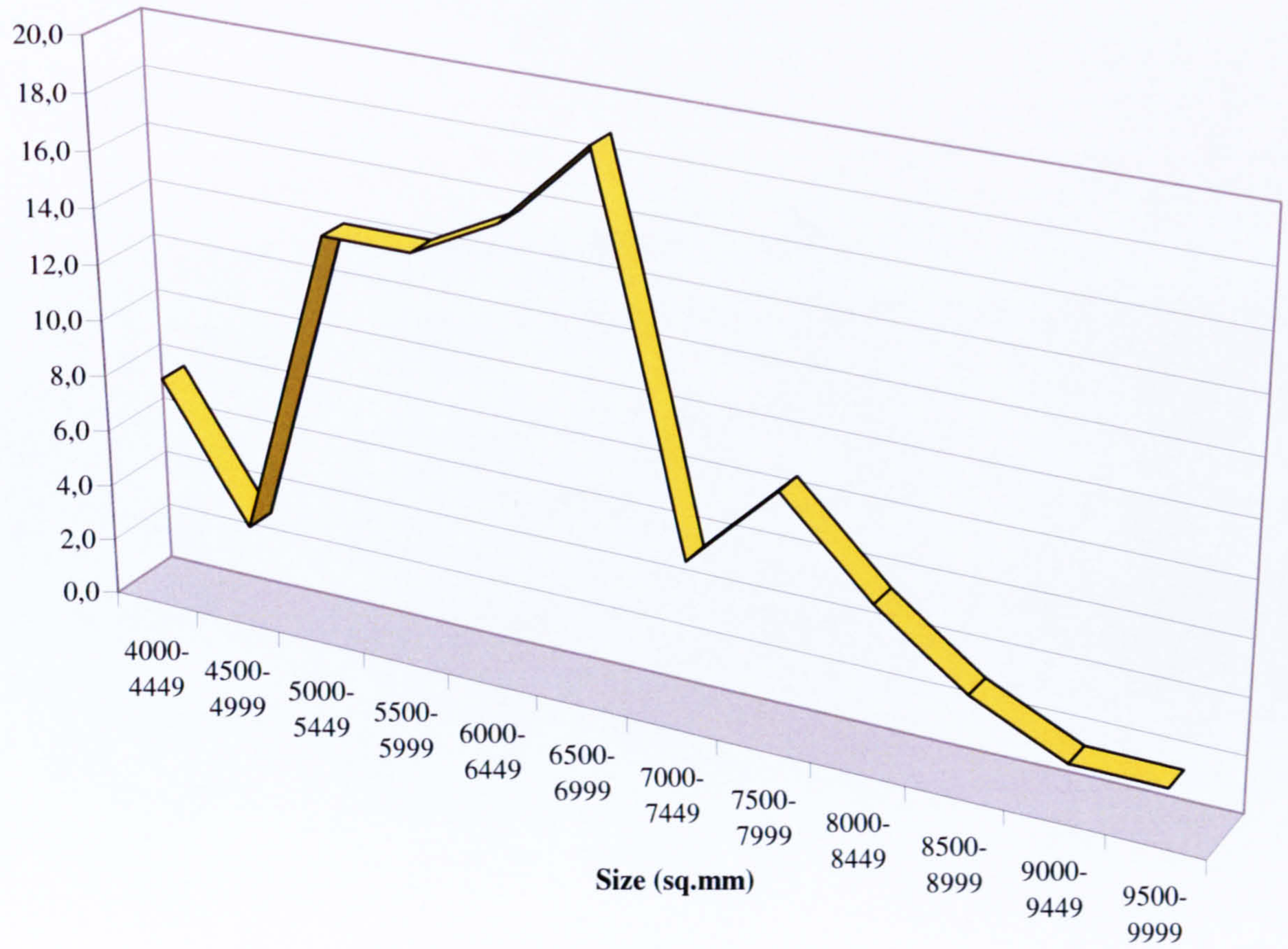
Σ 114 (35/79)

Fig. 5.8 Simple combs in wood. Relative depth

Σ 137

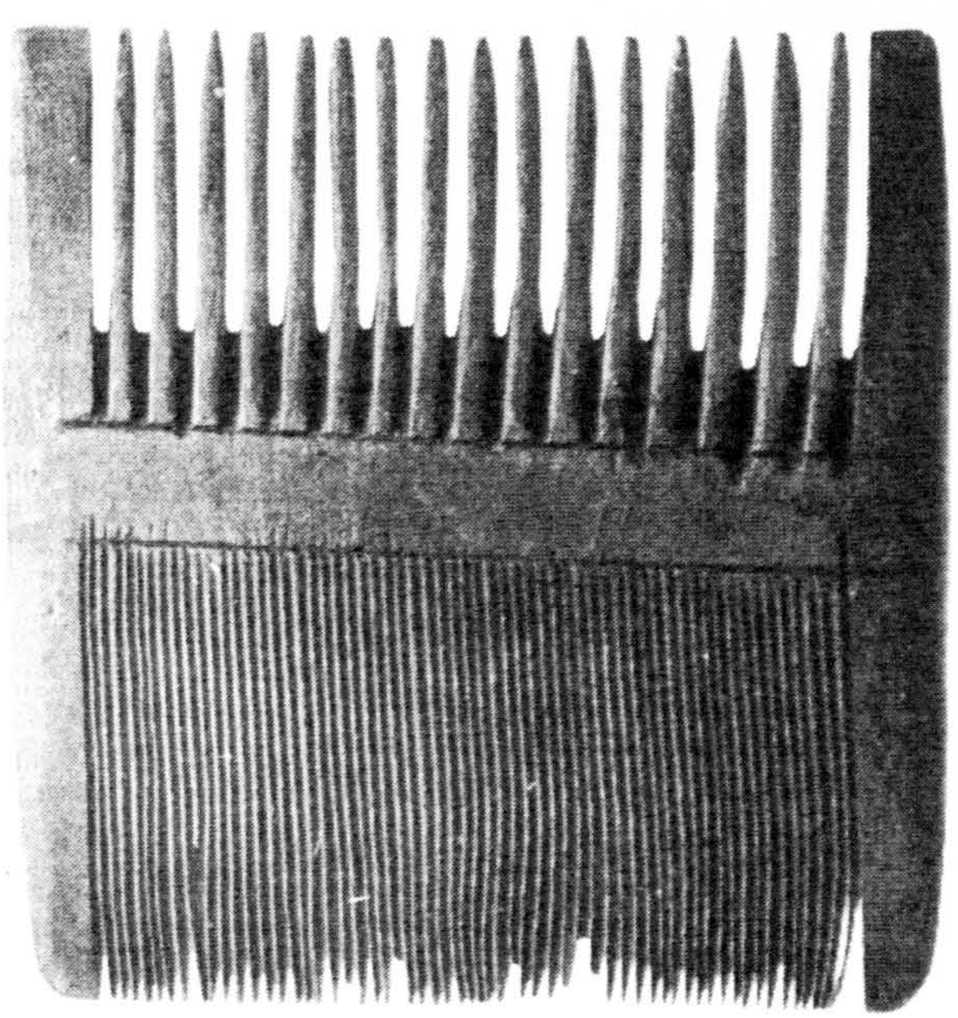
	0.05-0.06	0.07-0.08	0.09-0.10	0.11-0.12	0.13-0.14	0.15-0.16	0.17-0.18	0.19-0.20
■	5	14	25	48	25	9	9	2

Fig. 5.9 Sizes of simple combs in wood

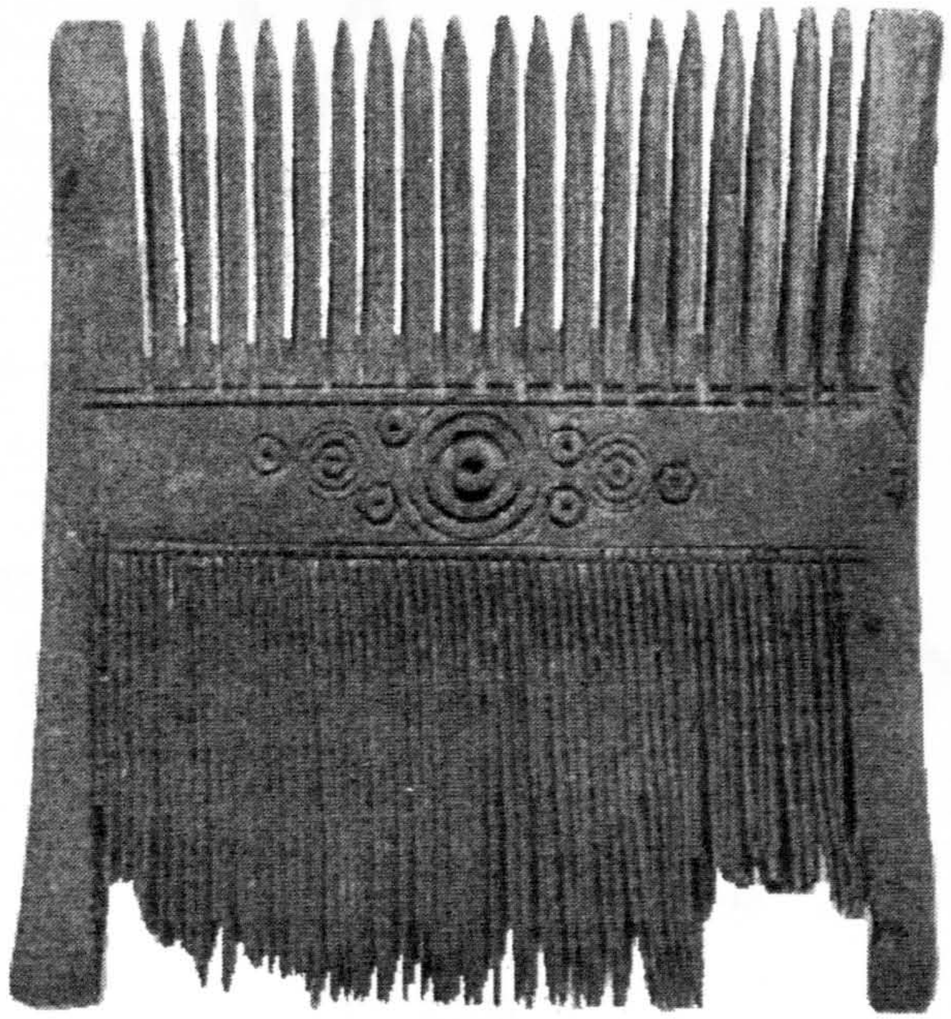


	4000-4449	4500-4999	5000-5449	5500-5999	6000-6449	6500-6999	7000-7449	7500-7999	8000-8449	8500-8999	9000-9449	9500-9999
total 127 (100%)	7,9	3,1	14,2	14,2	15,7	18,9	5,5	8,7	5,5	3,1	1,6	1,6

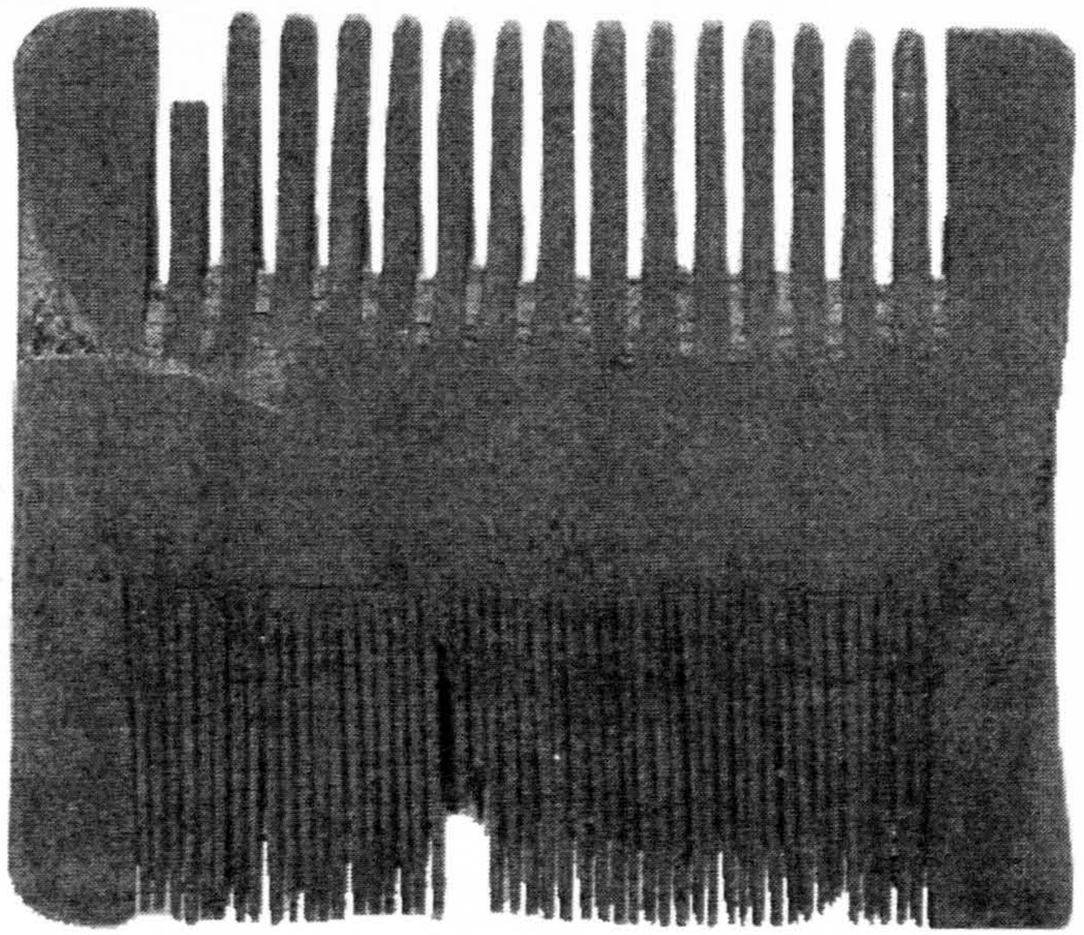
Fig. 5.10 Two types of guidelines: gently scratched lines (C266) and deepened grooves exploited decoratively (C290 ans292)



C292



C290



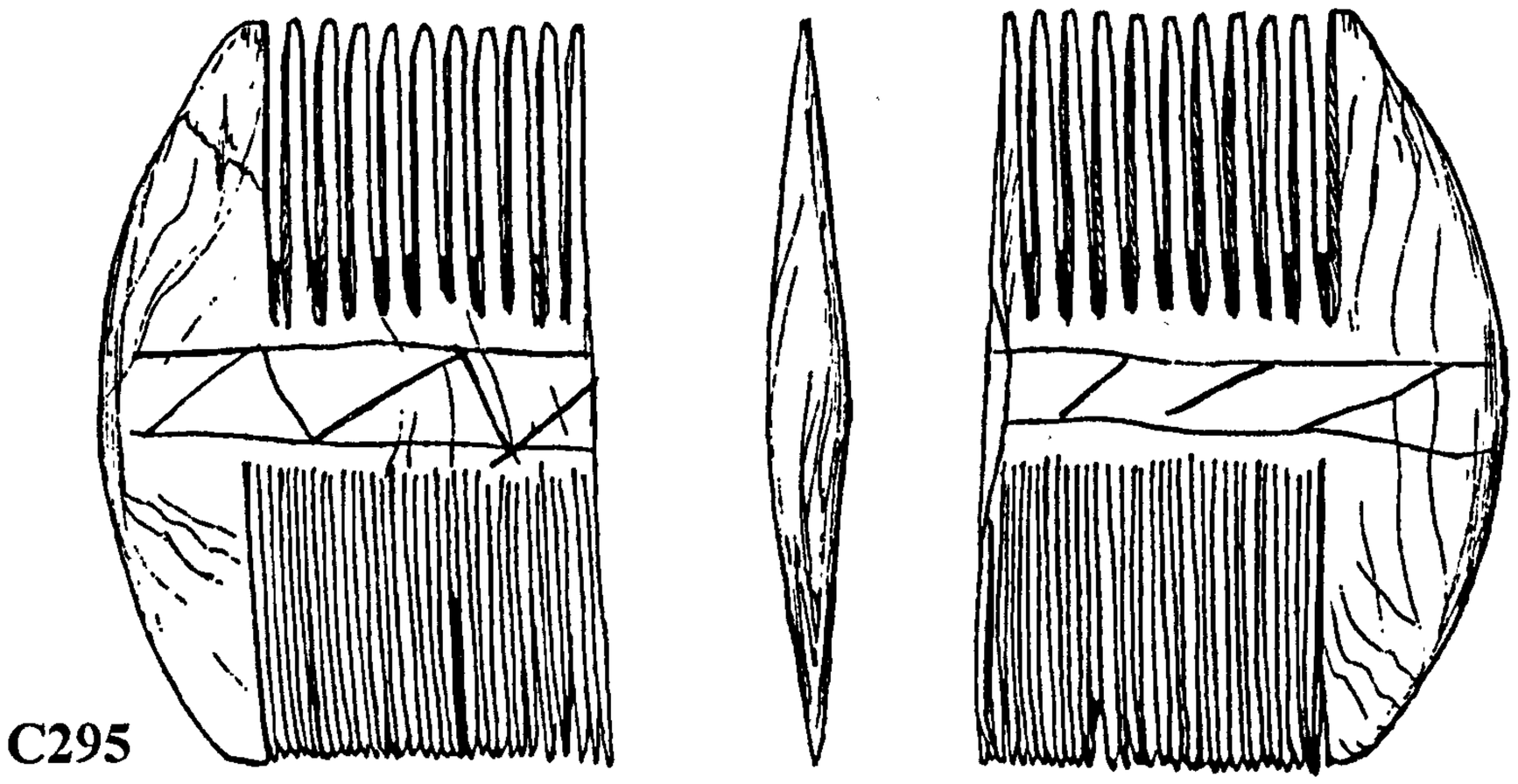
C266

Fig. 5.11 Simple combs in wood. Relative height of the central zone

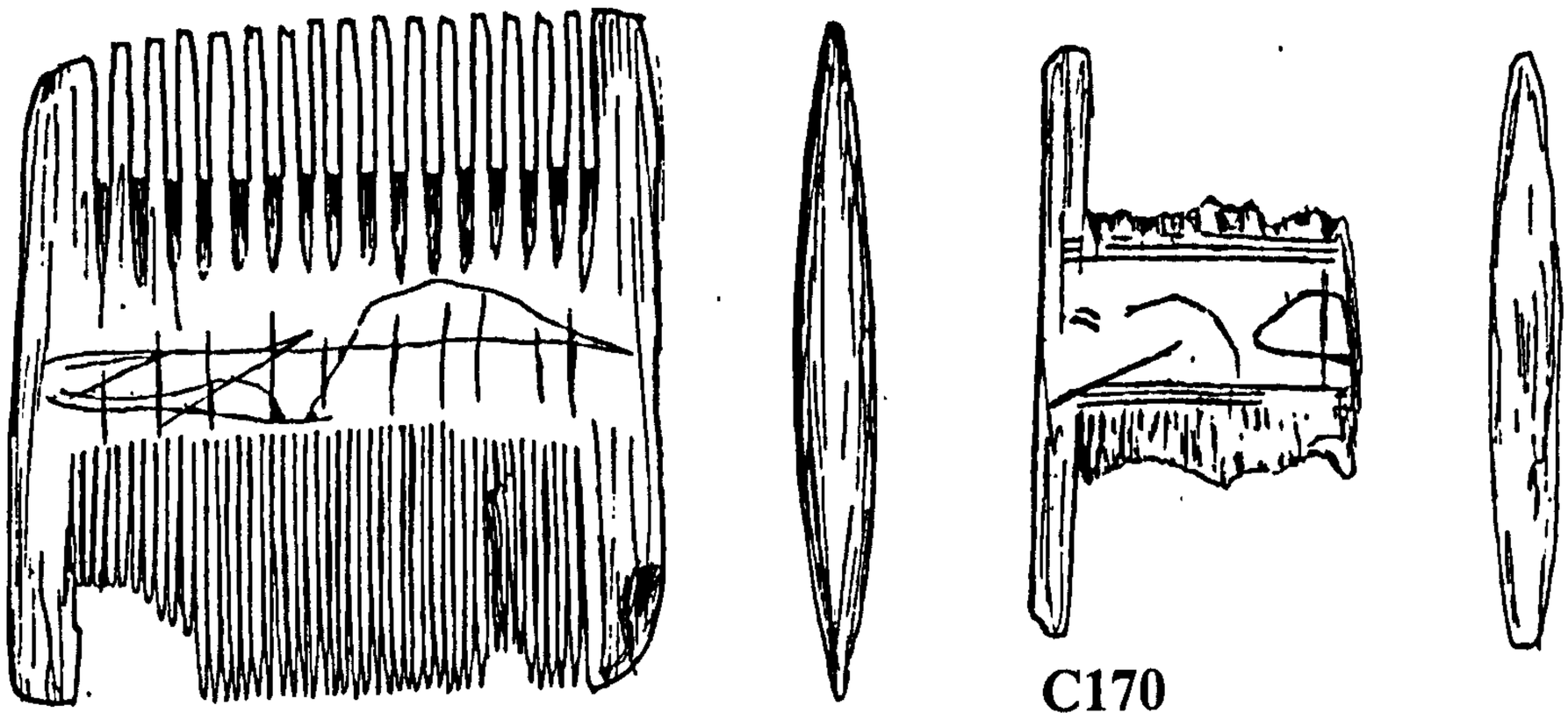
Σ 278

	0.11-0.12	0.13-0.14	0.15-0.16	0.17-0.18	0.19-0.20	0.21-0.22	0.23-0.24	0.25-0.26	0.27-0.28	0.29-0.30	0.31-0.32	0.33-0.34	0.35-0.36	0.37-0.38	0.39-0.40	0.41-0.42	0.43-0.44	0.45-0.46	0.47-0.48	0.49-0.50
278	3	6	23	27	40	37	40	19	31	12	14	7	9	2	3	1	3	0	0	1

Fig. 5.12 13th - 14th century combs featuring secondary decorations

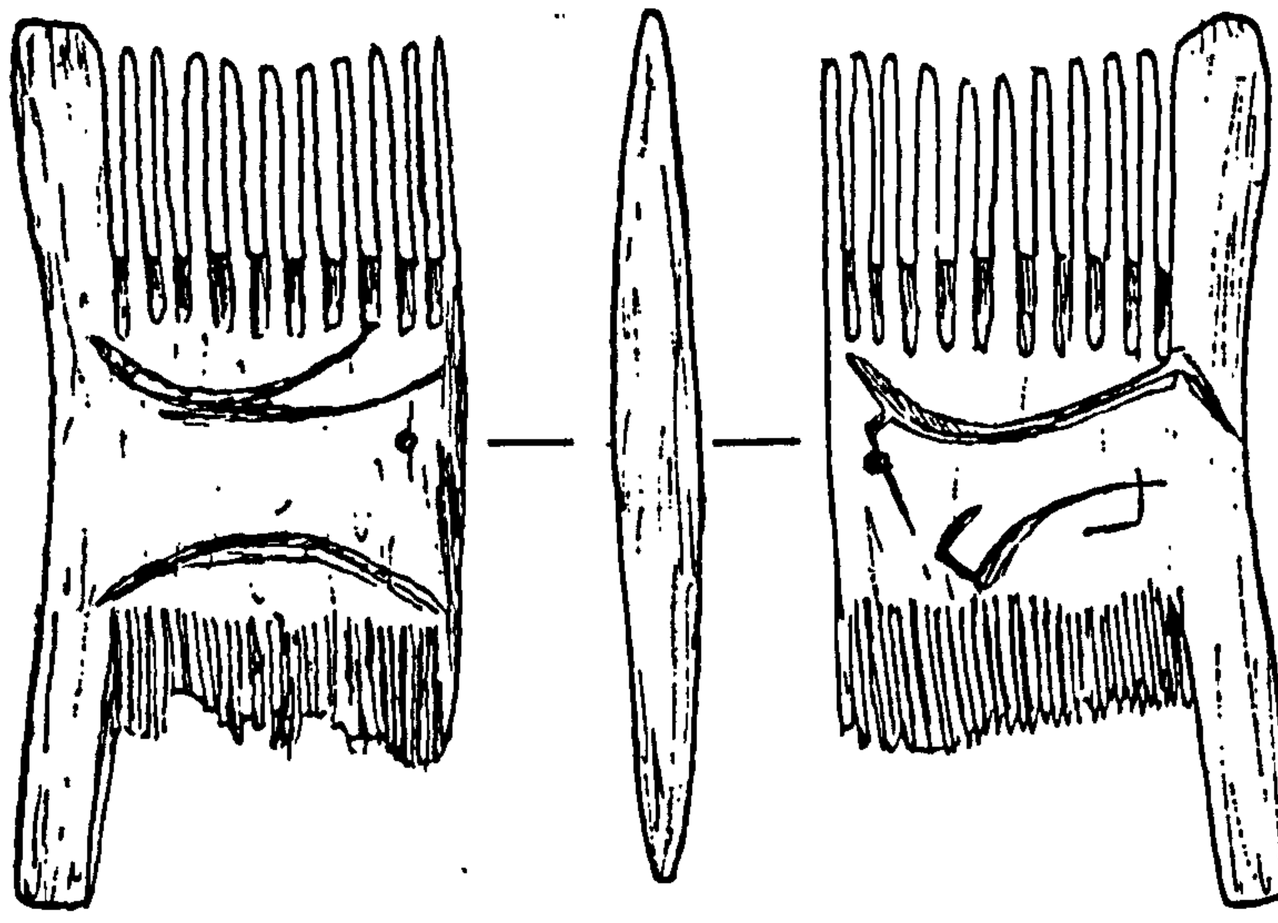


C295



C183

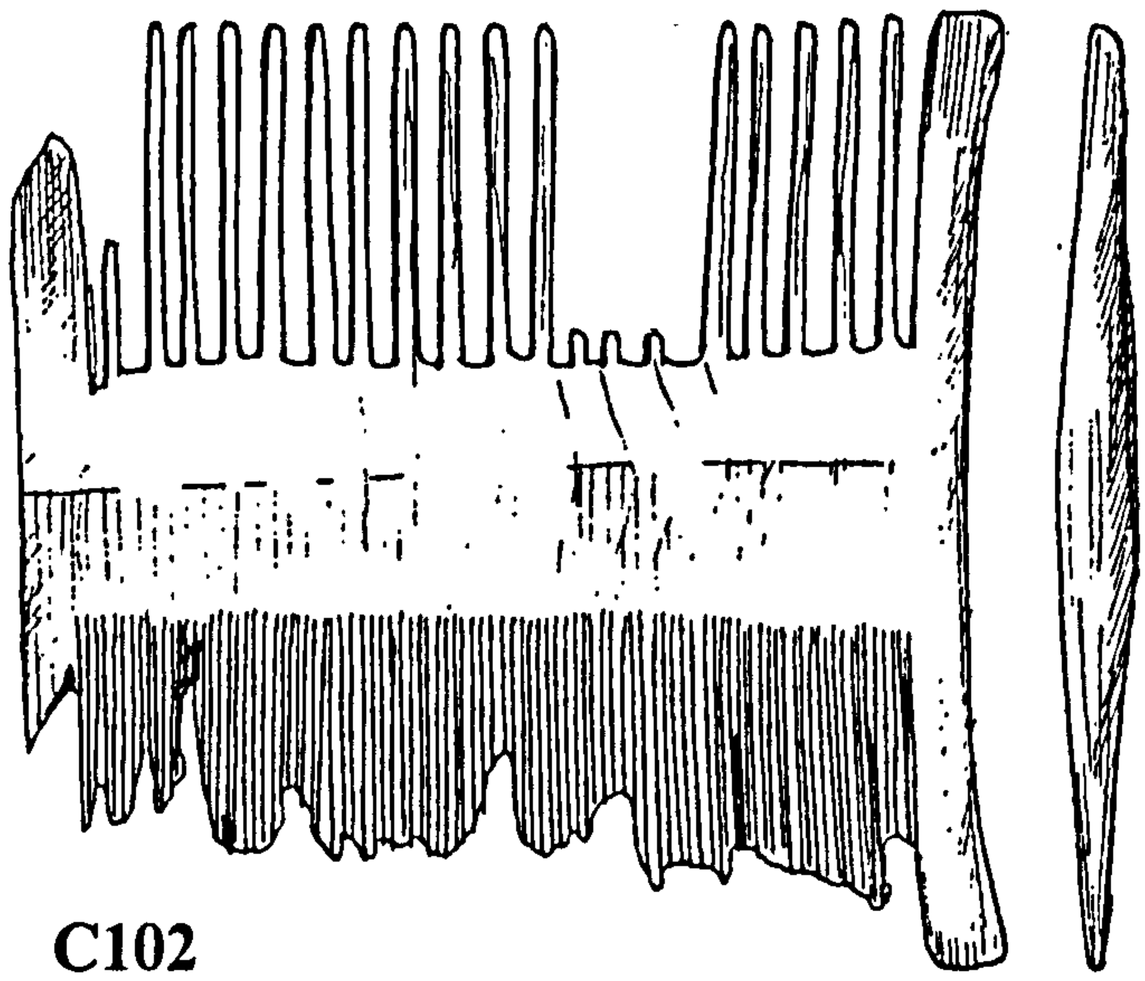
C170



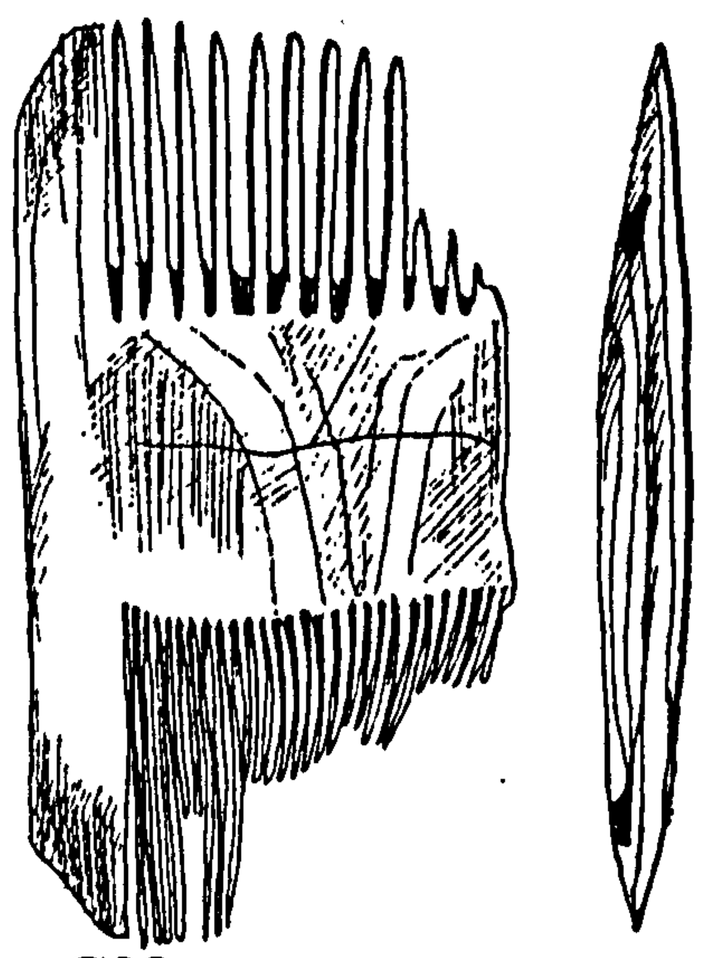
C173

Scale 4:5

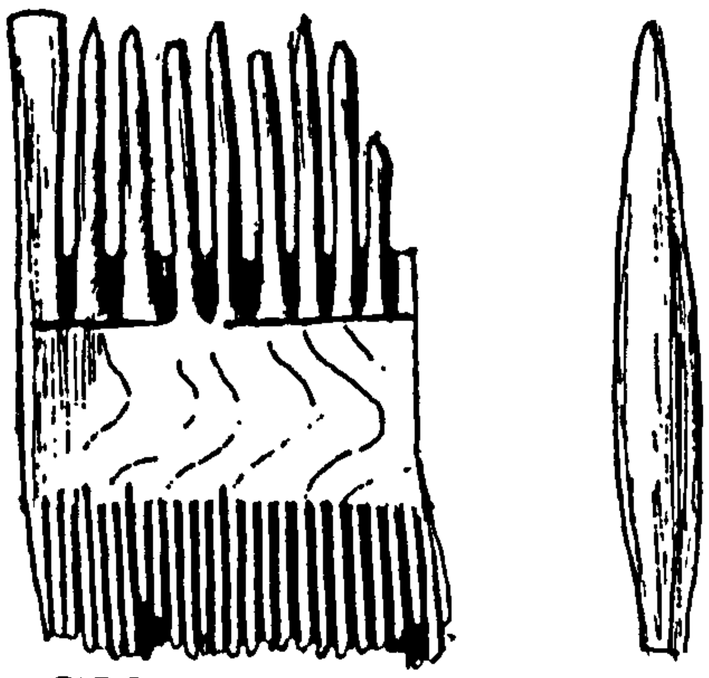
Fig. 5.13 Late wooden combs featuring guidelines for cutting teeth



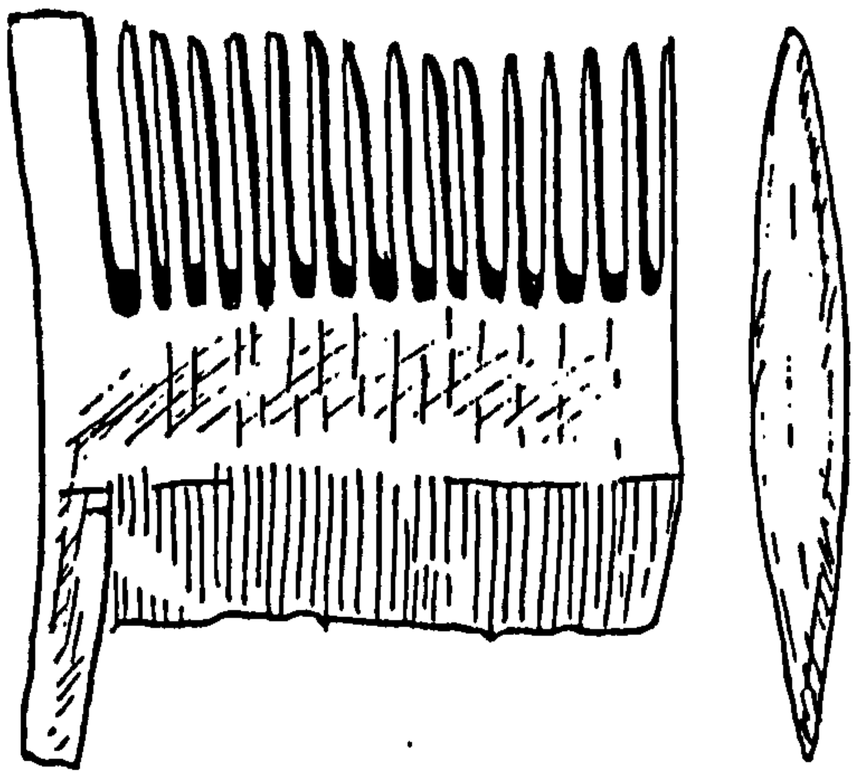
C102



C93



C89



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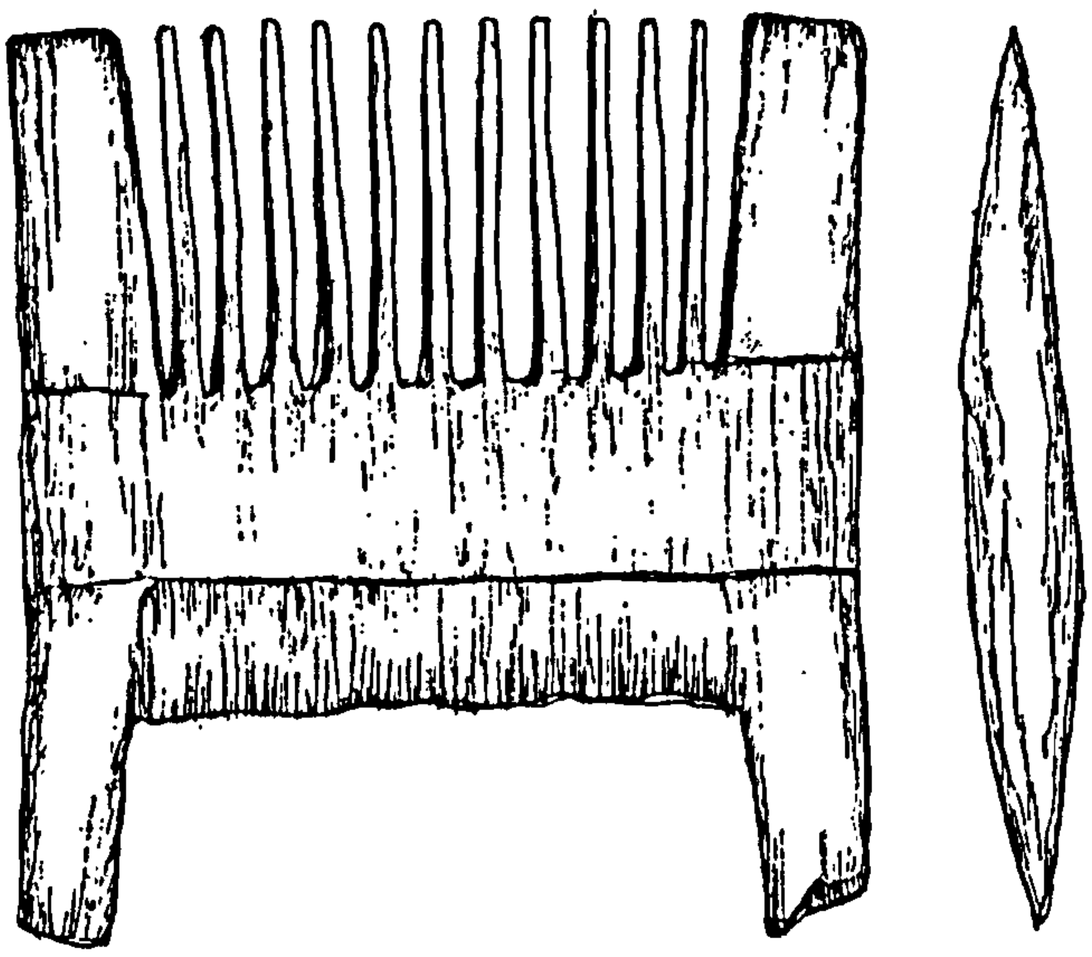
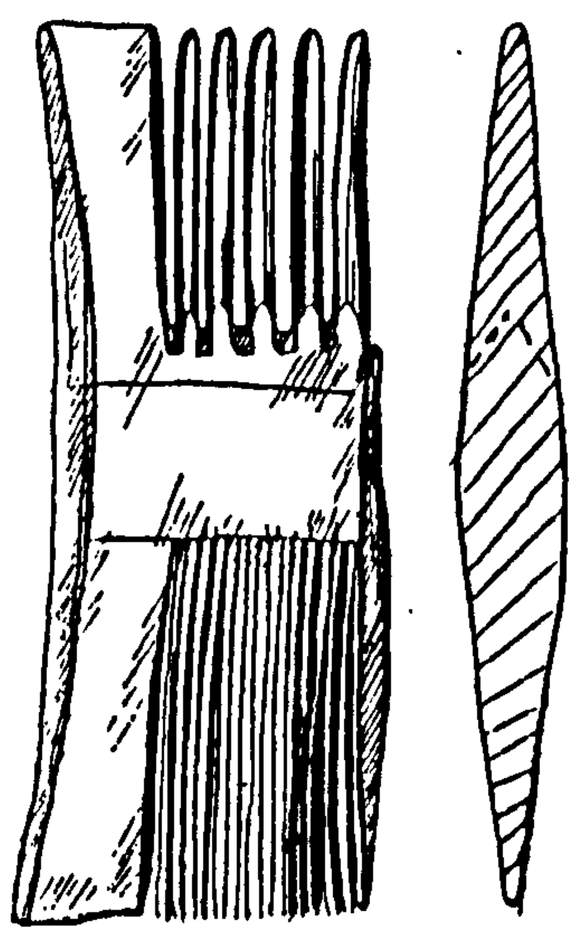


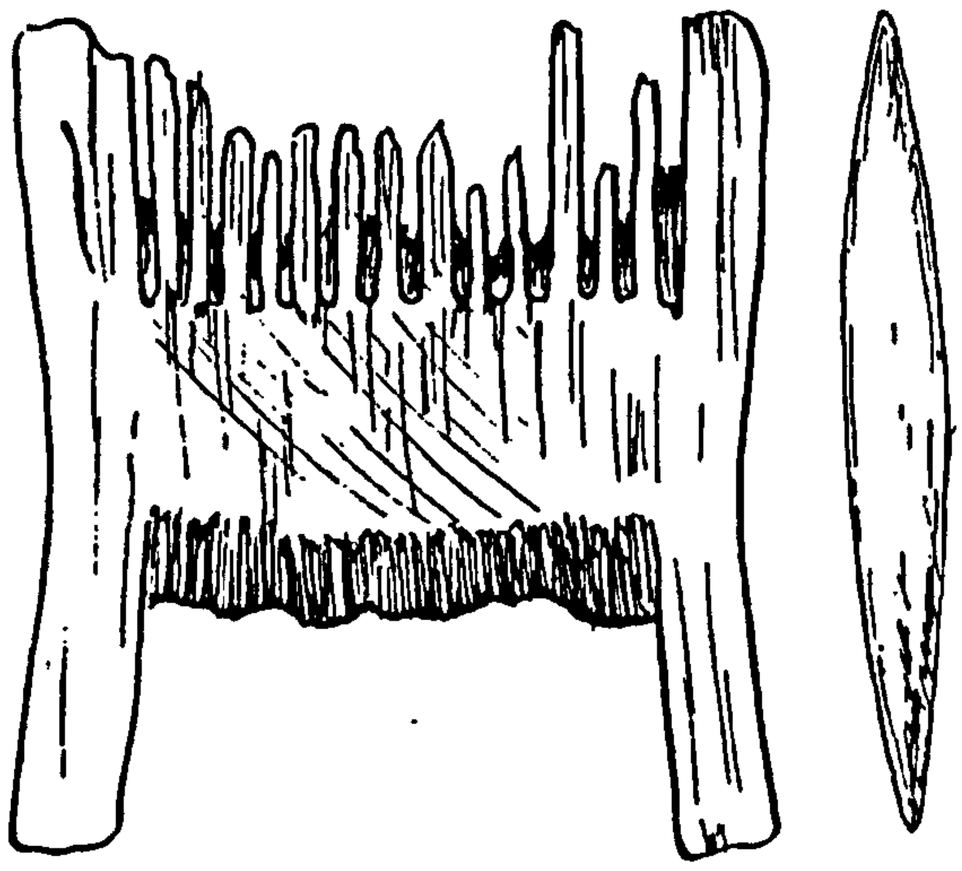
C90



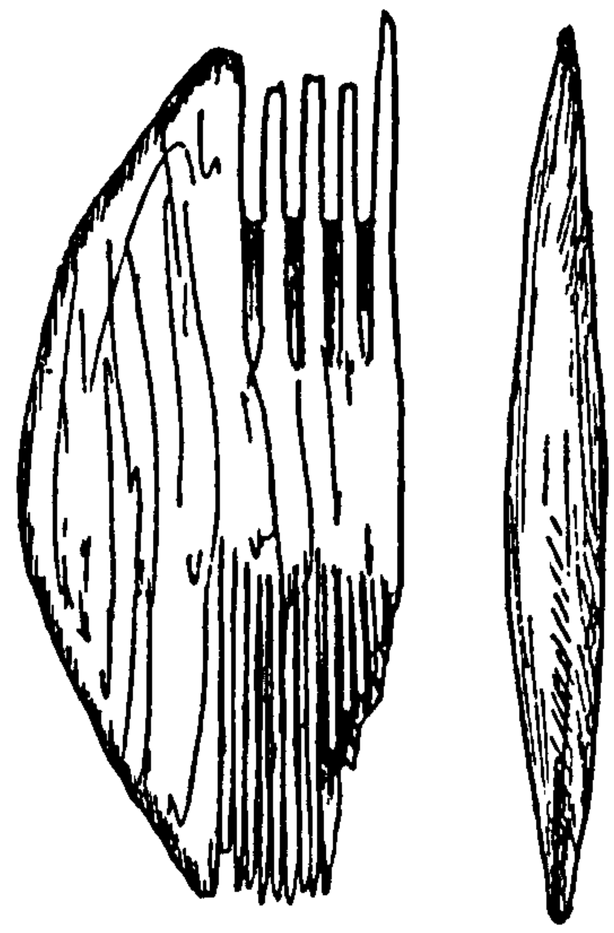
C50

Scale 4:5

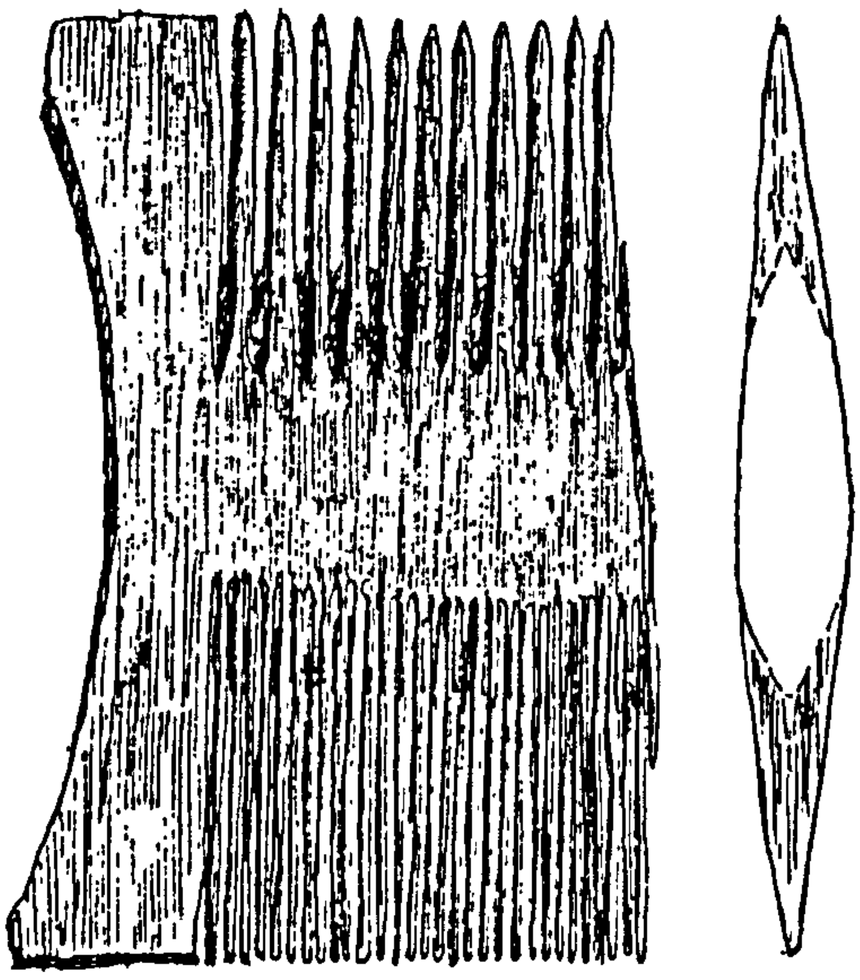
Fig. 5.14 Common types of late 13th - 14th century undecorated combs with straight, concave and convex sides



C136



C172



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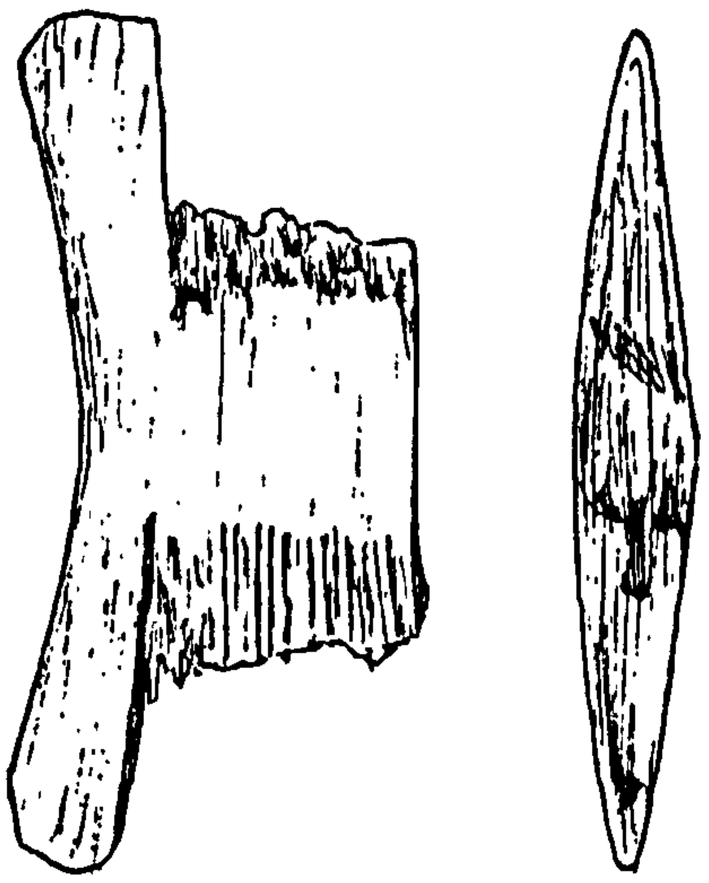

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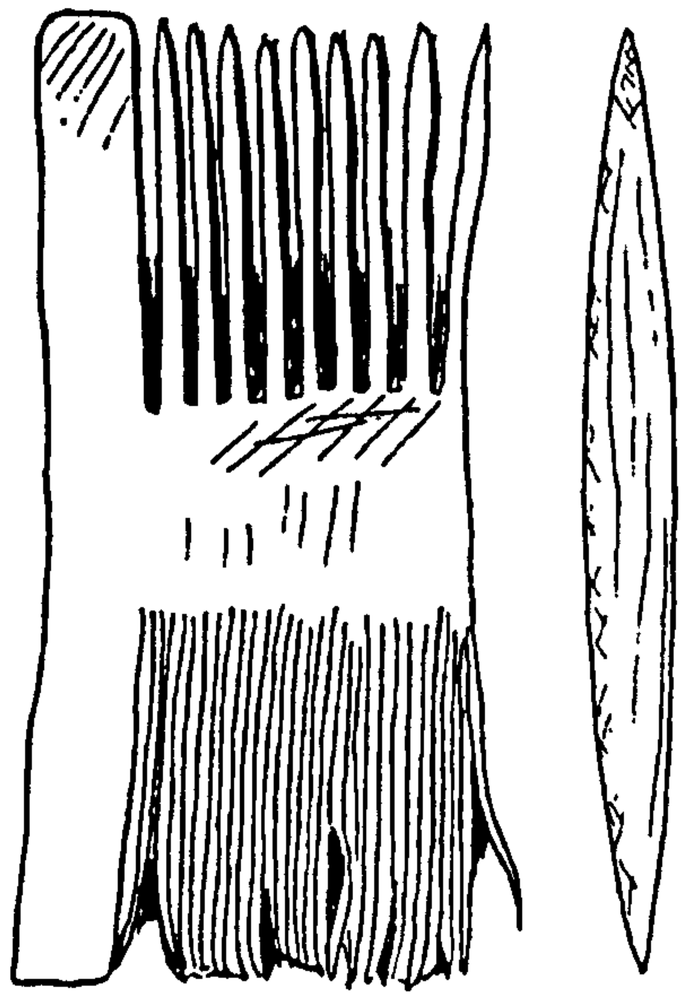
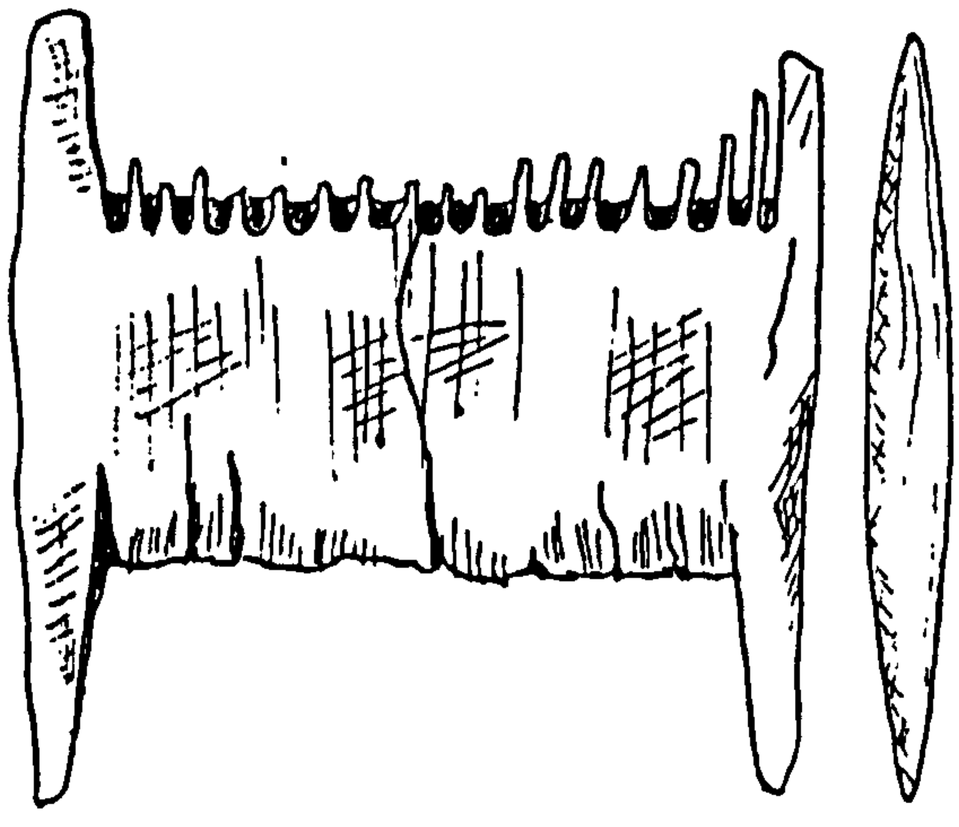


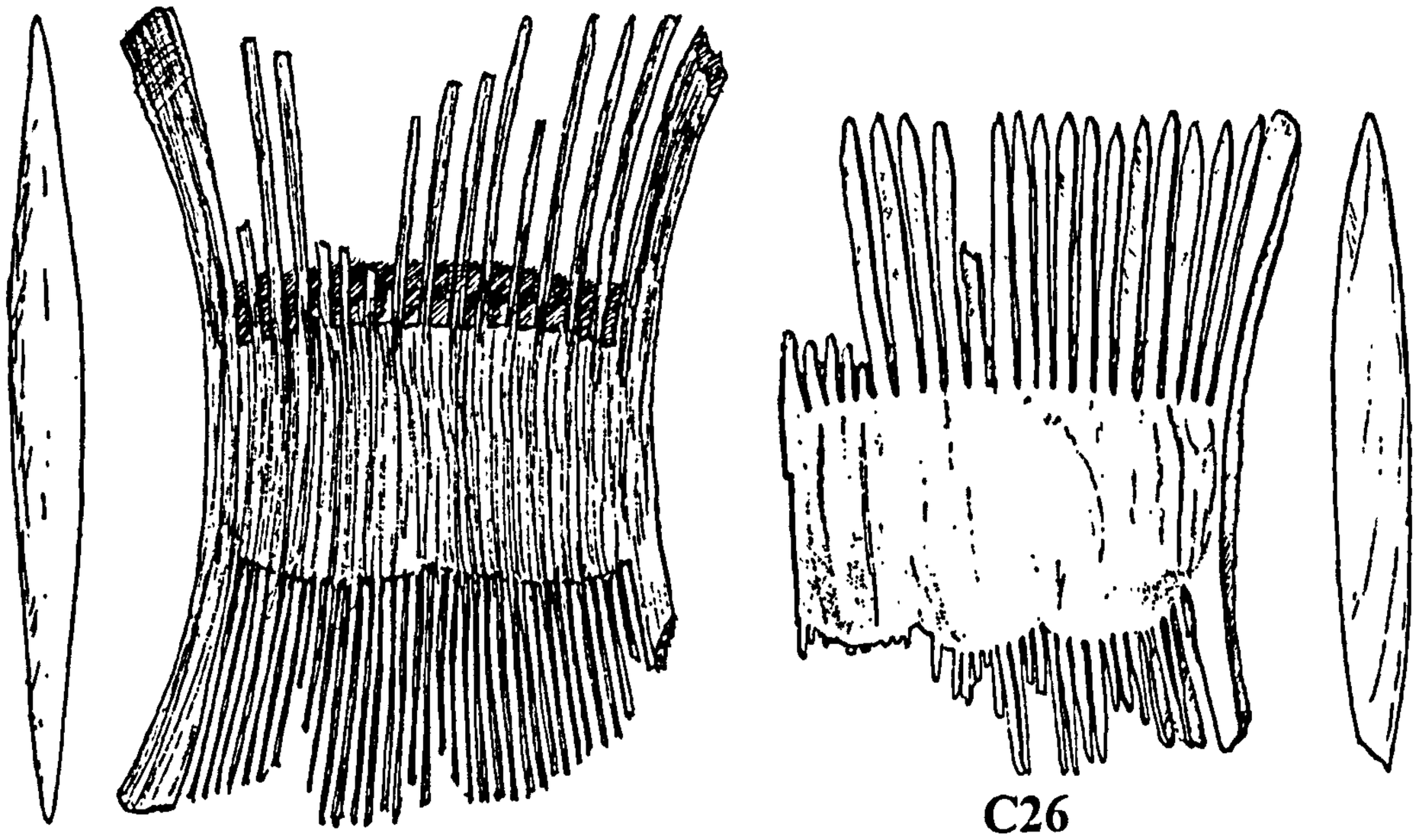
C210



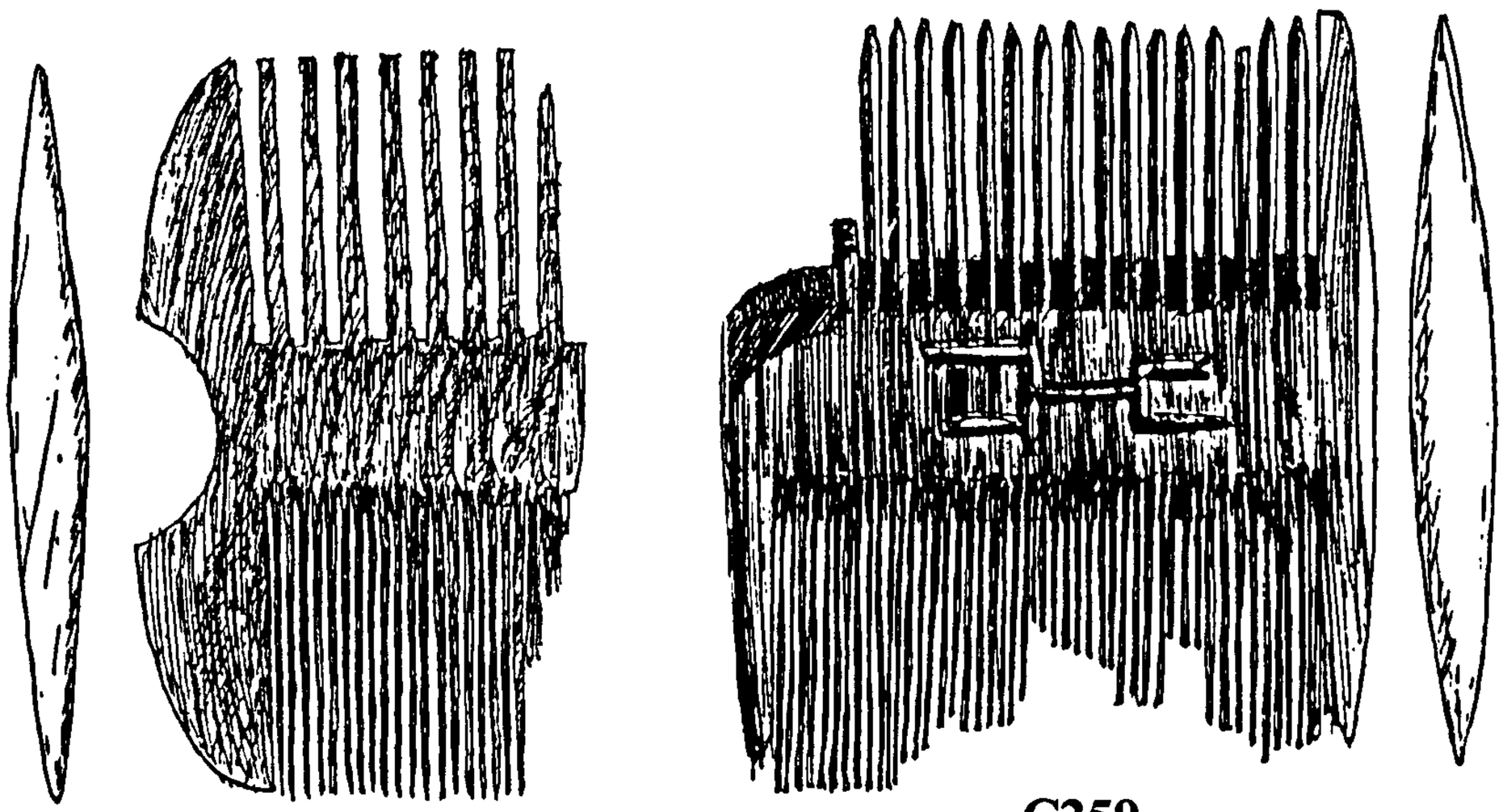
C209

Scale 4:5

Fig. 5.15 13th century combs with straight, concave and ornate sides



C260

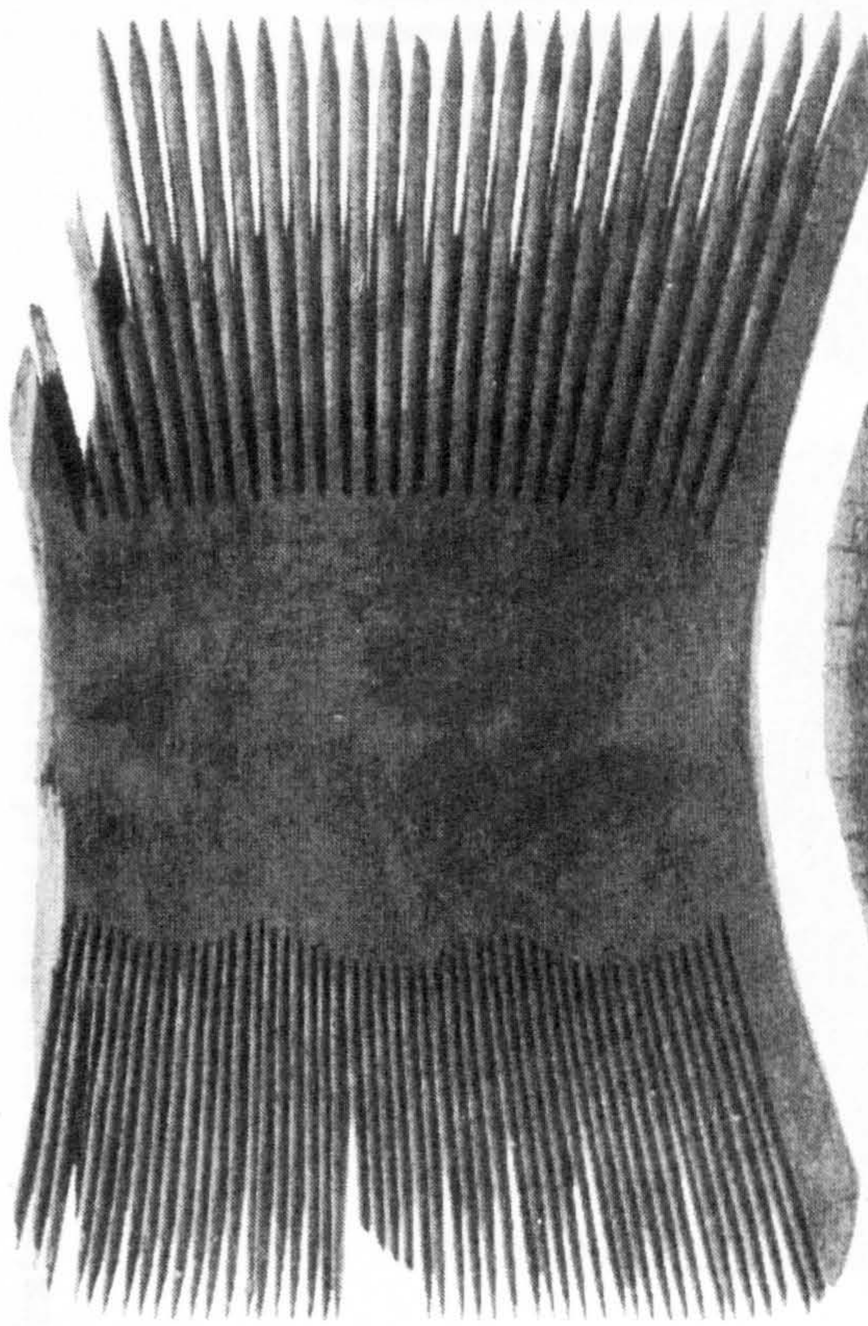


C261

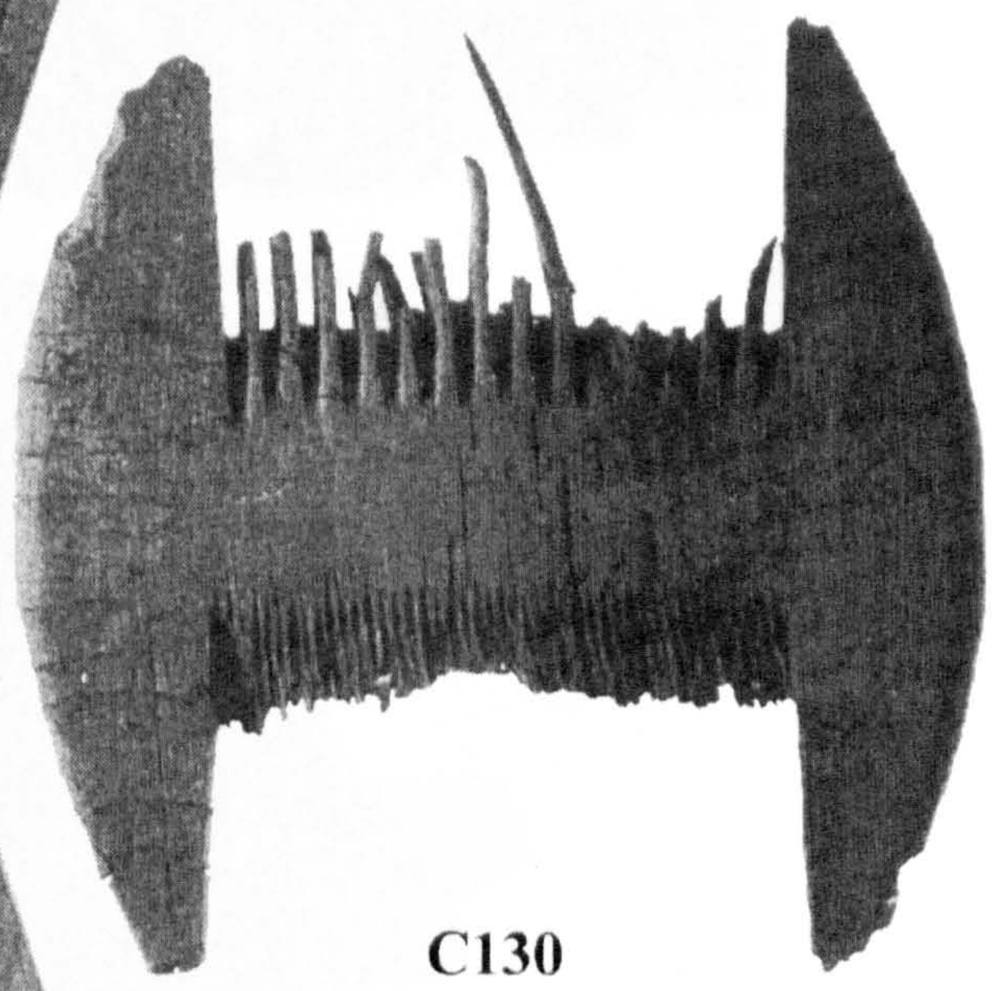
C259

Scale 4:5

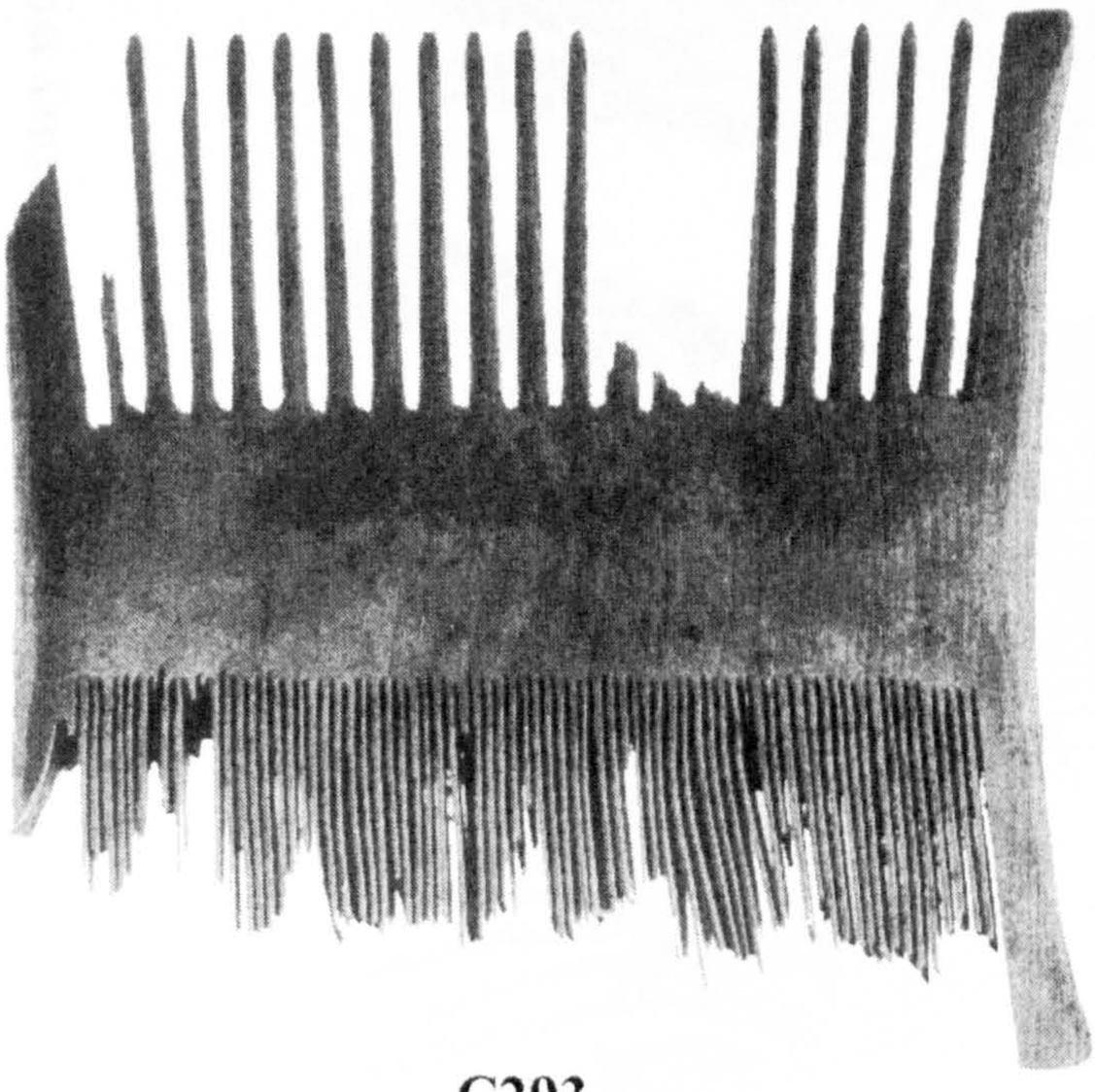
Fig. 5.16 13th - early 14th century combs with blank central zones and concave, convex or ornate sides



C120



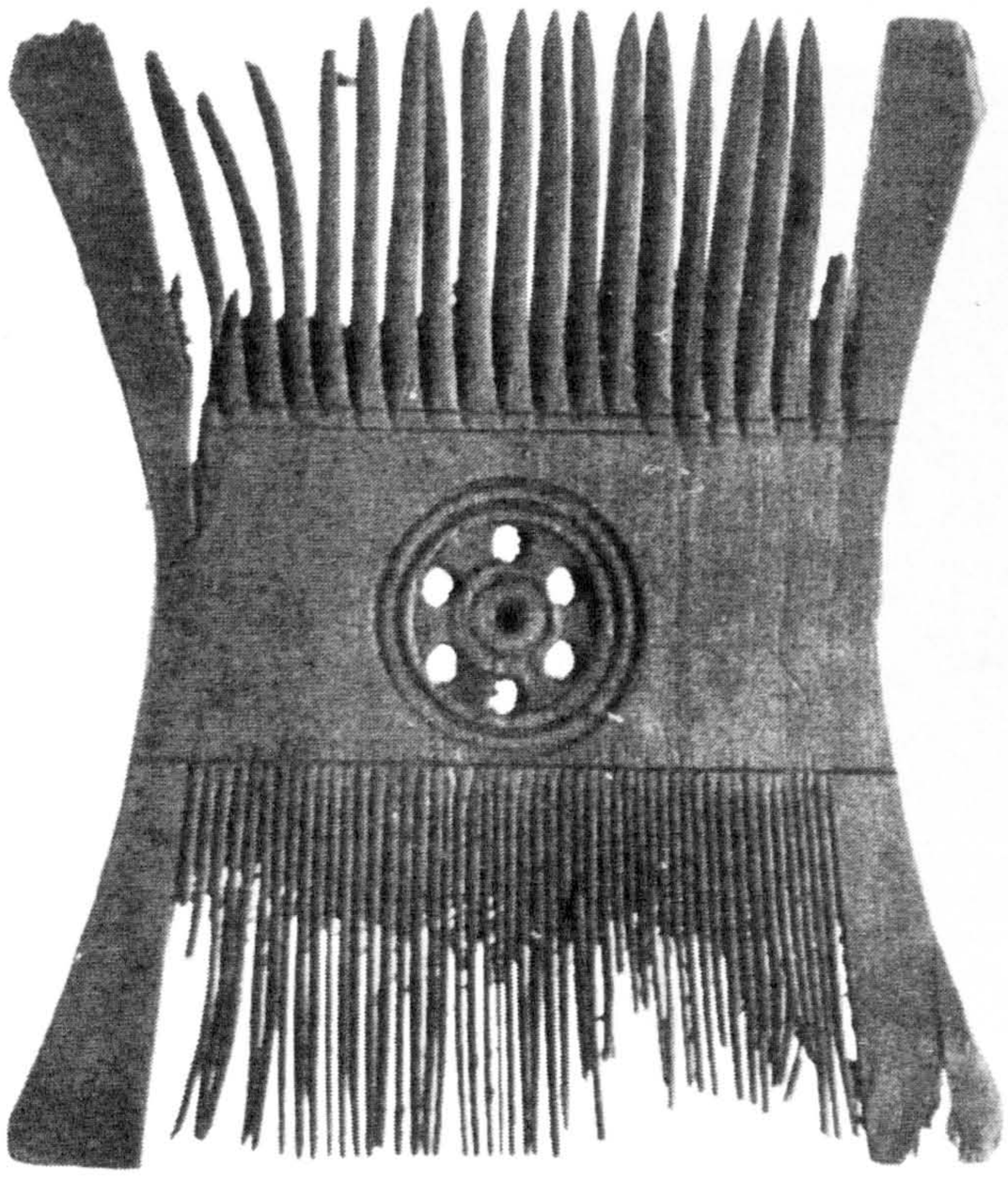
C130



C293

C41

Fig. 5.17 13th-14th century wooden combs featuring rare types of carved decoration



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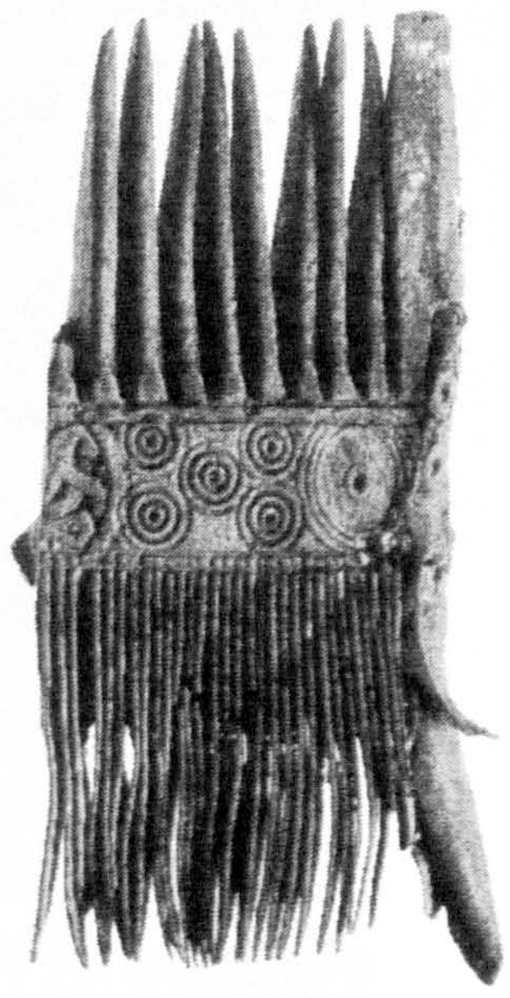

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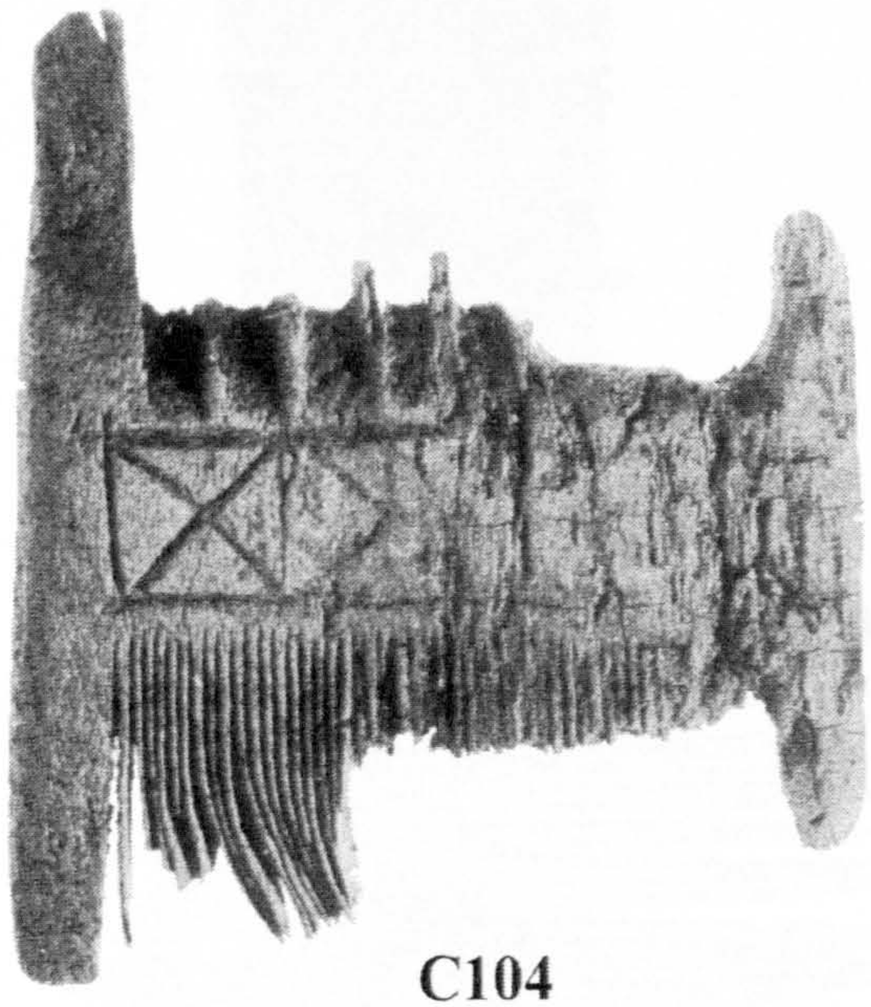

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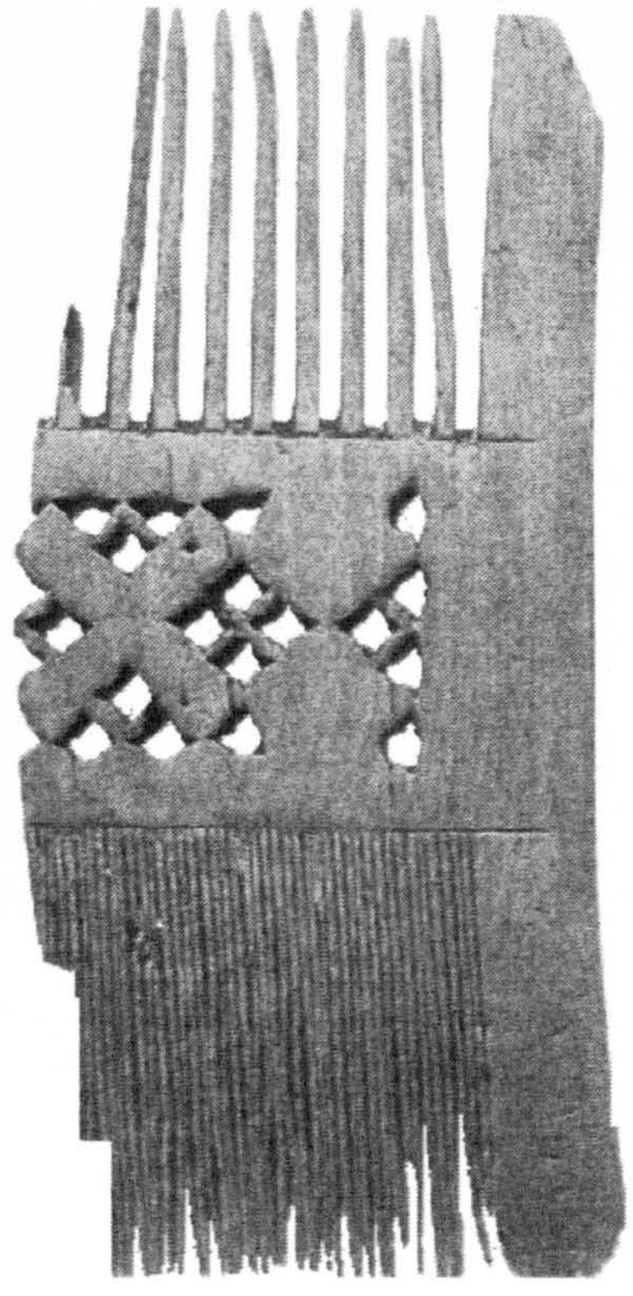
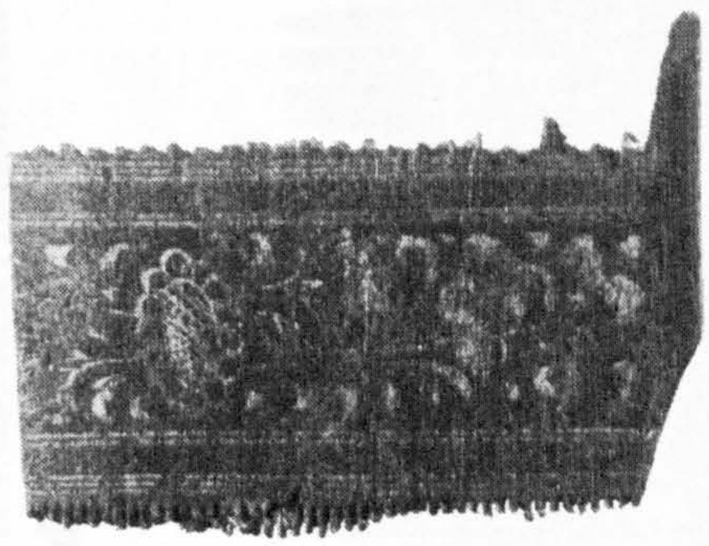
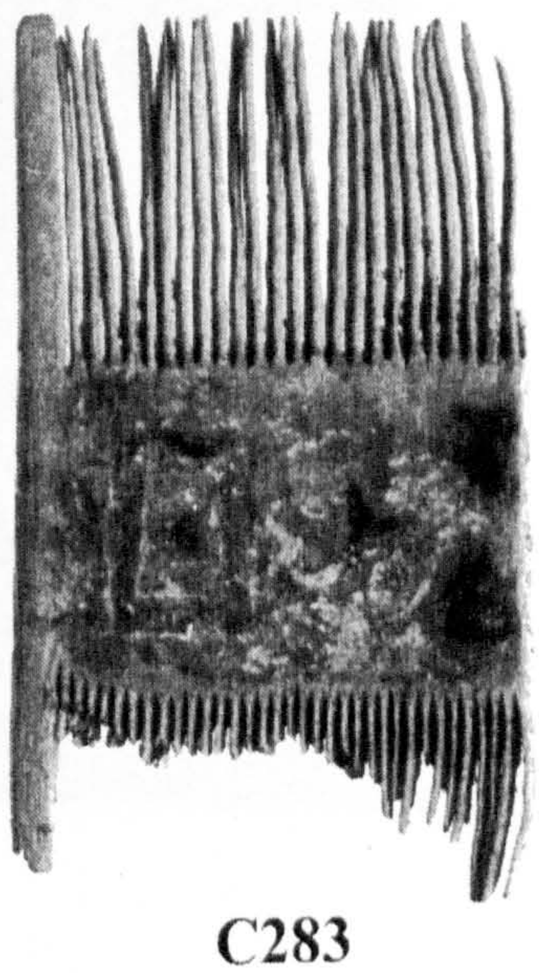


Ner-1

Fig. 5.18 15th century combs with painted decorations



C265



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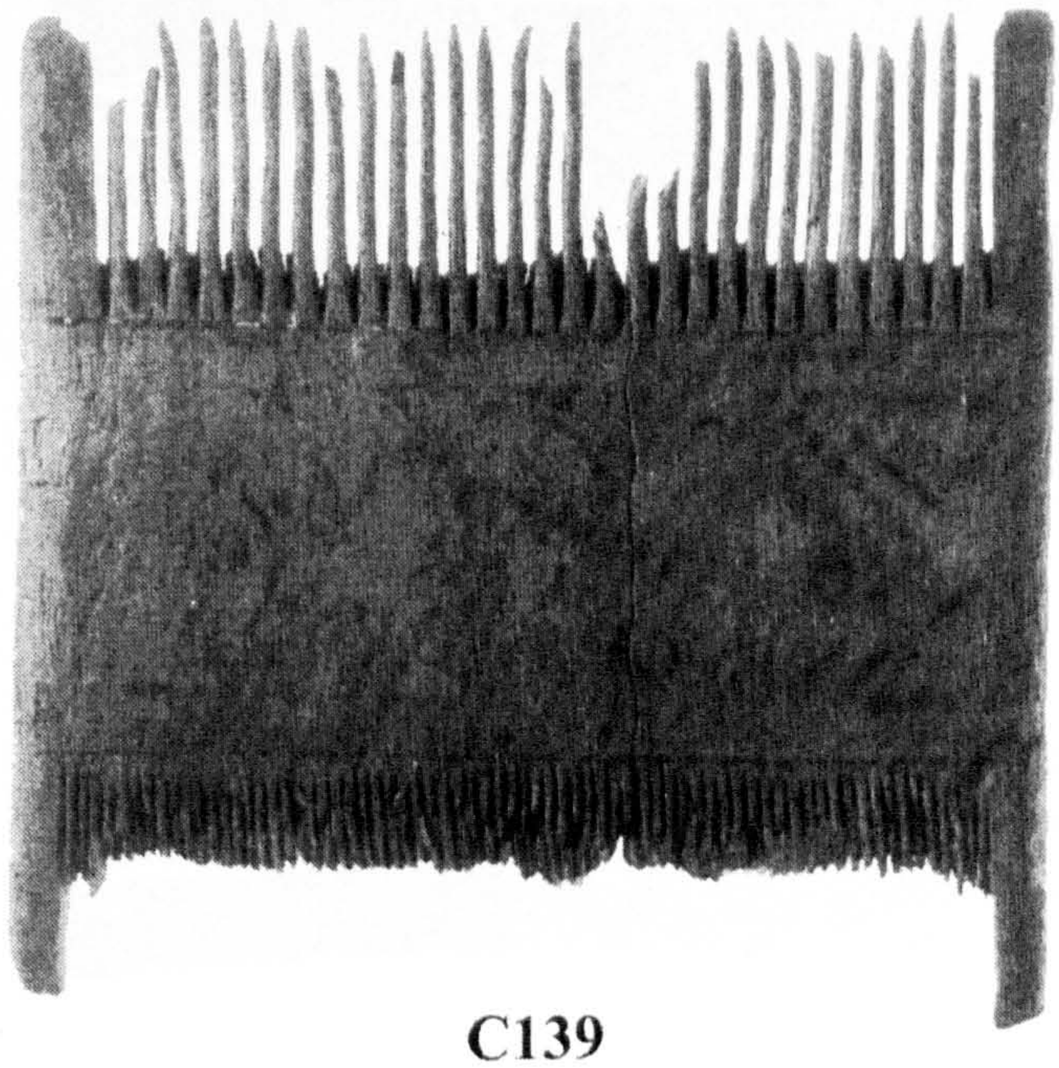
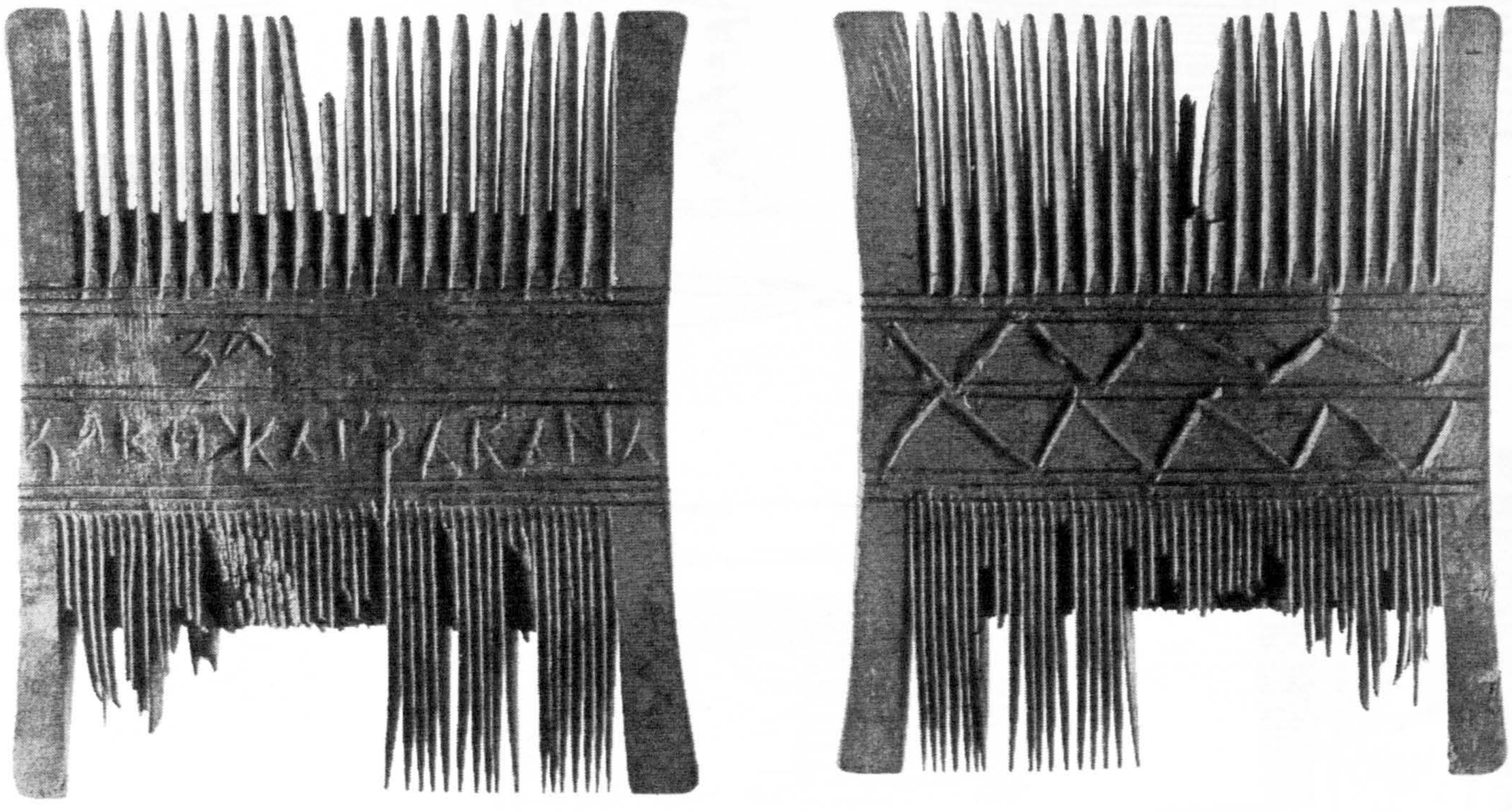


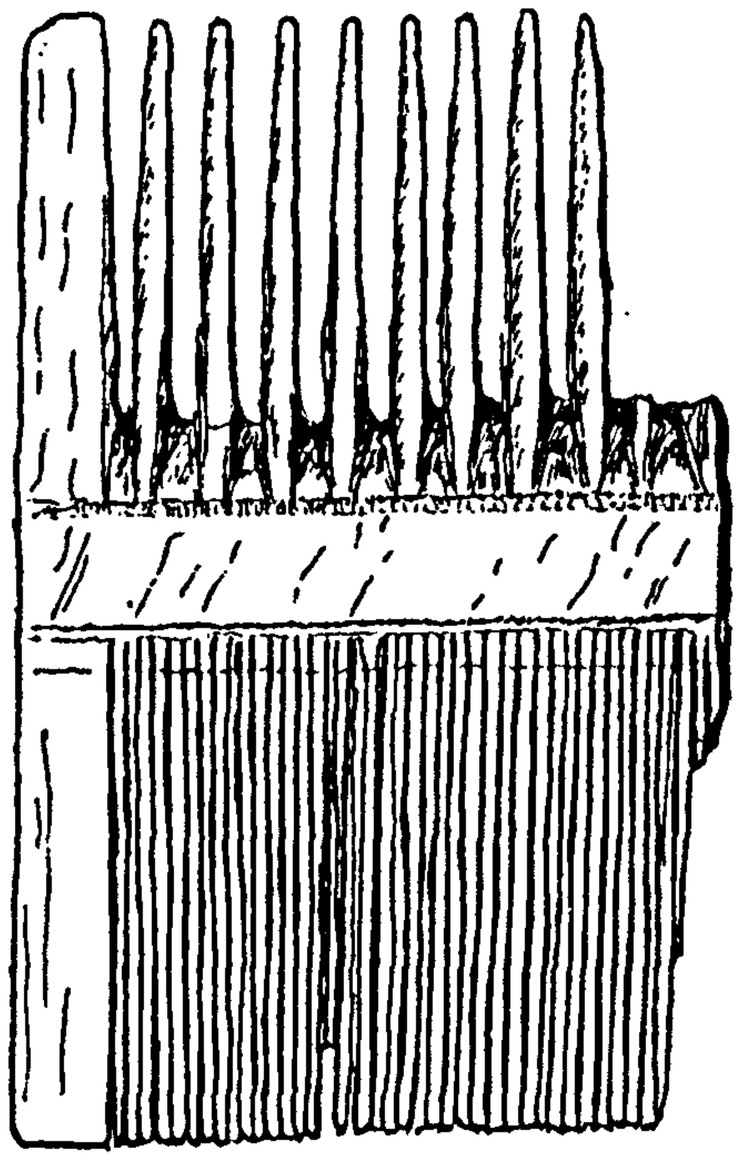
C139

Fig. 5.19 Two faces of a late 13th century comb with the inscription reading 'comb belonging to Zavid'

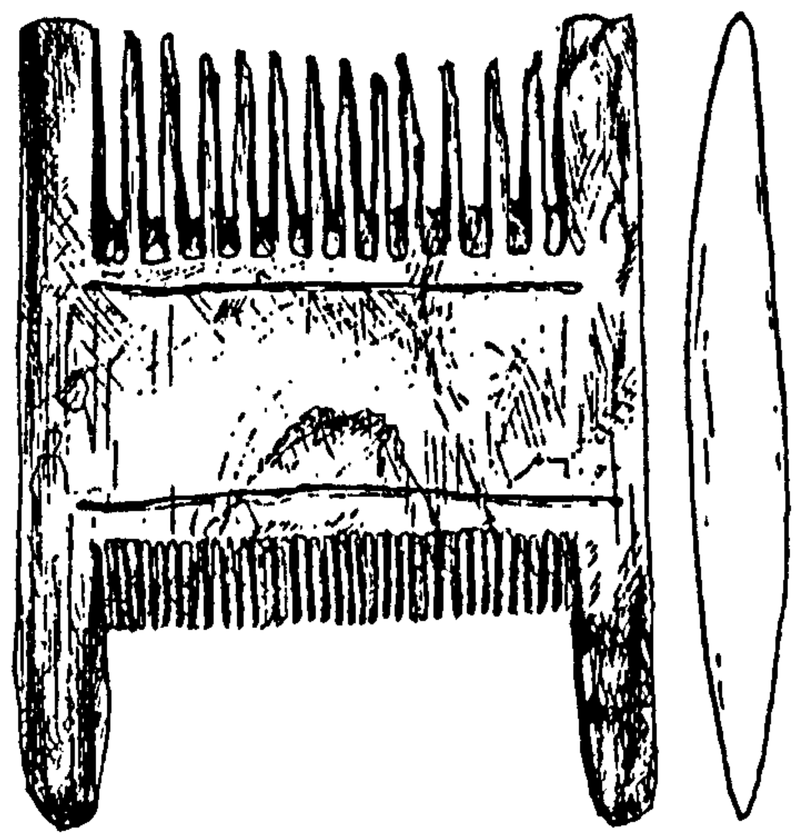


C60

Fig. 5.20 Wooden combs from early-mid 13th century deposits



C8



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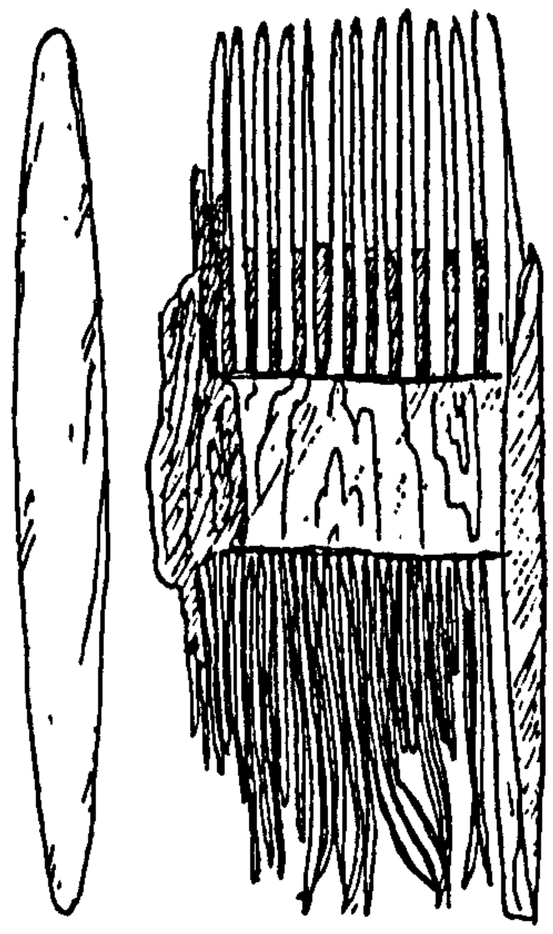

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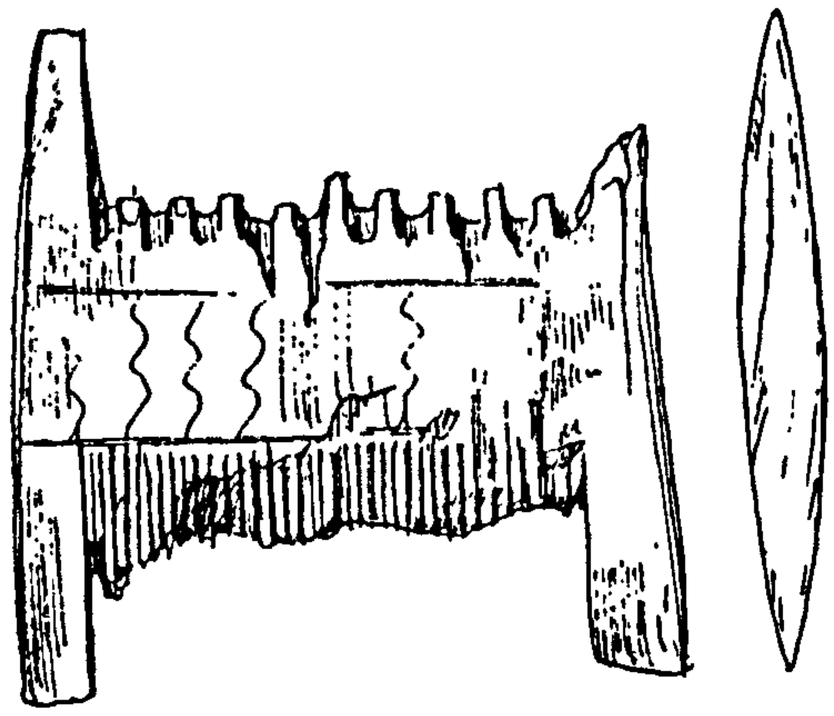

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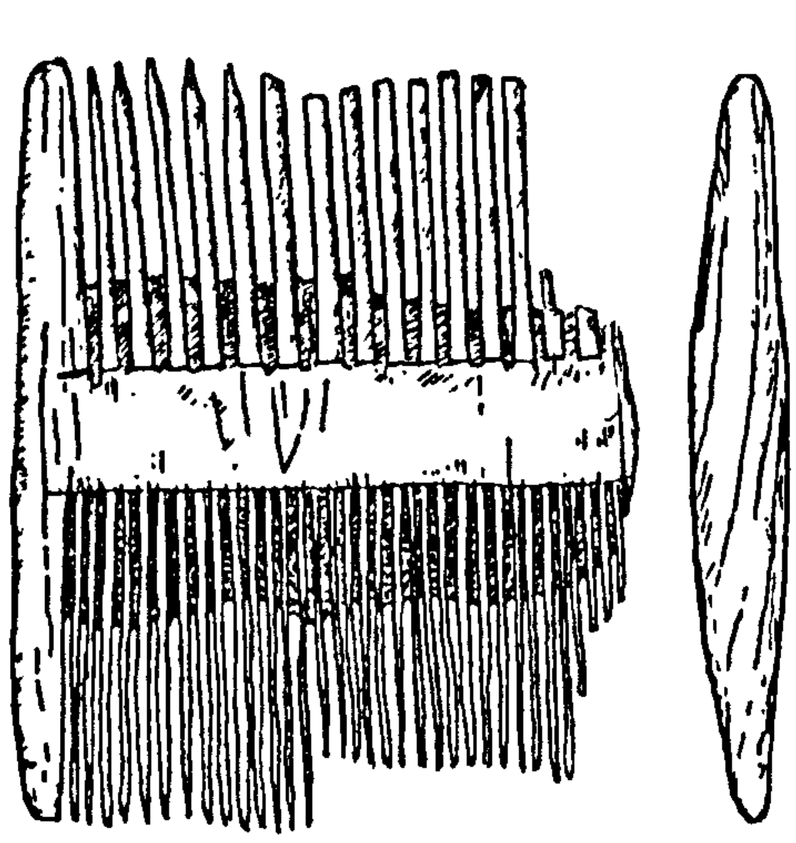

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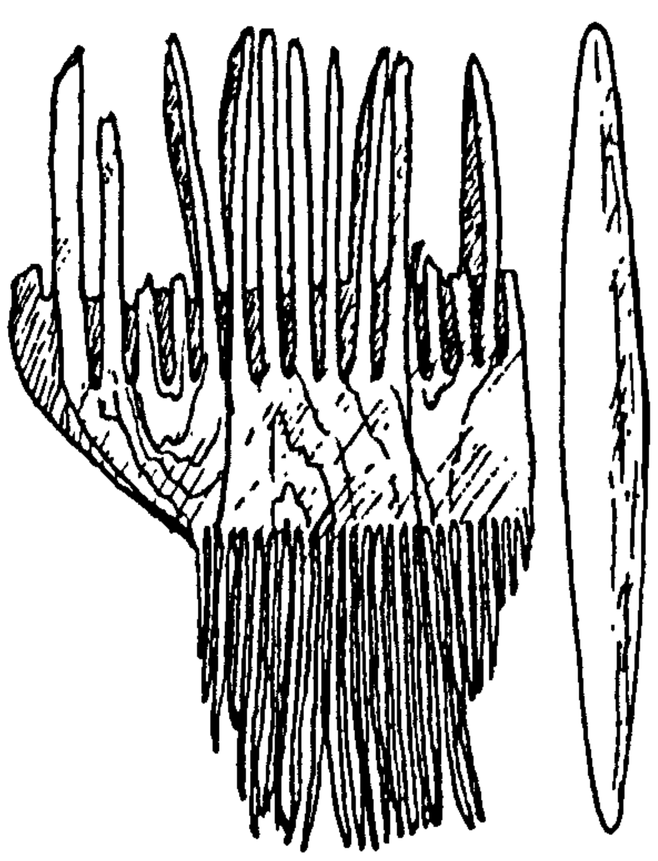
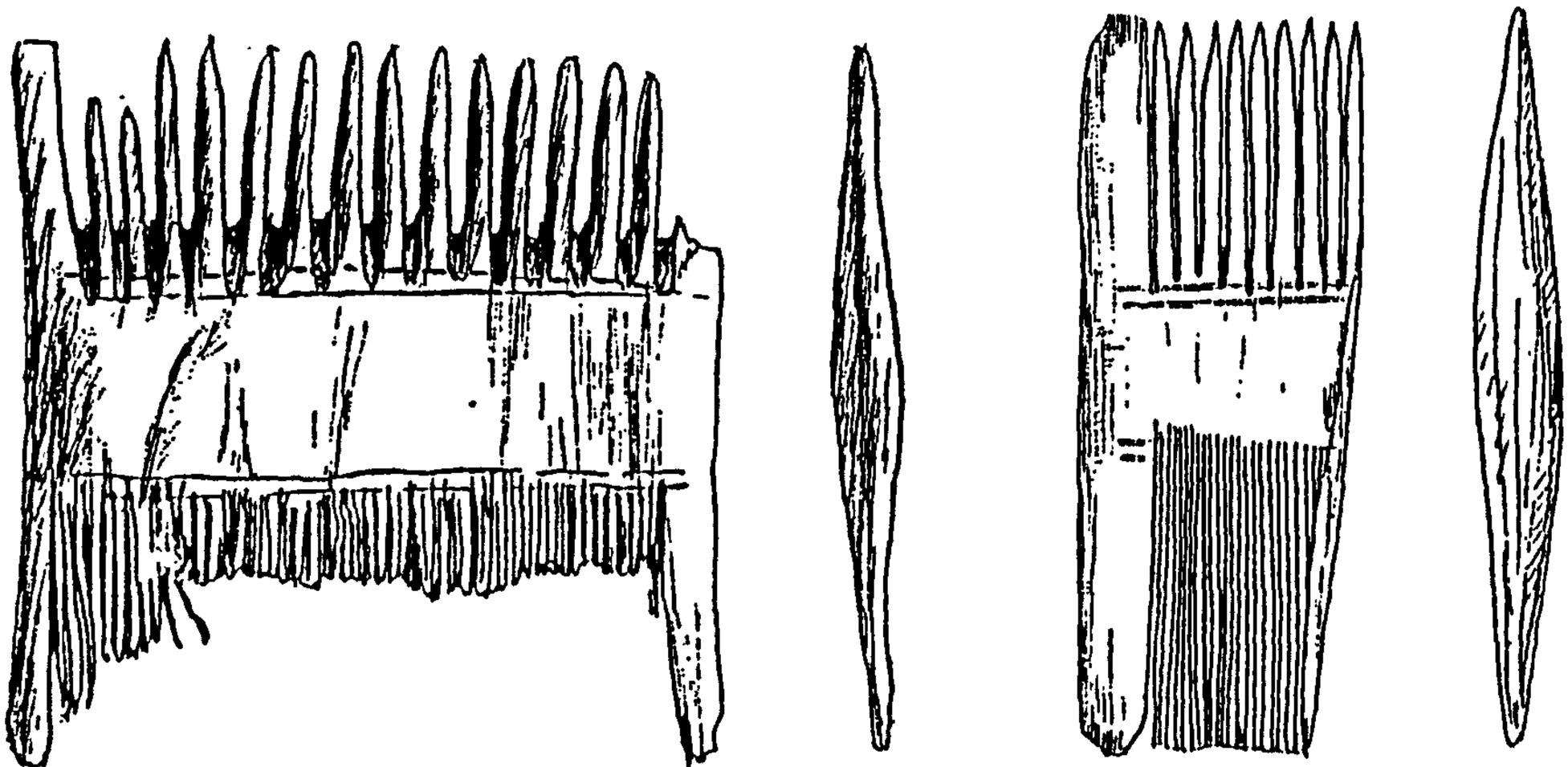


C35

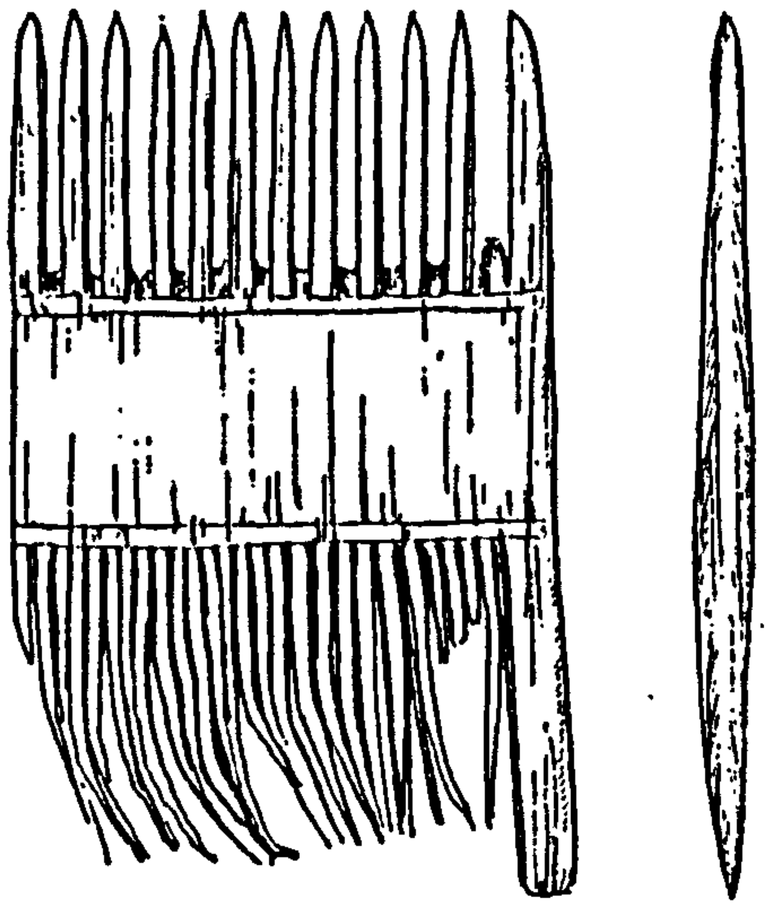
Scale 3:4

Fig. 5.21 14th century combs featuring linear decoration

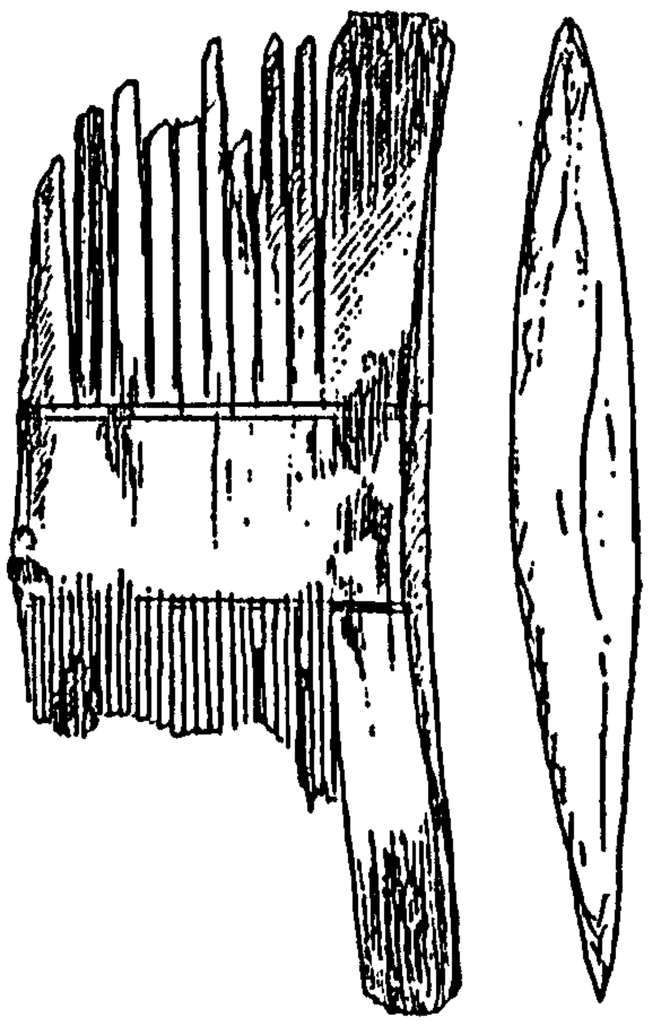


C95

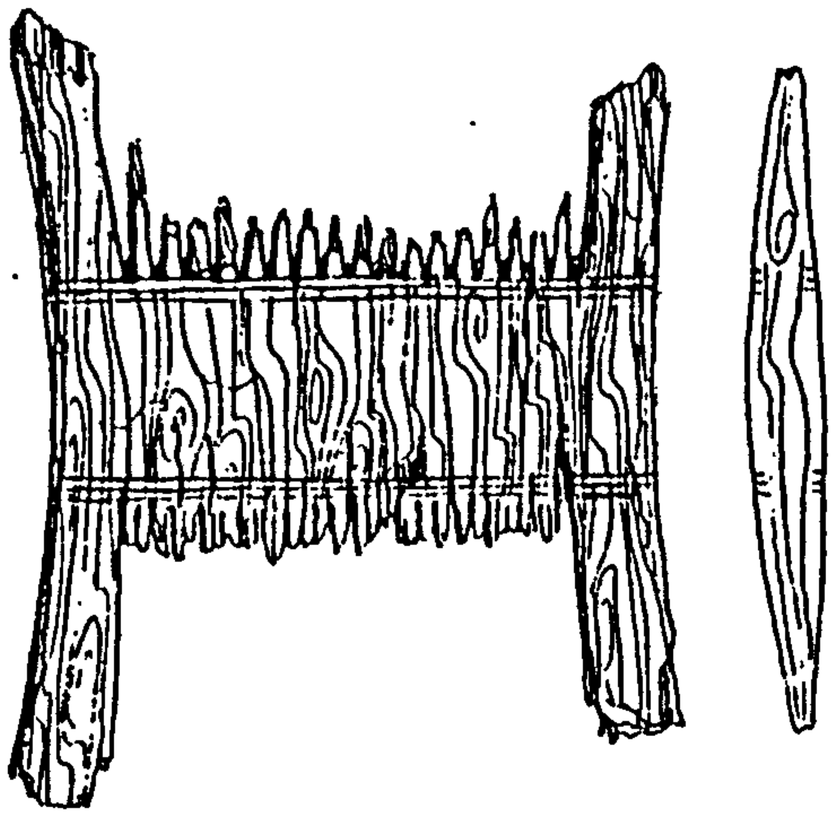
C142



C94



C144



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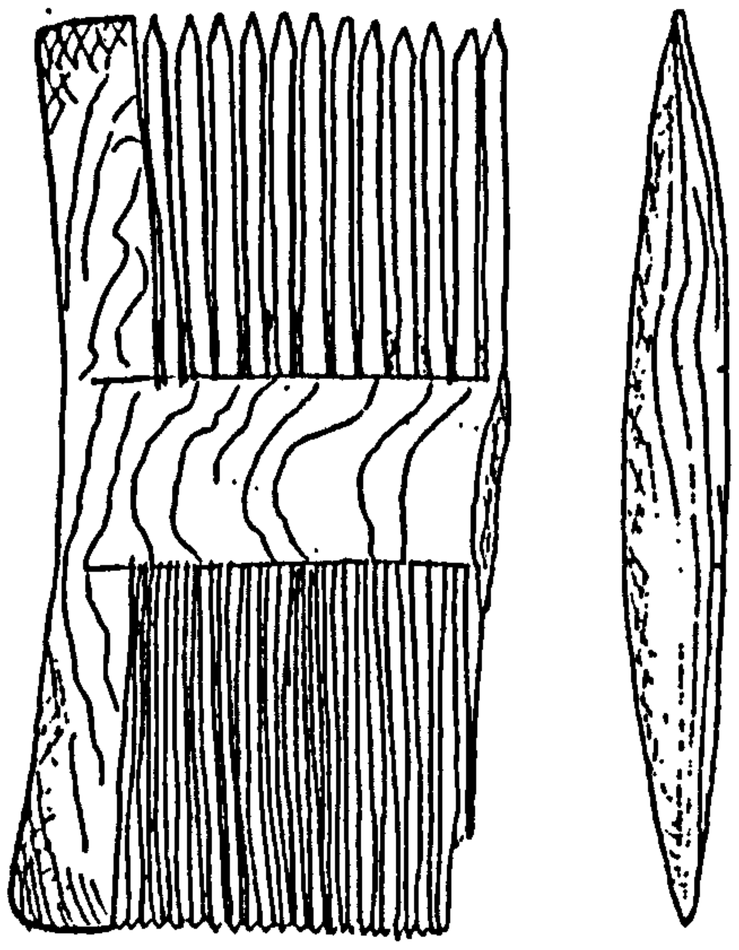
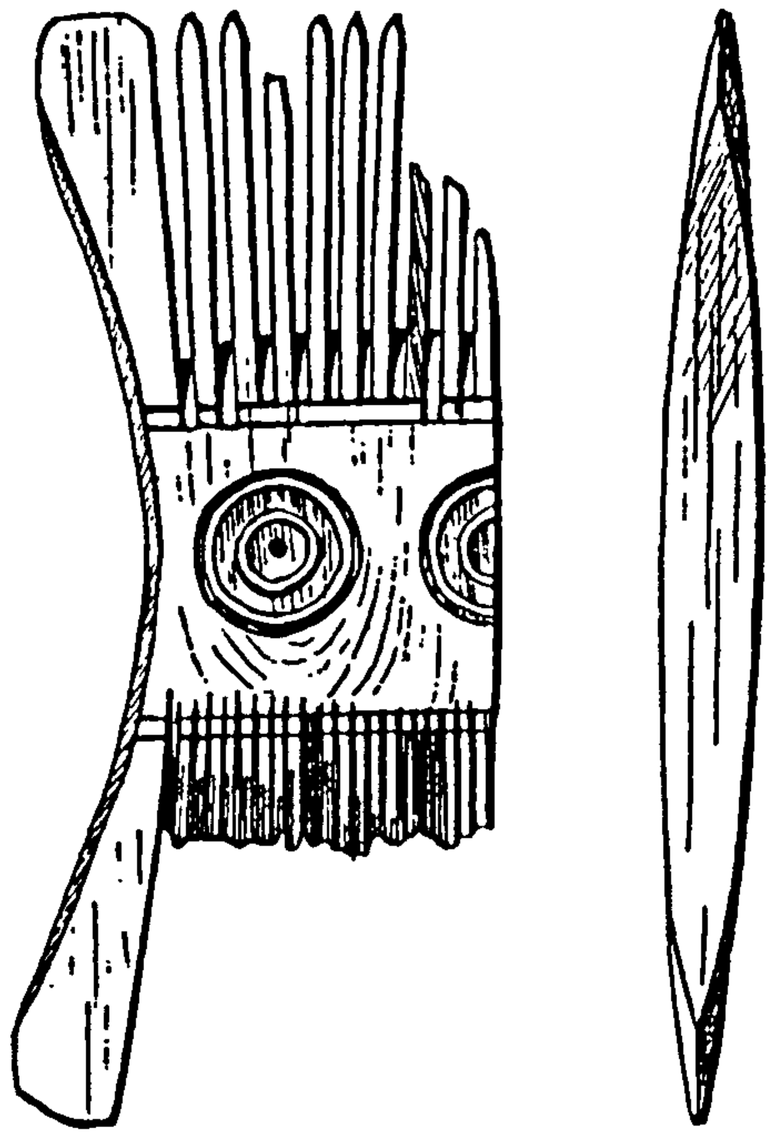


C160

Scale 4:5

Fig. 5.22 Late combs featuring rare patterns or techniques of ring-and-dot decoration



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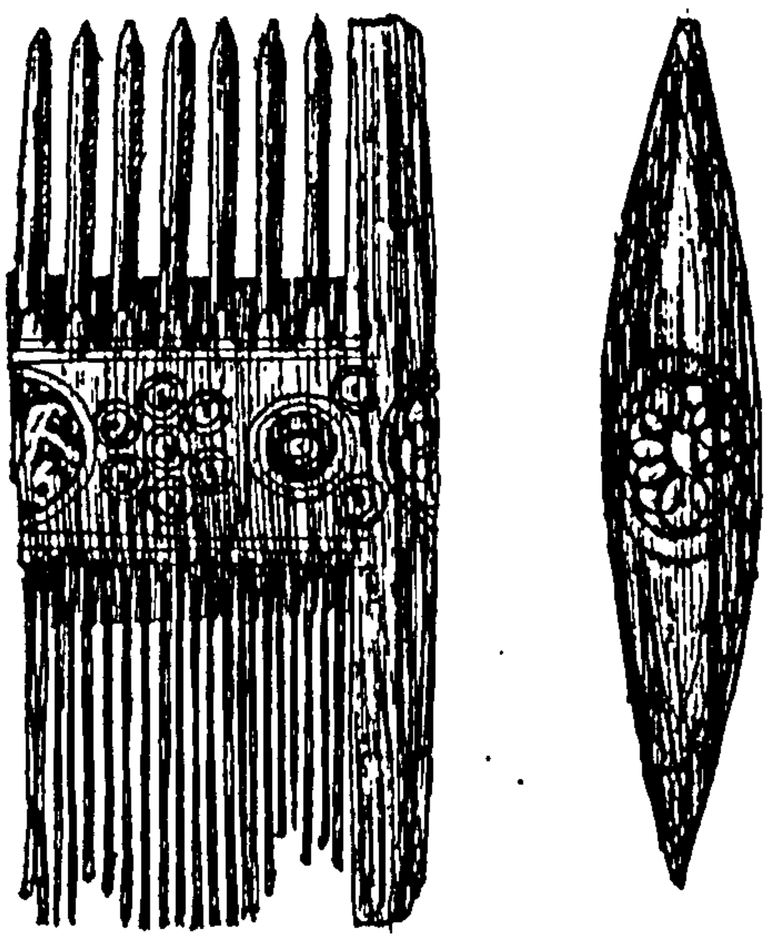

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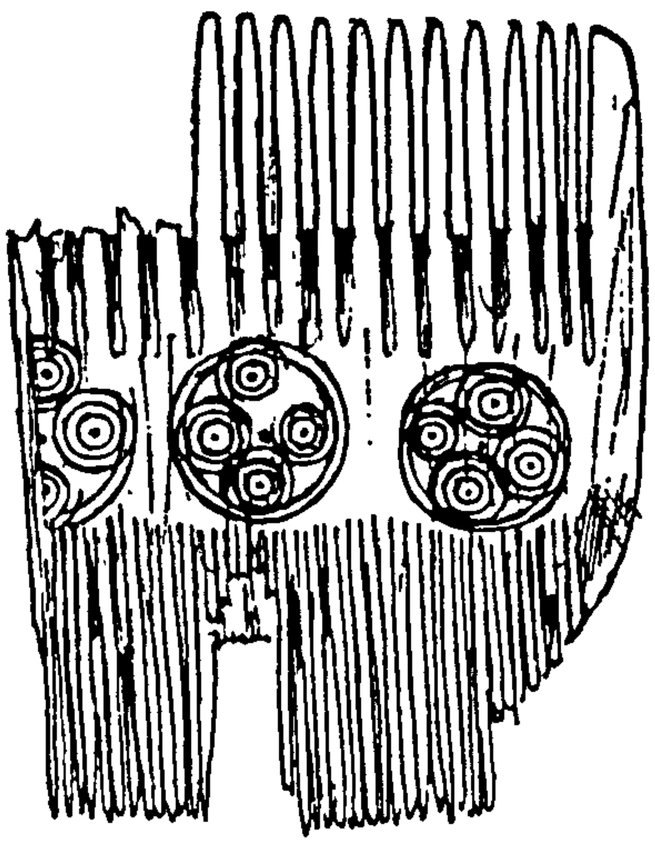

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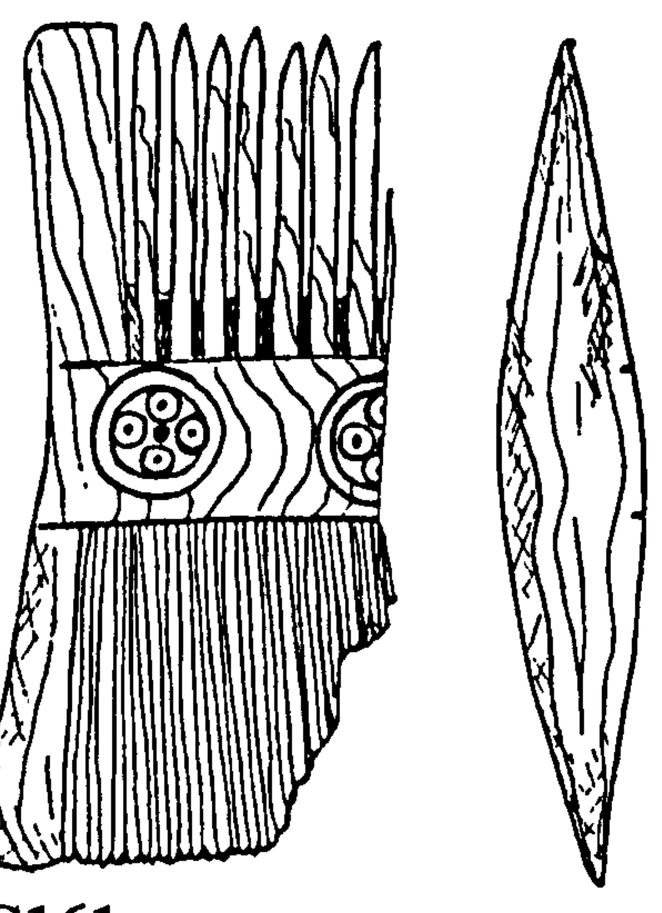

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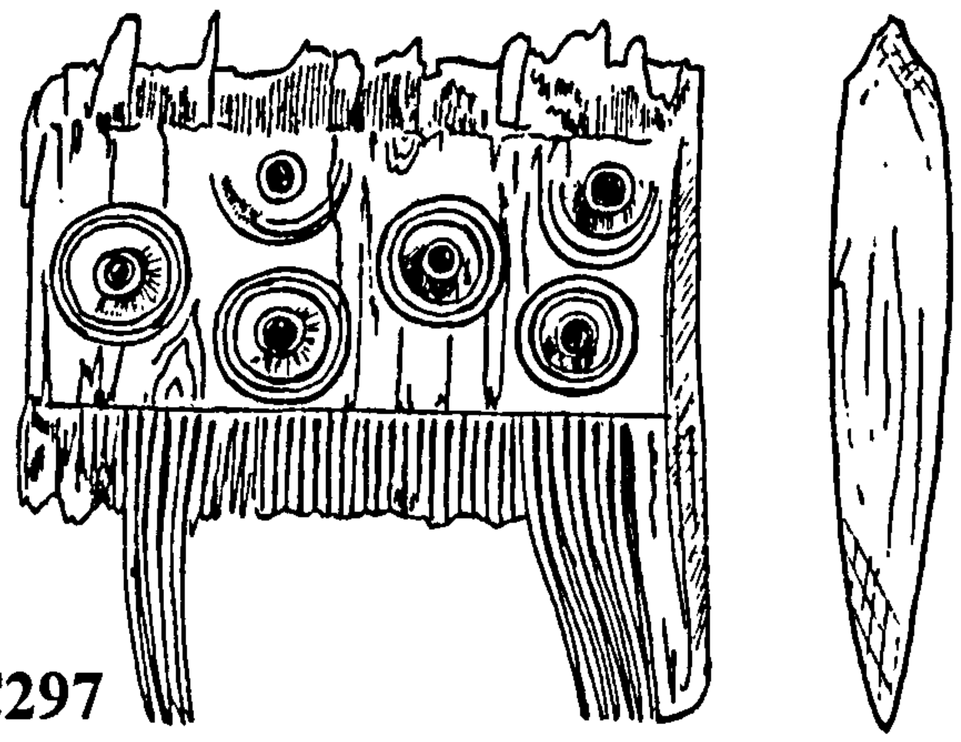
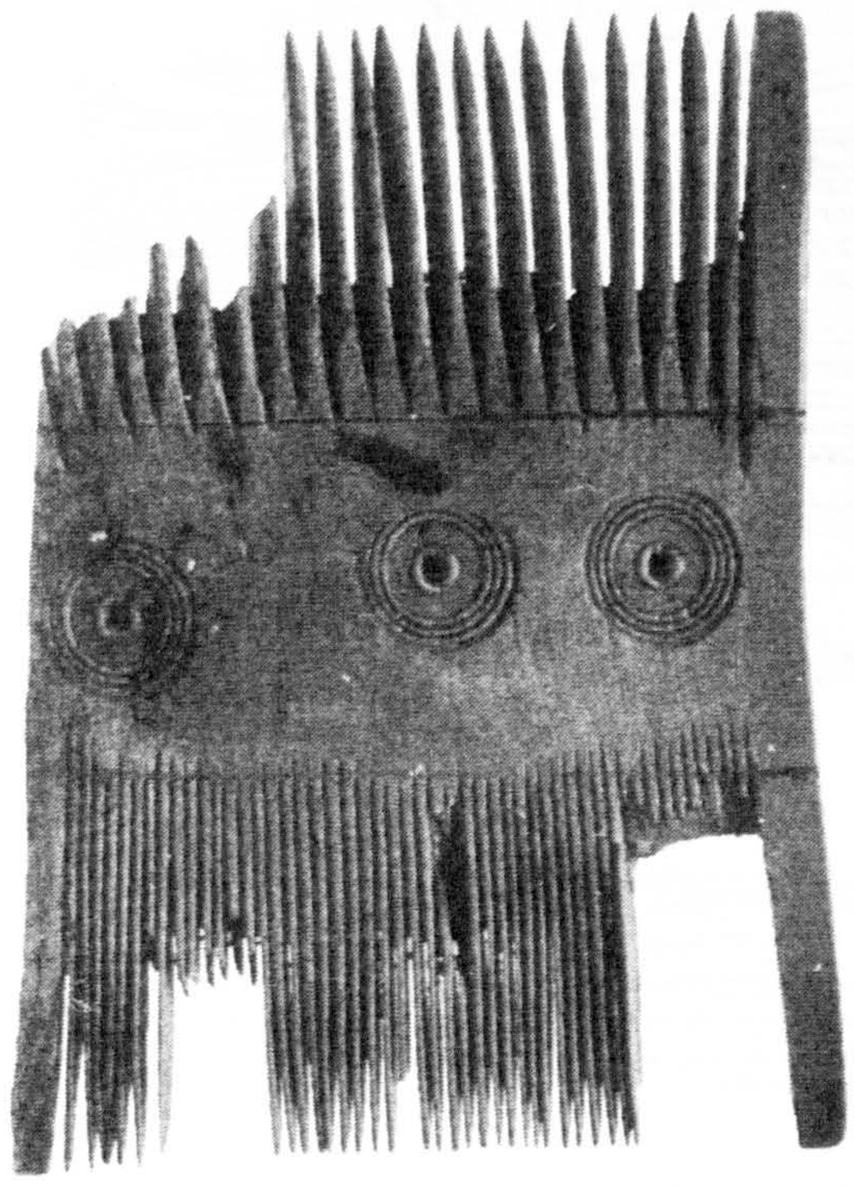


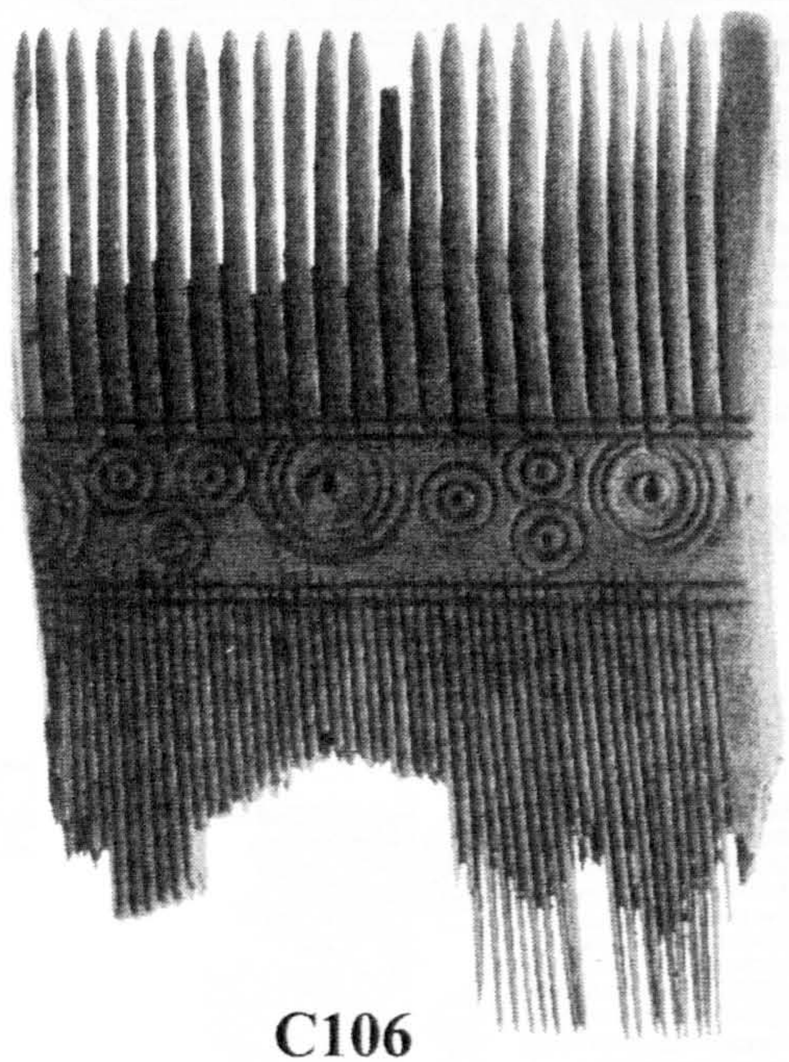
C297

Scale 4:5

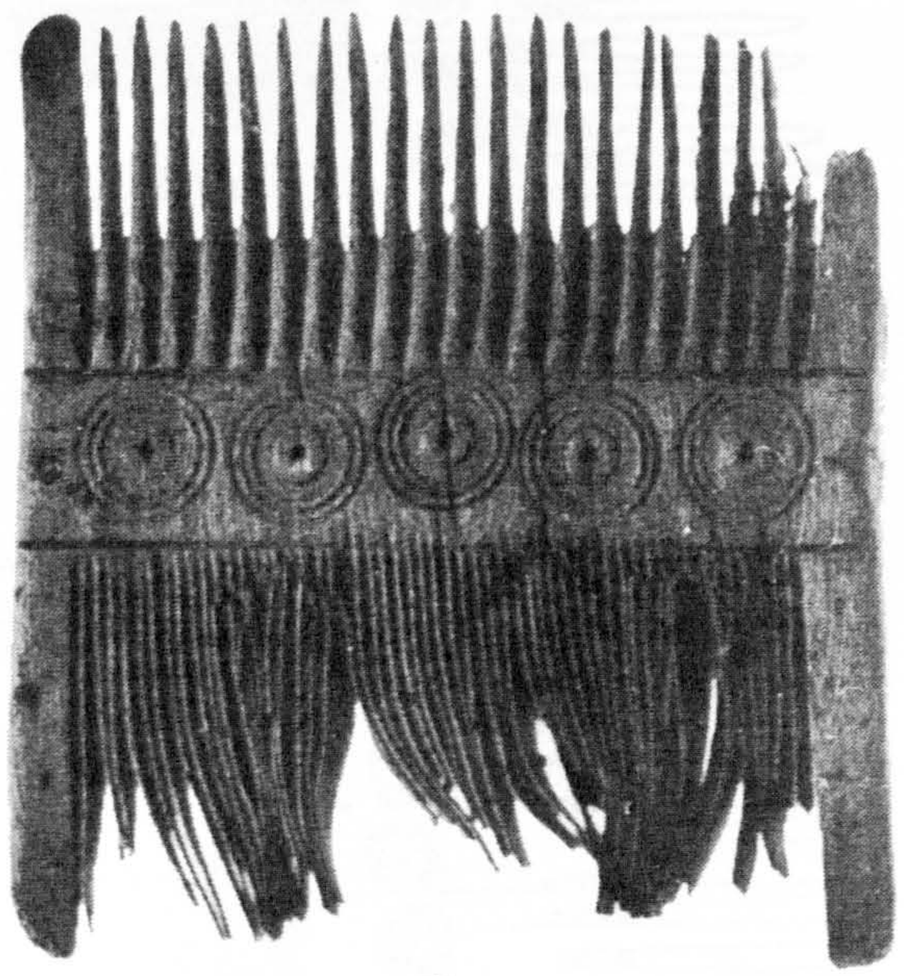
Fig. 5.23 Late wooden combs featuring common patterns of ring-and-dot decoration



C132

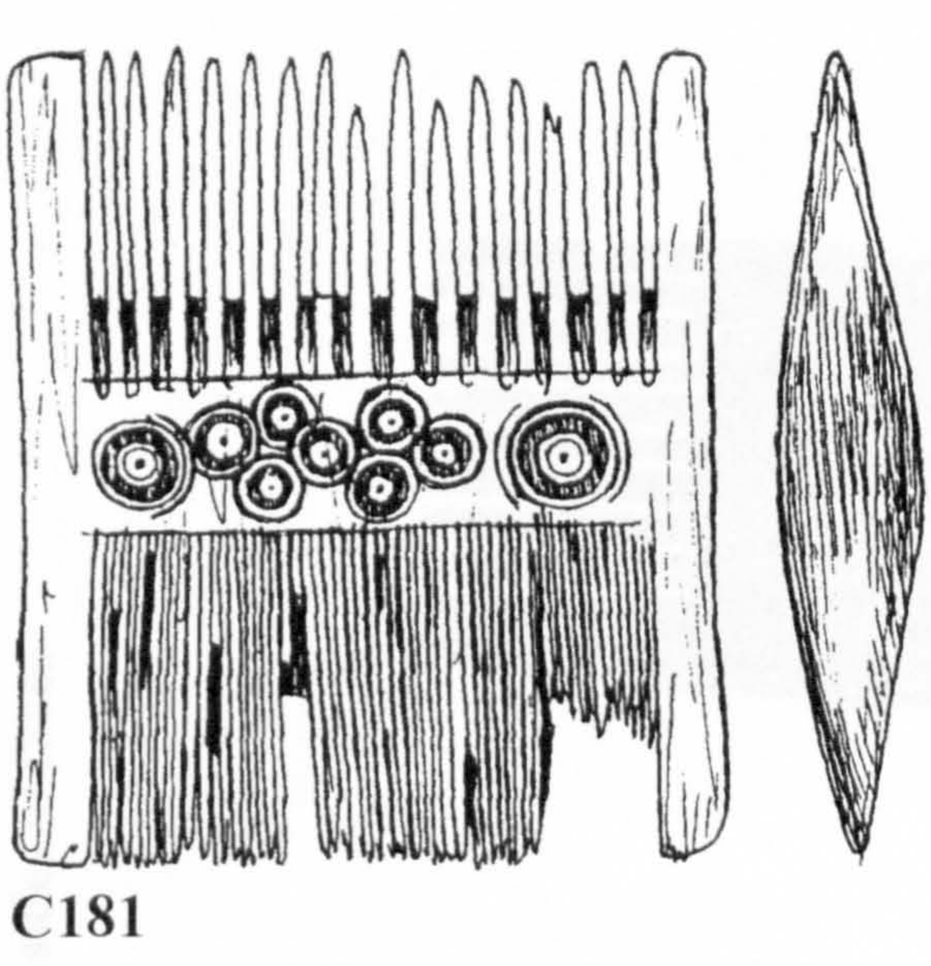


C106

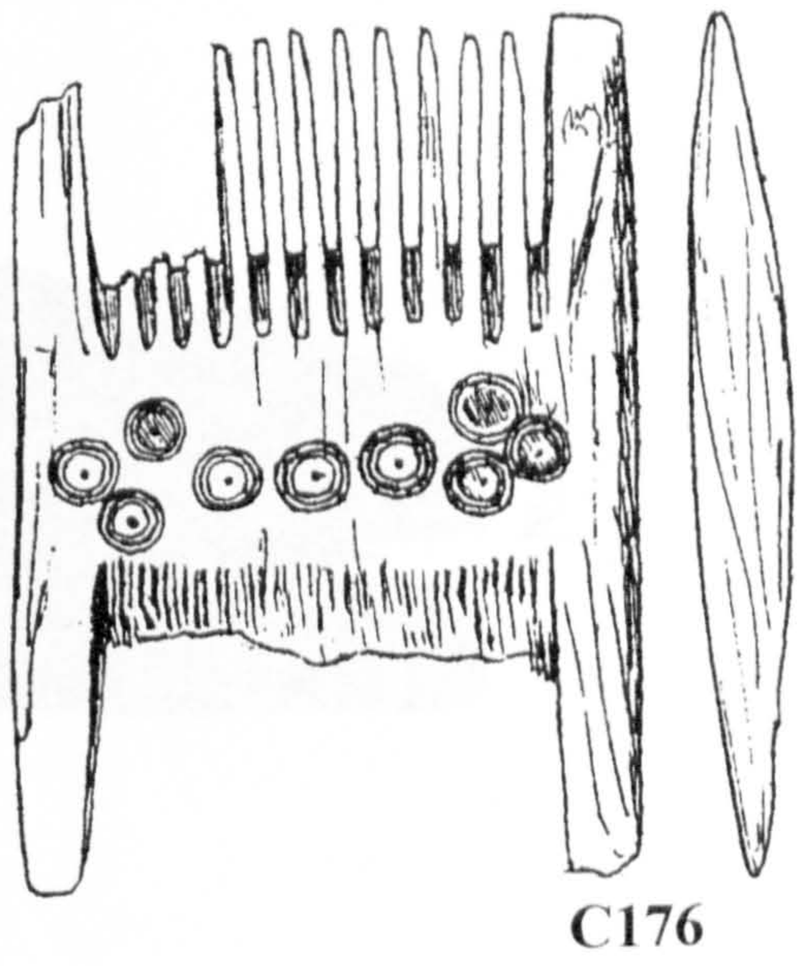


C147

Fig. 5.24 Common patterns of late combs featuring ring-and-dot decoration



C181



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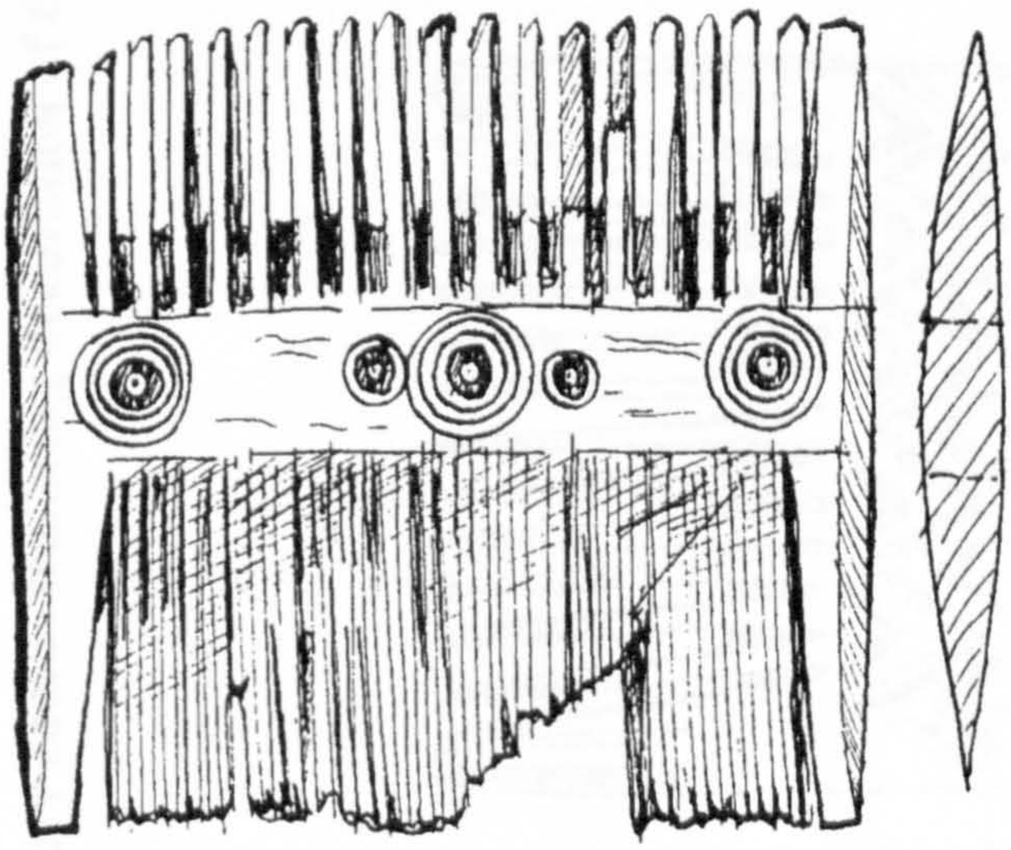

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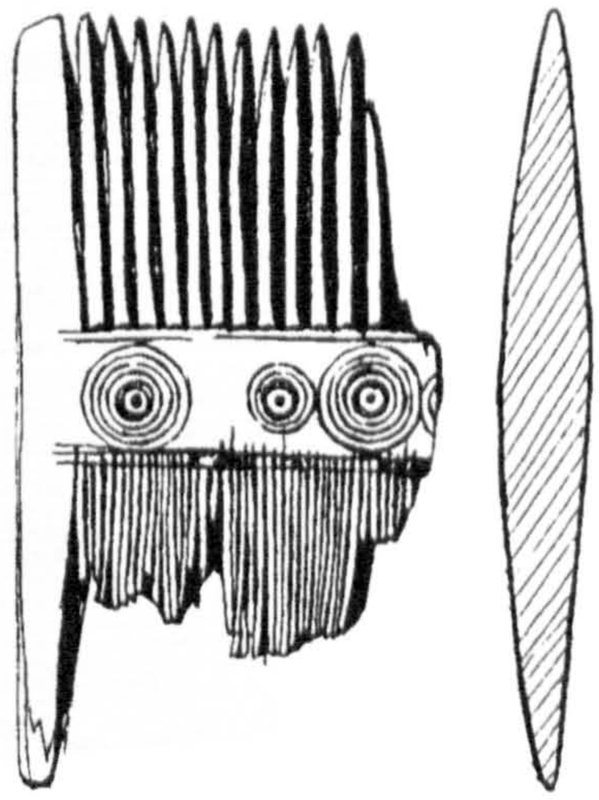

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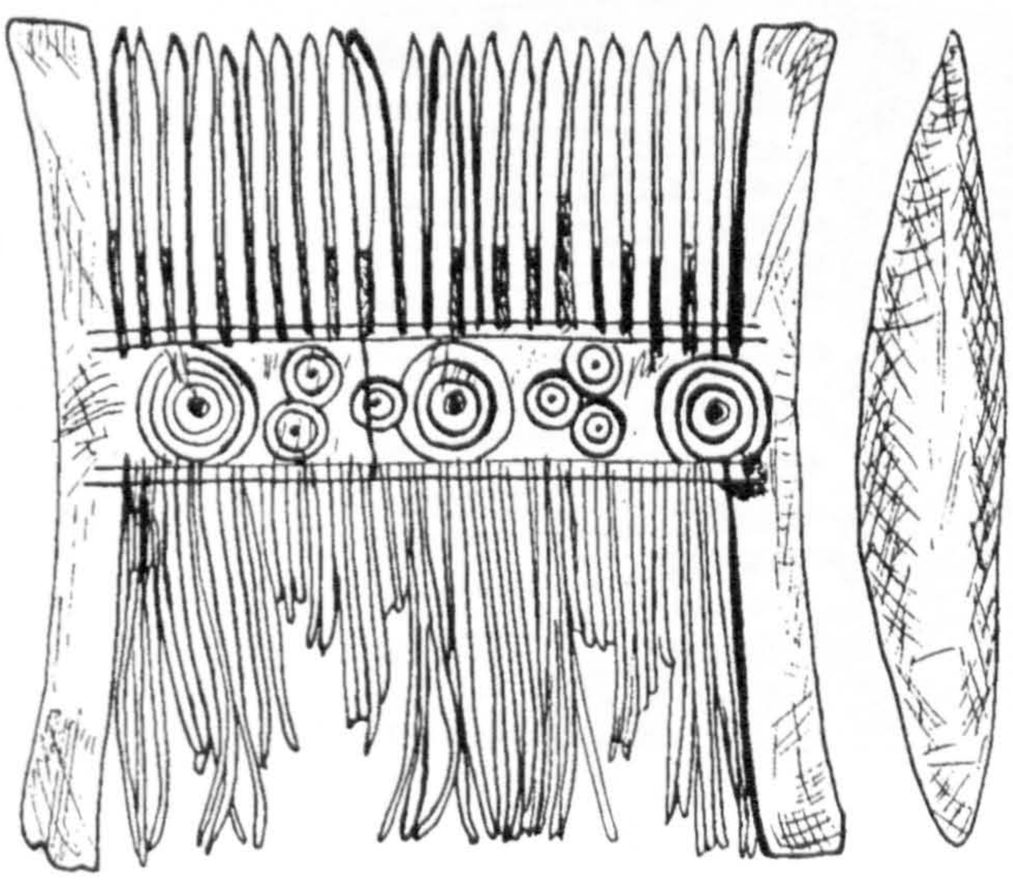

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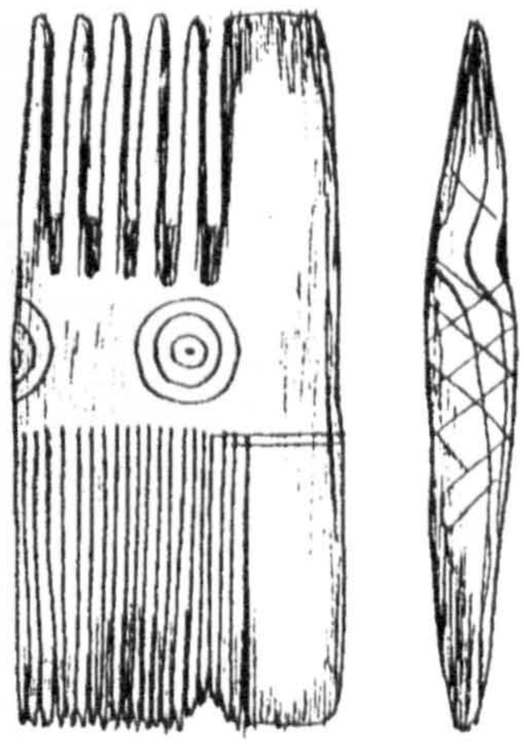
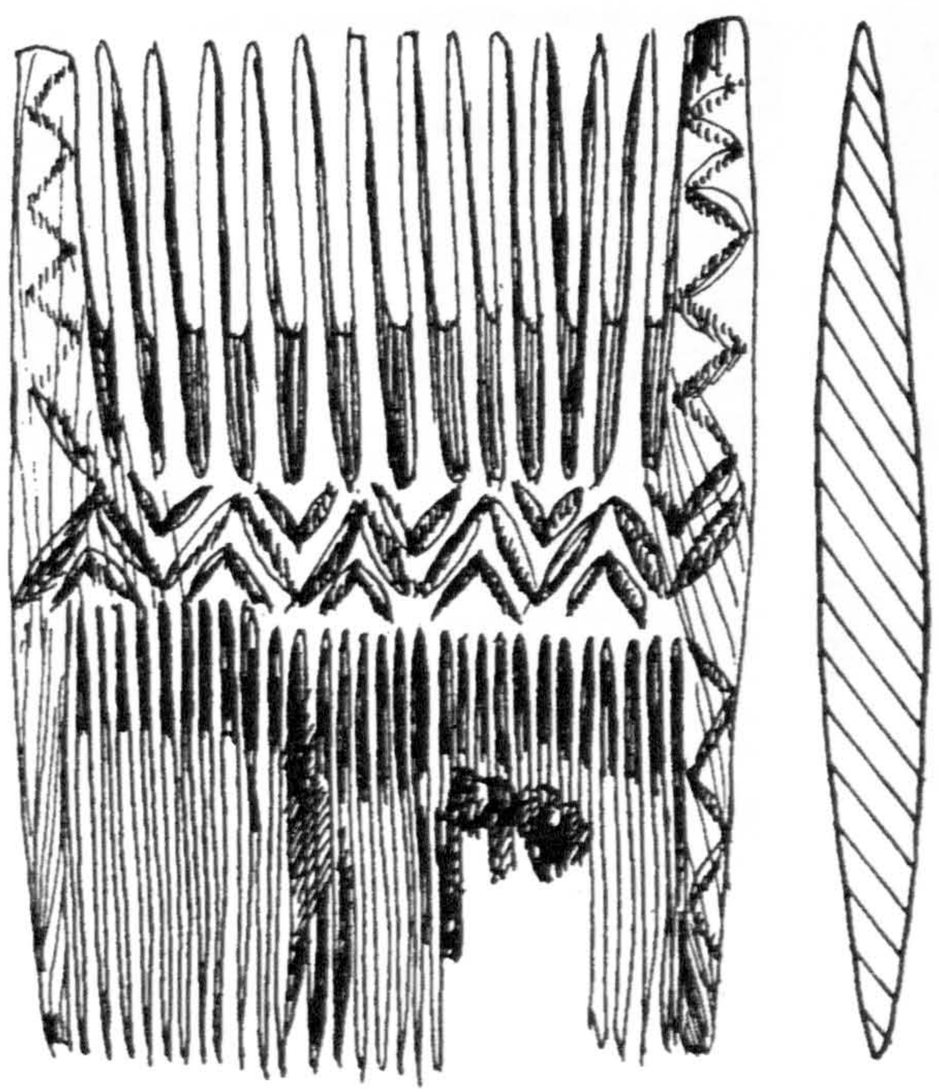


C96

Scale 4:5

Fig. 5.25 13th century combs featuring decoration of the sides of faces



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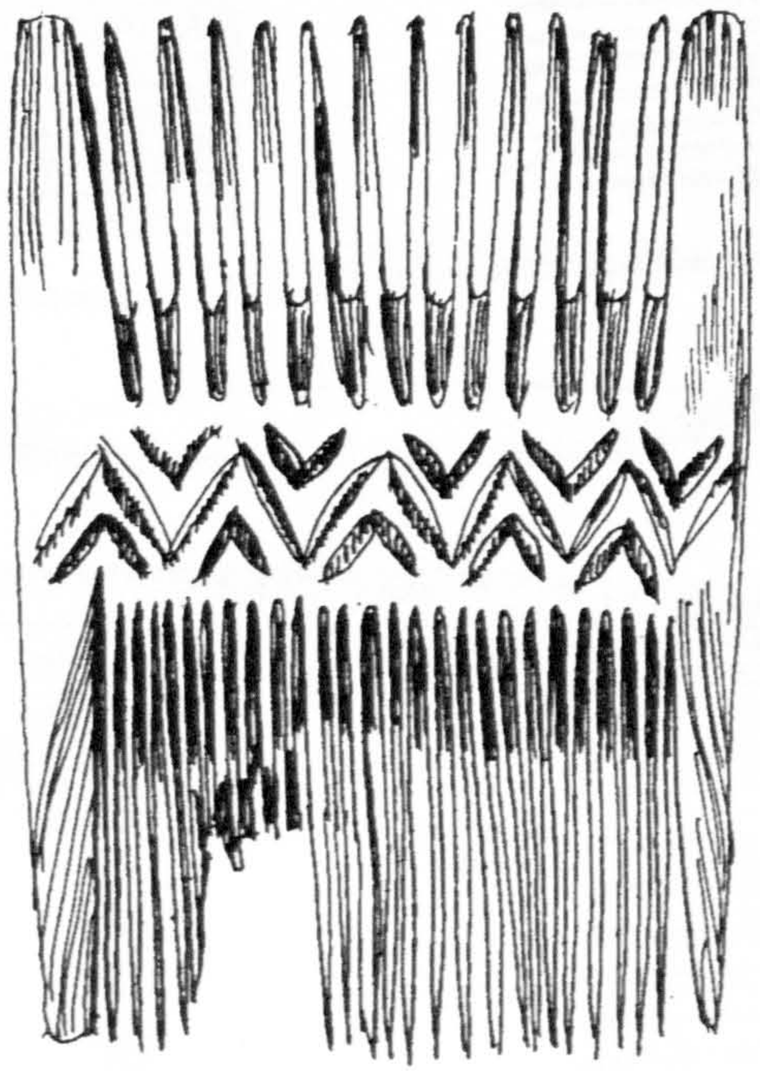
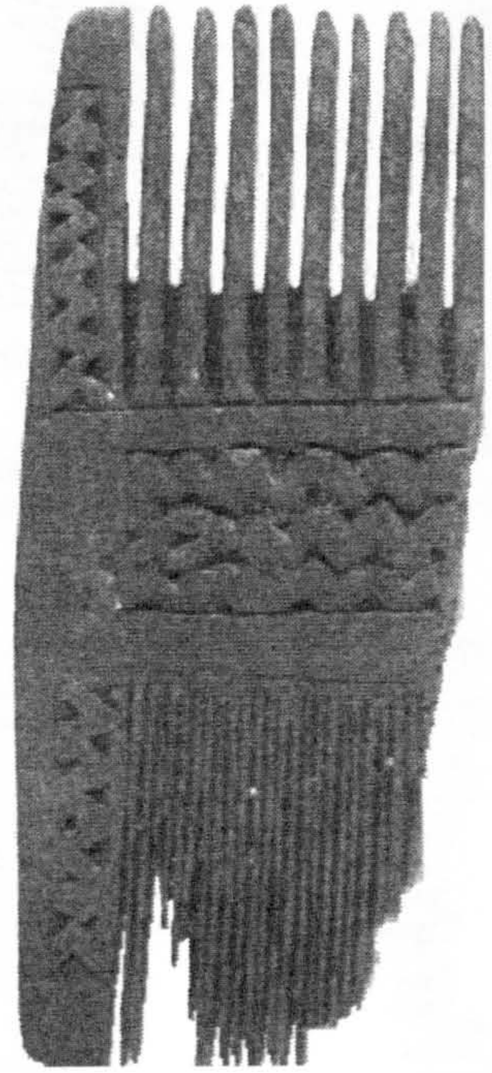
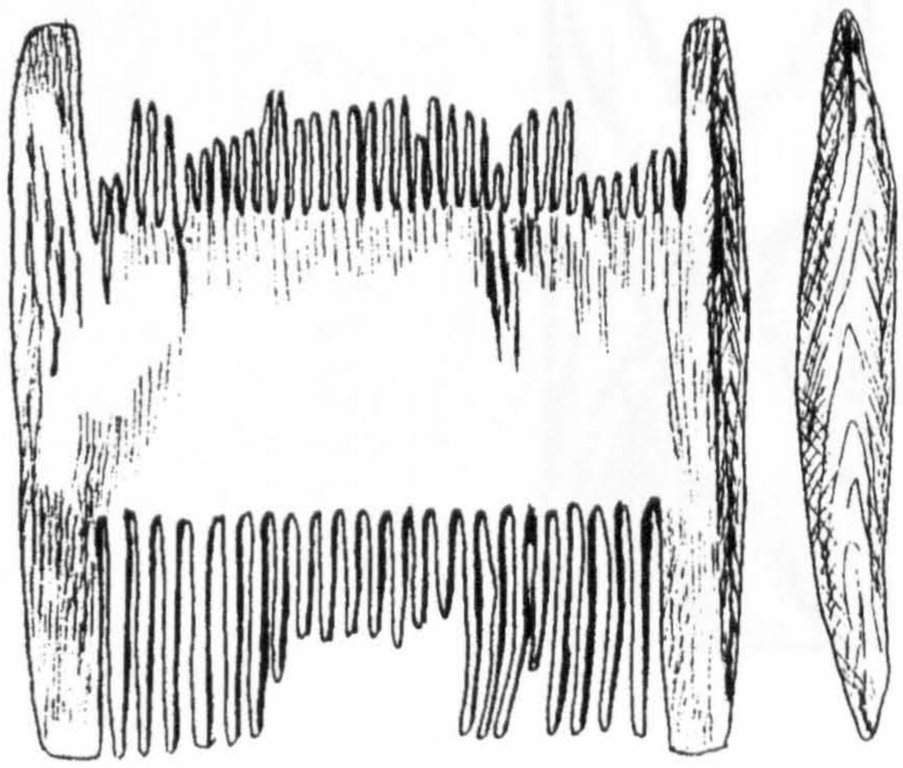


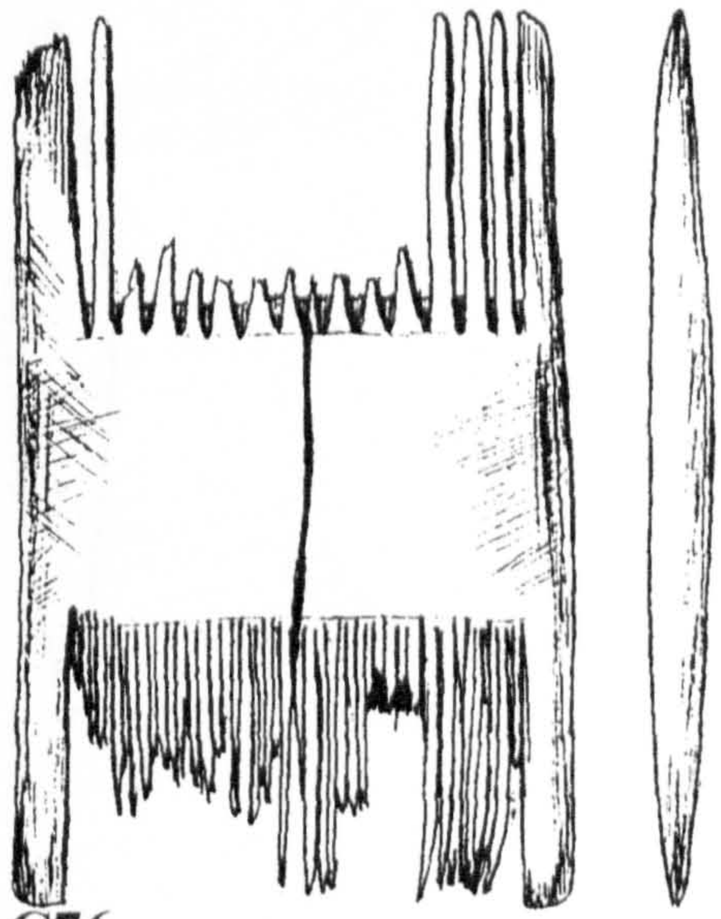


Ner-2

Fig. 5.26 Undecorated combs from 11th century deposits on the Troitsky site



C84



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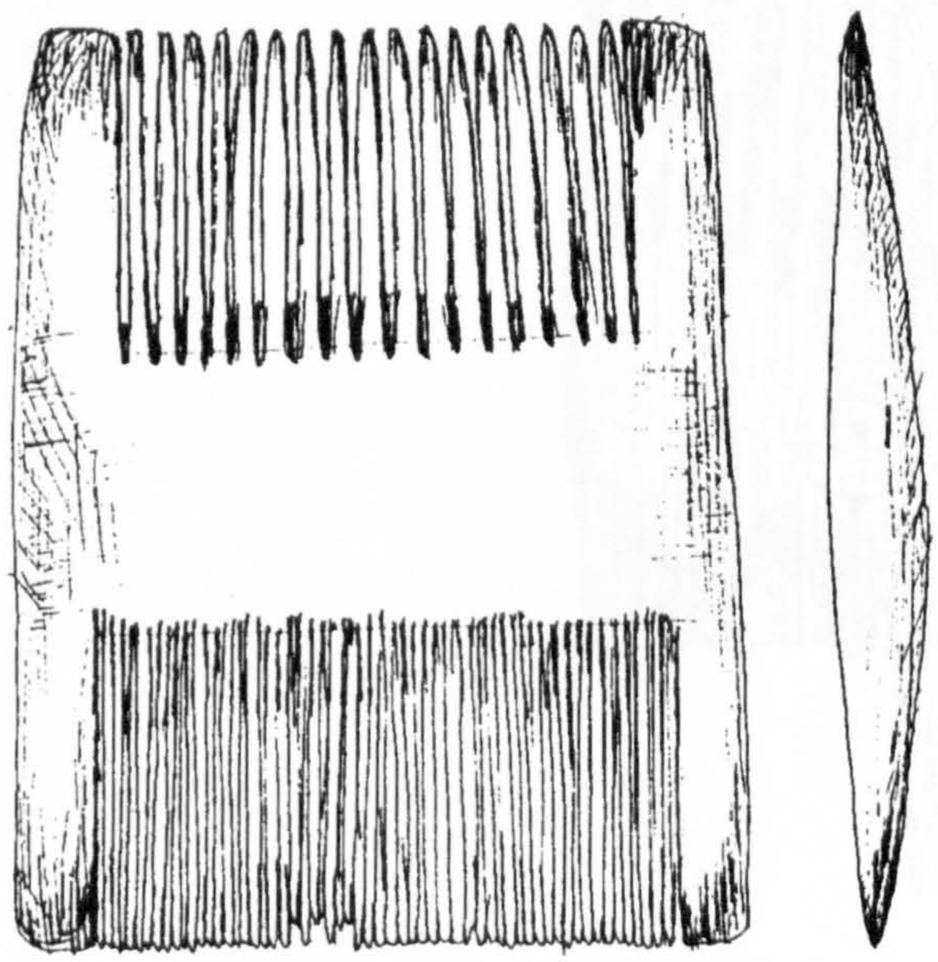

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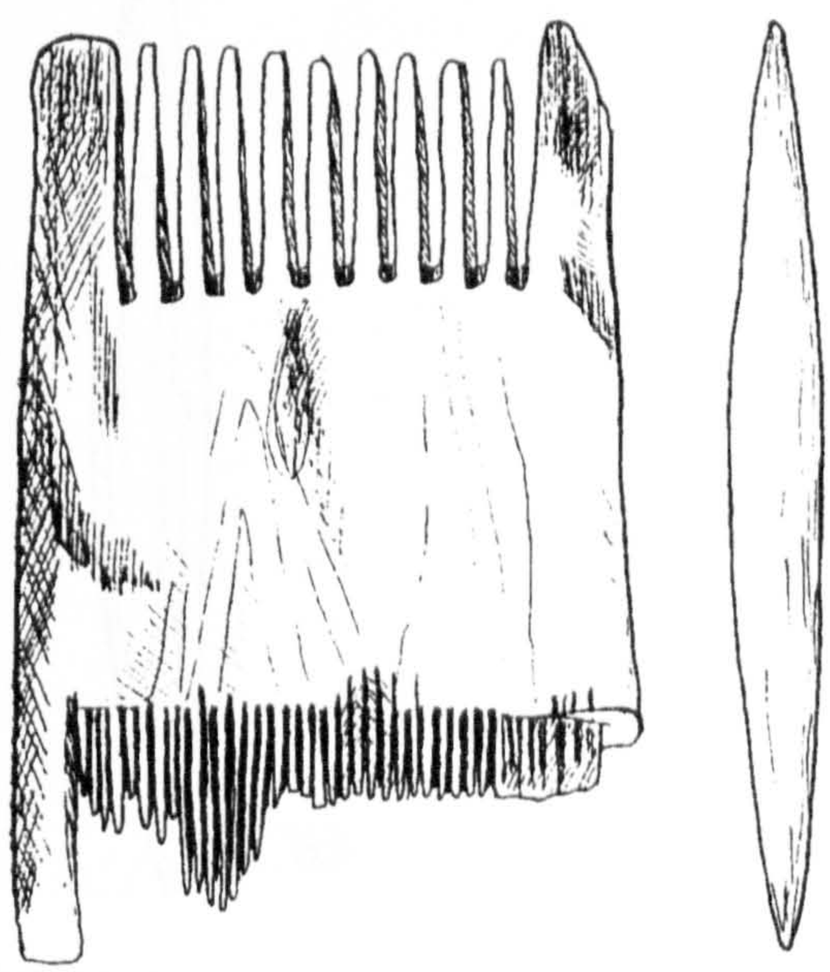

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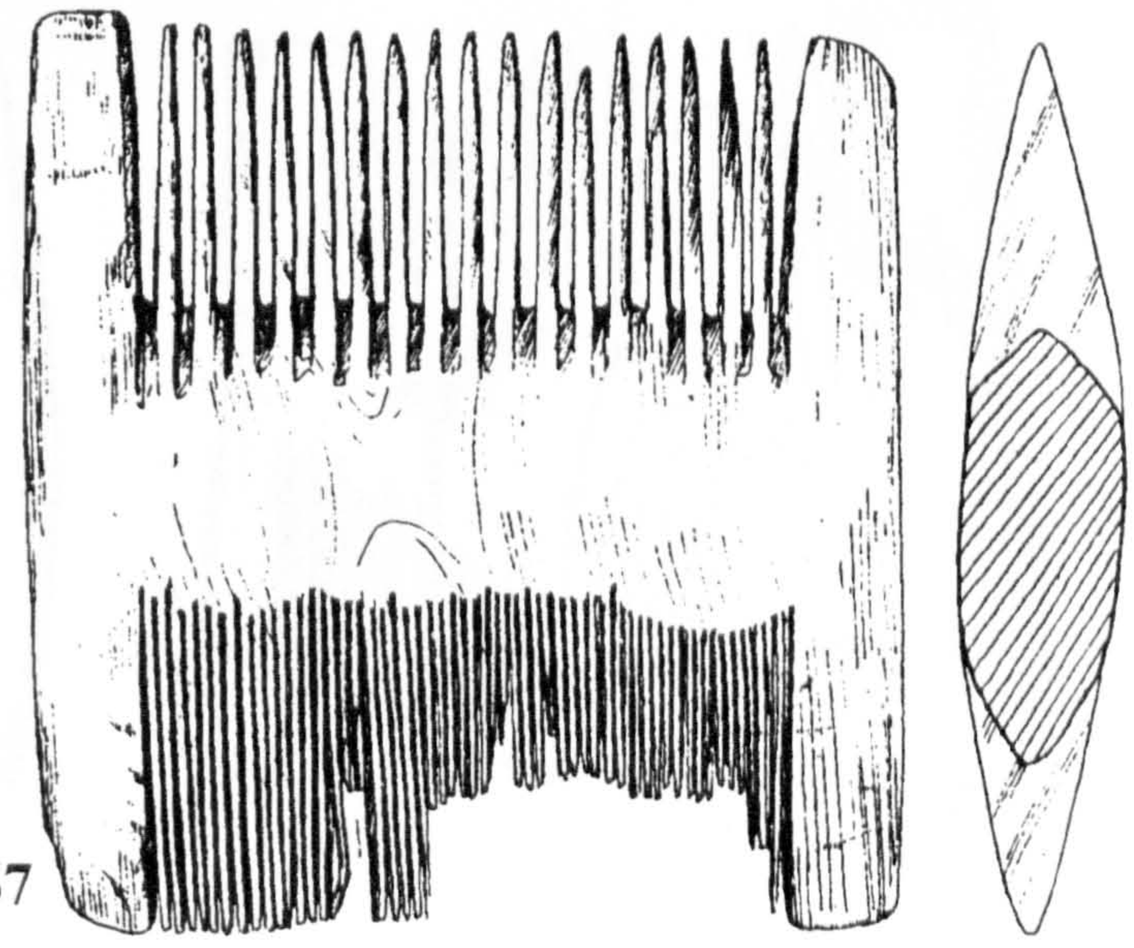
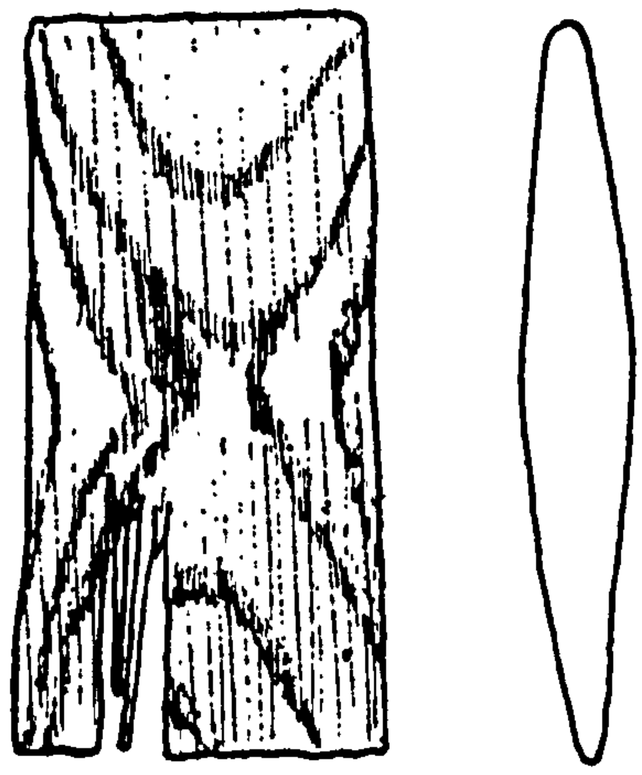


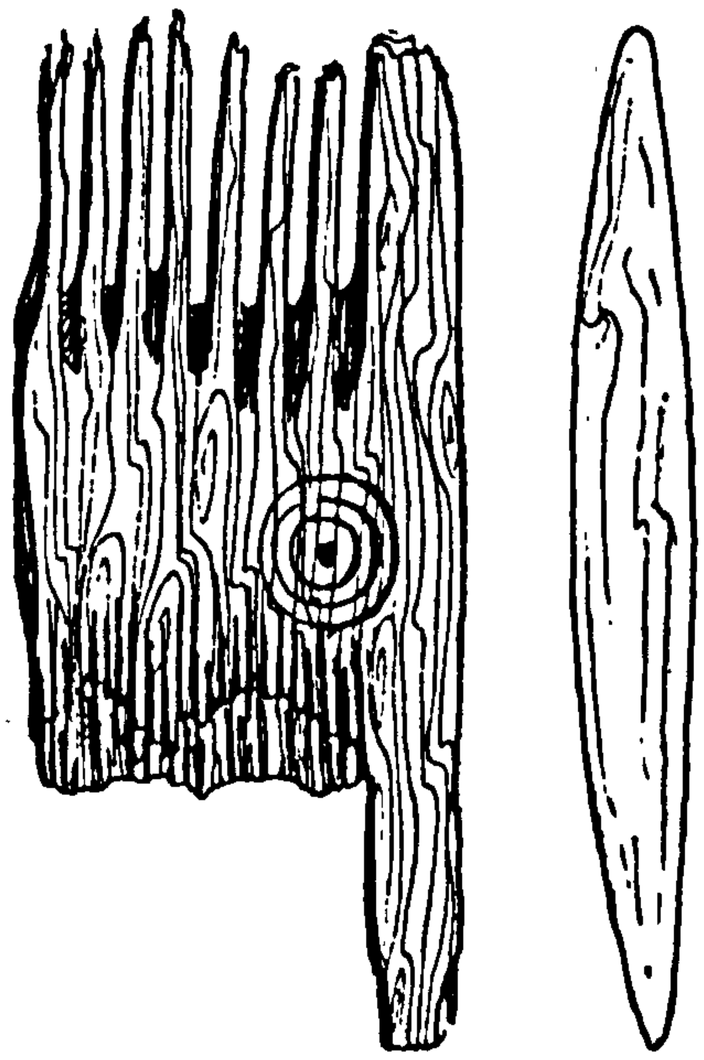
C167

Scale 4:5

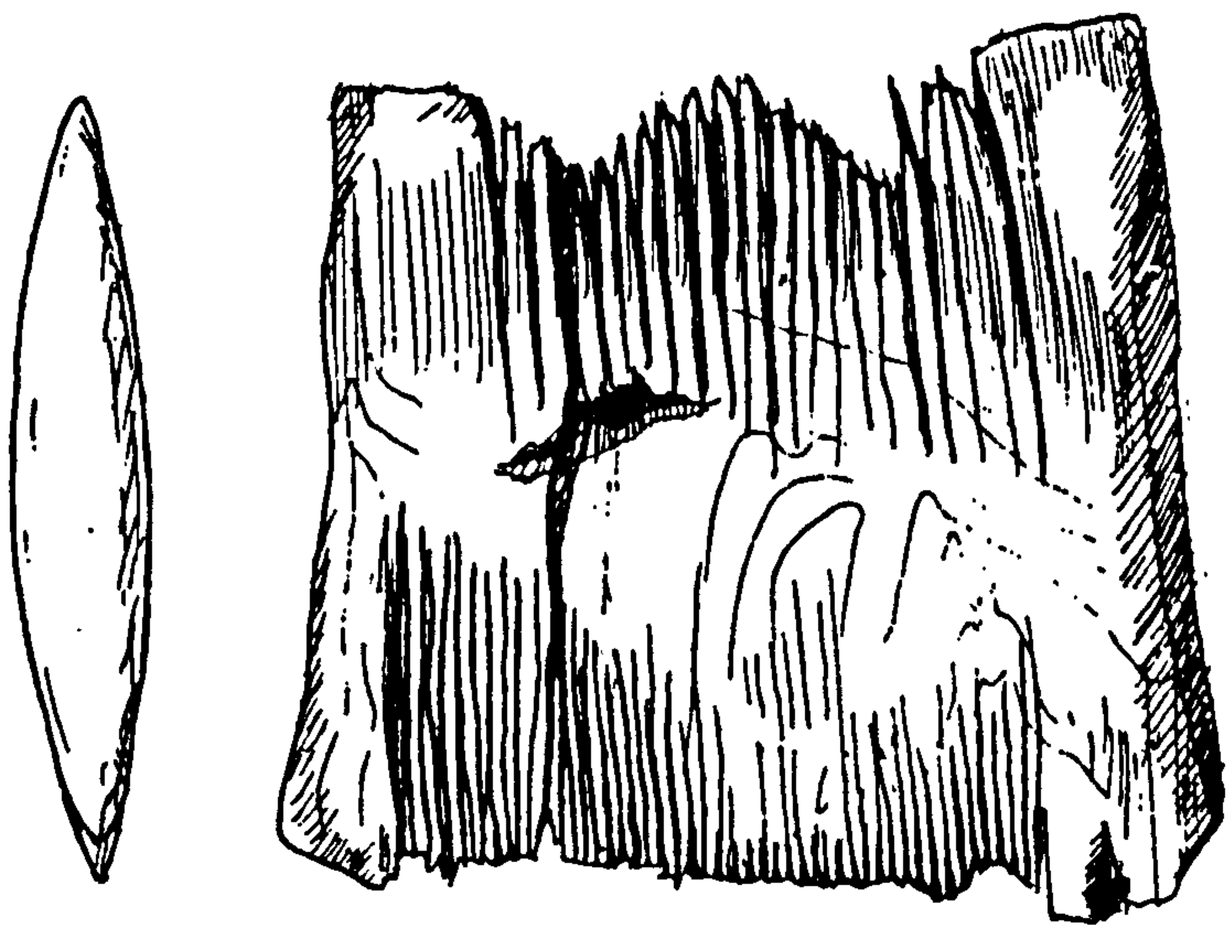
Fig. 5.27 Comb rejects from 13th-14th century deposits



Kir-1

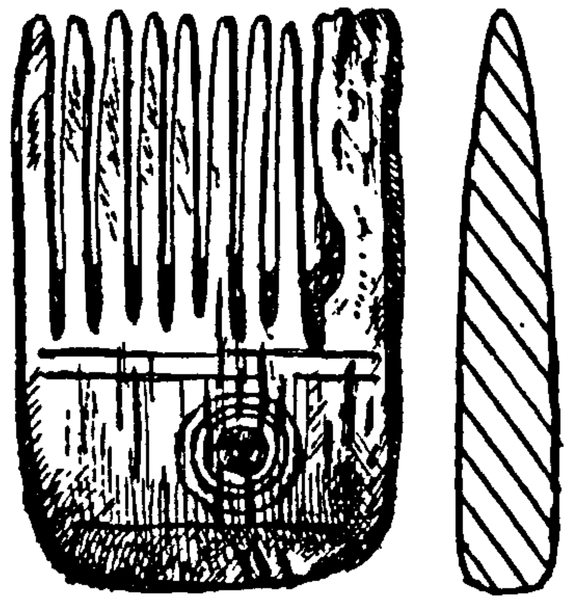


C63

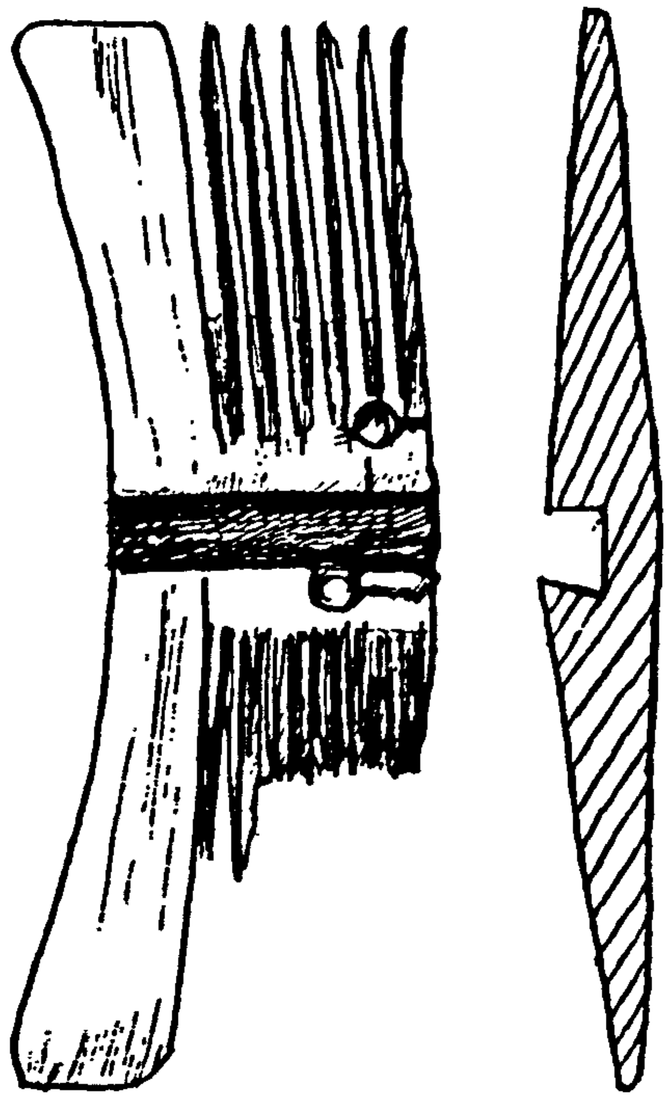


C70

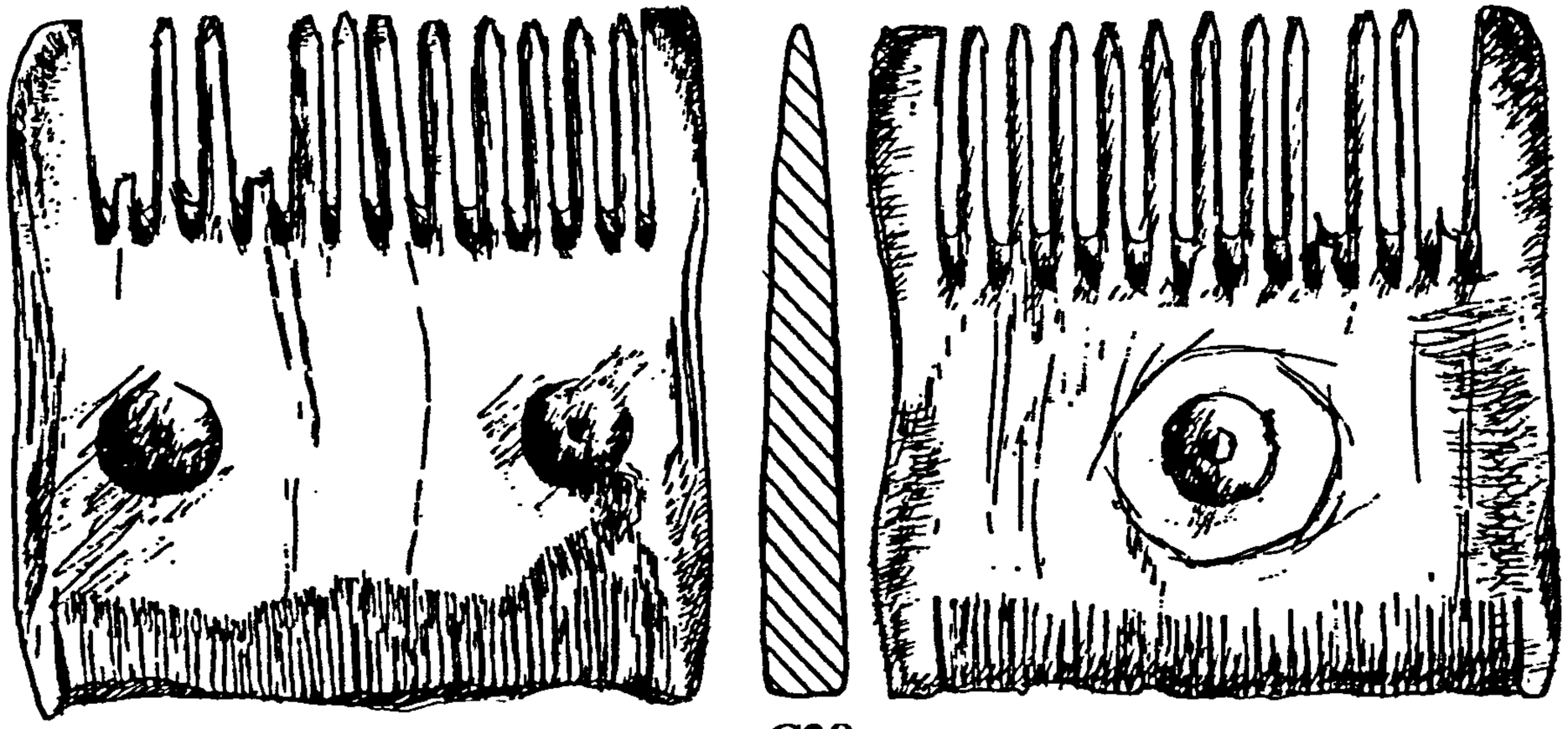
Fig. 5.28 Damaged wooden combs repaired for reuse (single-sided and double-sided examples)



C21

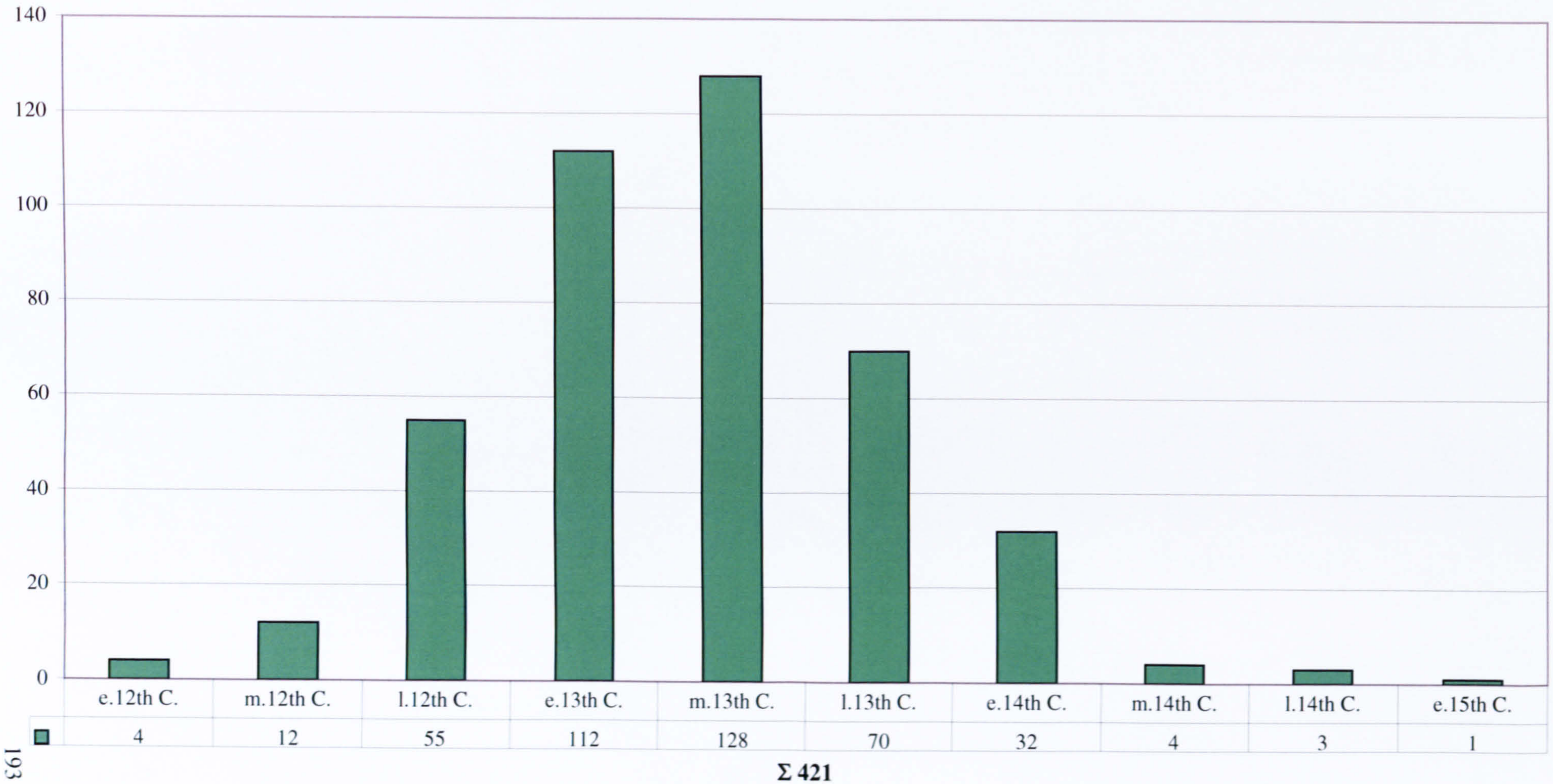


C24



C28

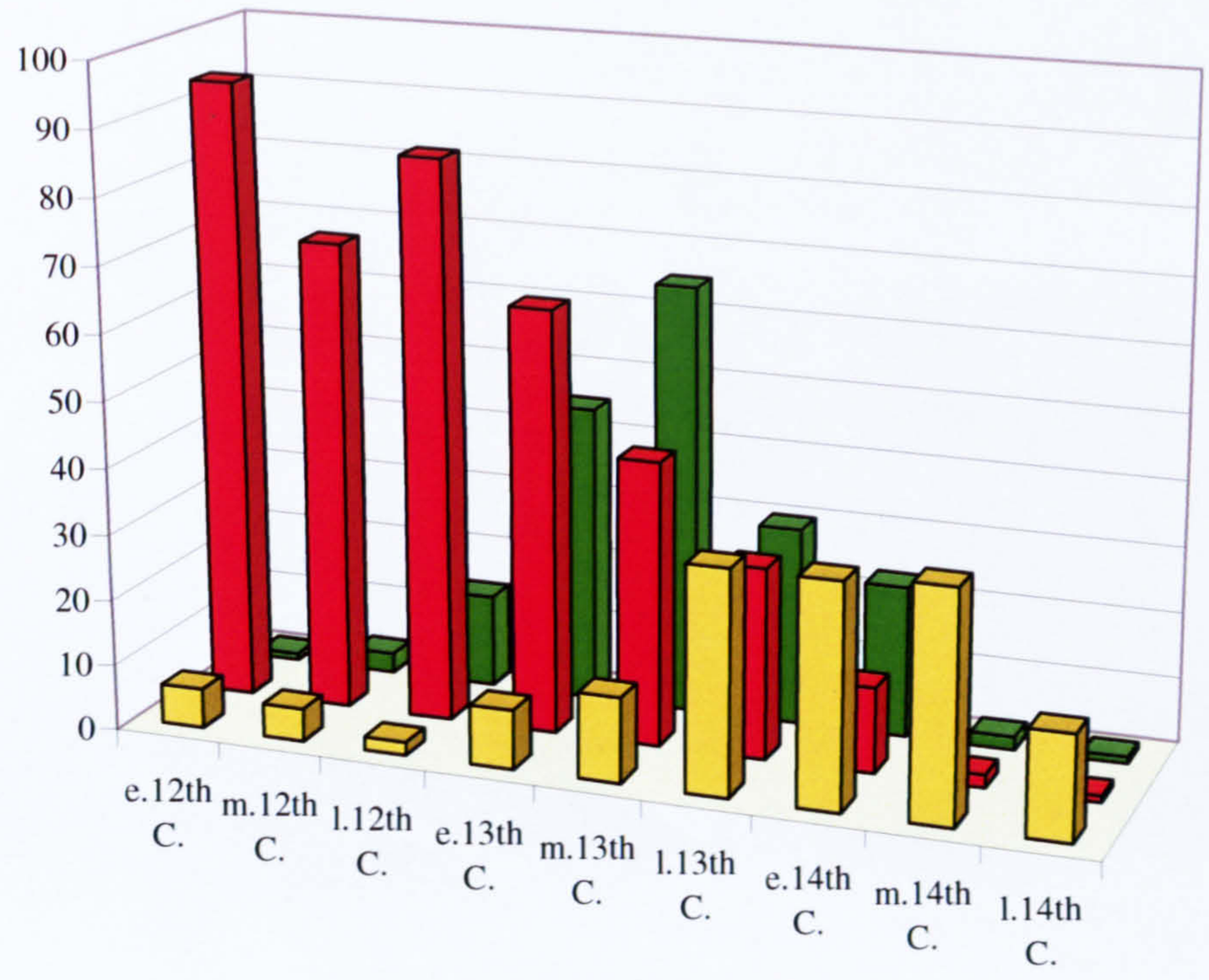
Fig. 6.1 Chronological distribution of double-sided composite combs



193

Σ 421

Fig. 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)



	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.
class 2b (154 items)	6	5	2	9	13	34	34	35	16
class 2a (402 items)	94	71	85	64	43	29	13	2	1
class 3 (184 items)	1	3	14	45	65	30	23	2	1

Fig. 6.3 Double-sided composite combs featuring only one billet

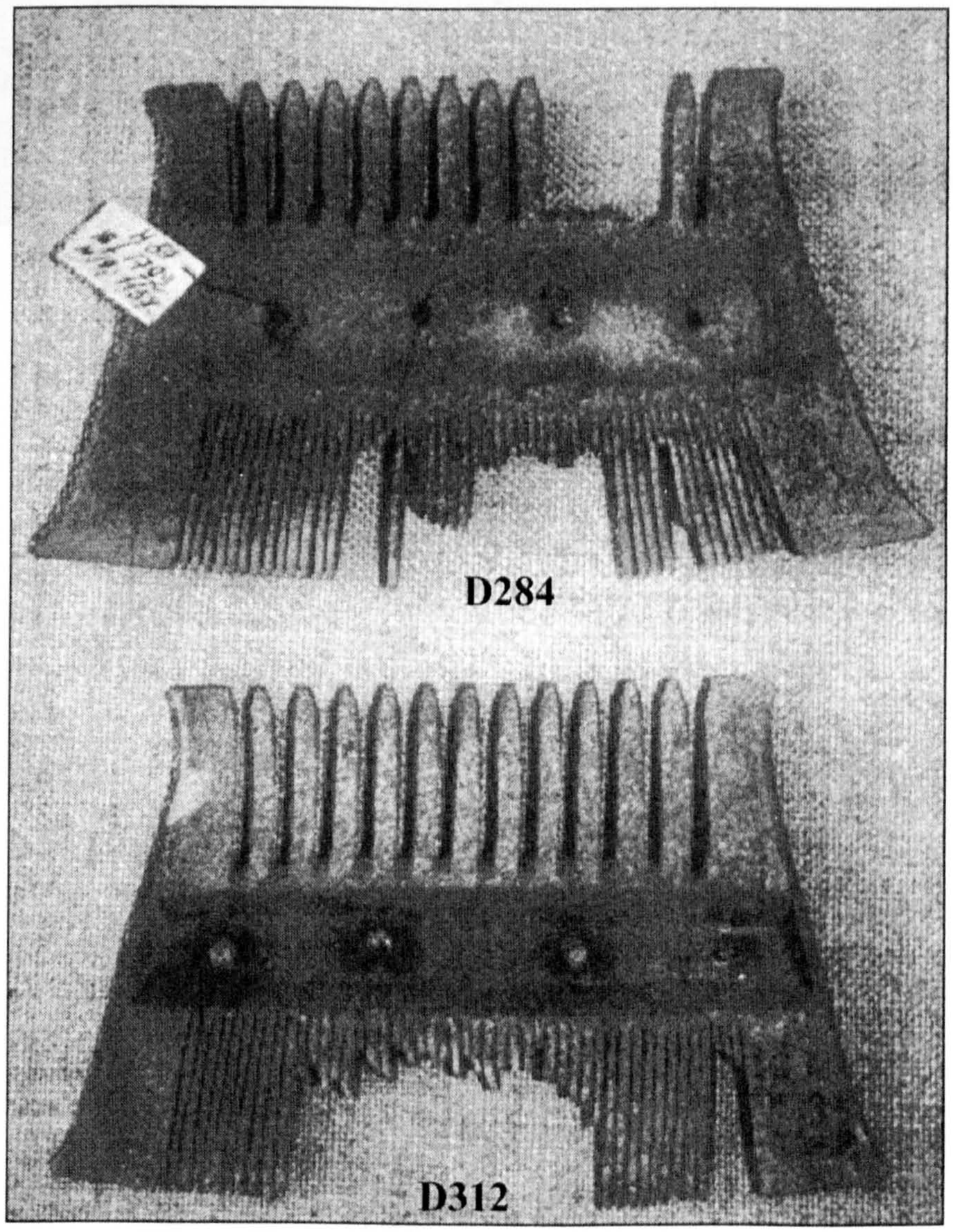
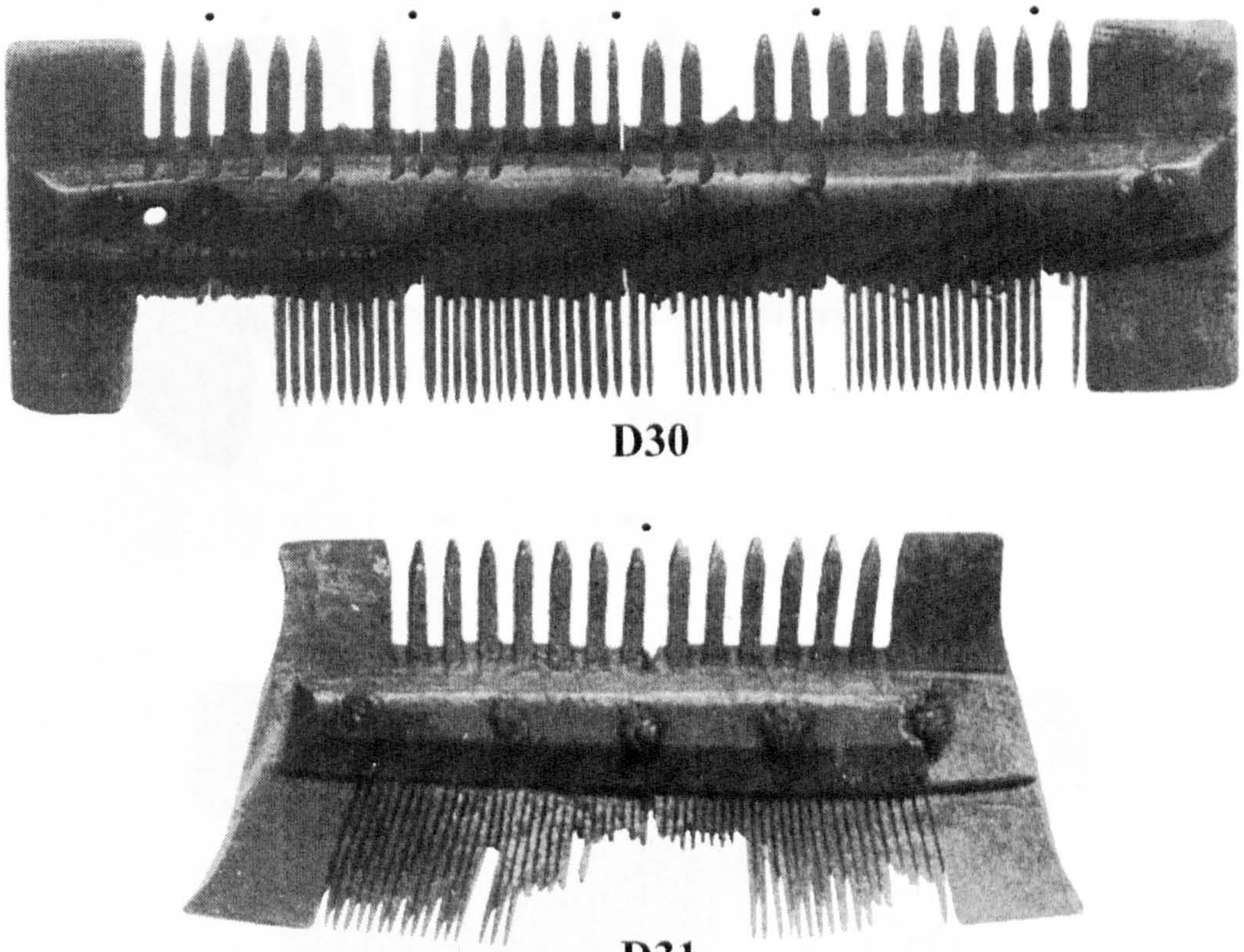


Fig. 6.4 Combs featuring a single row of rivets set at a low frequency



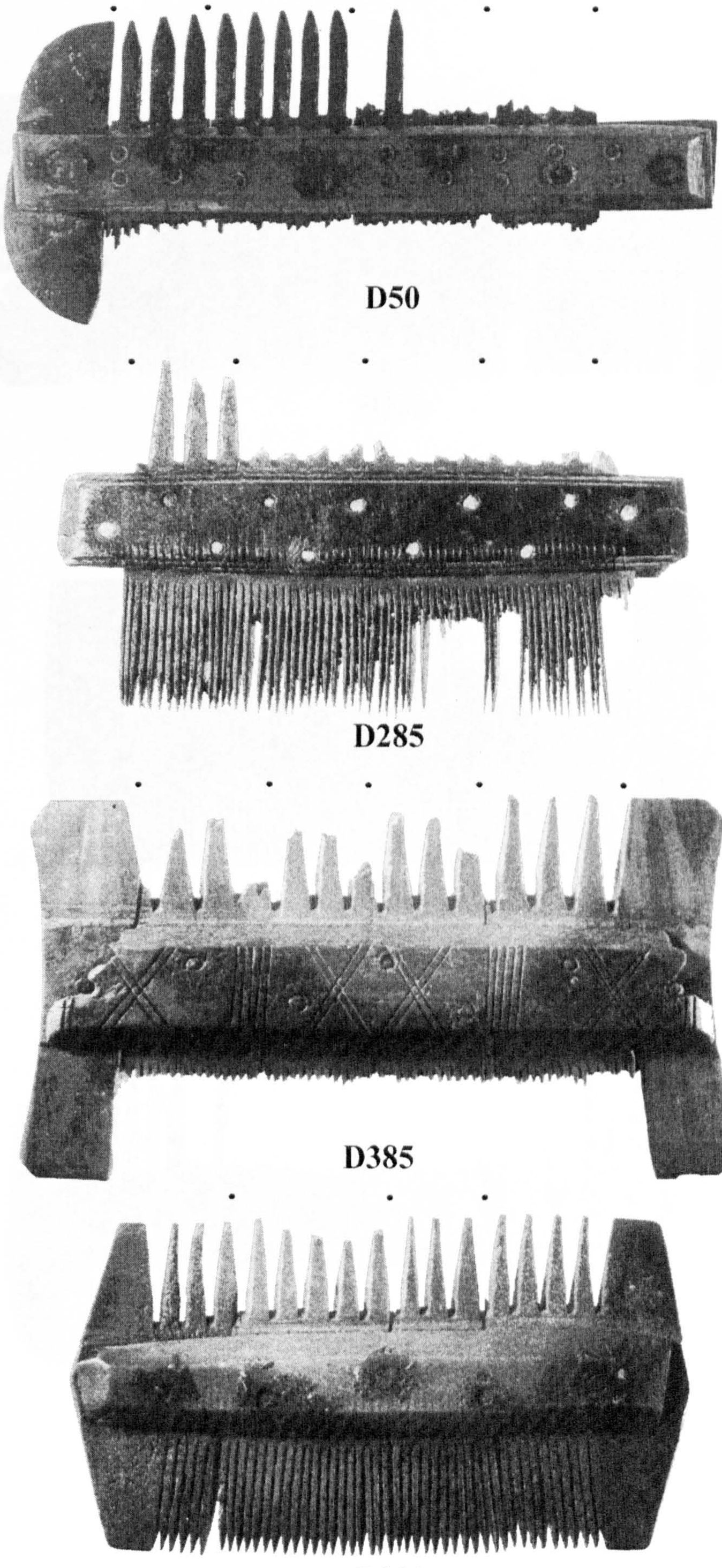
D30

D31

D406

D391

Fig. 6.5 Combs featuring two rows of offset rivets



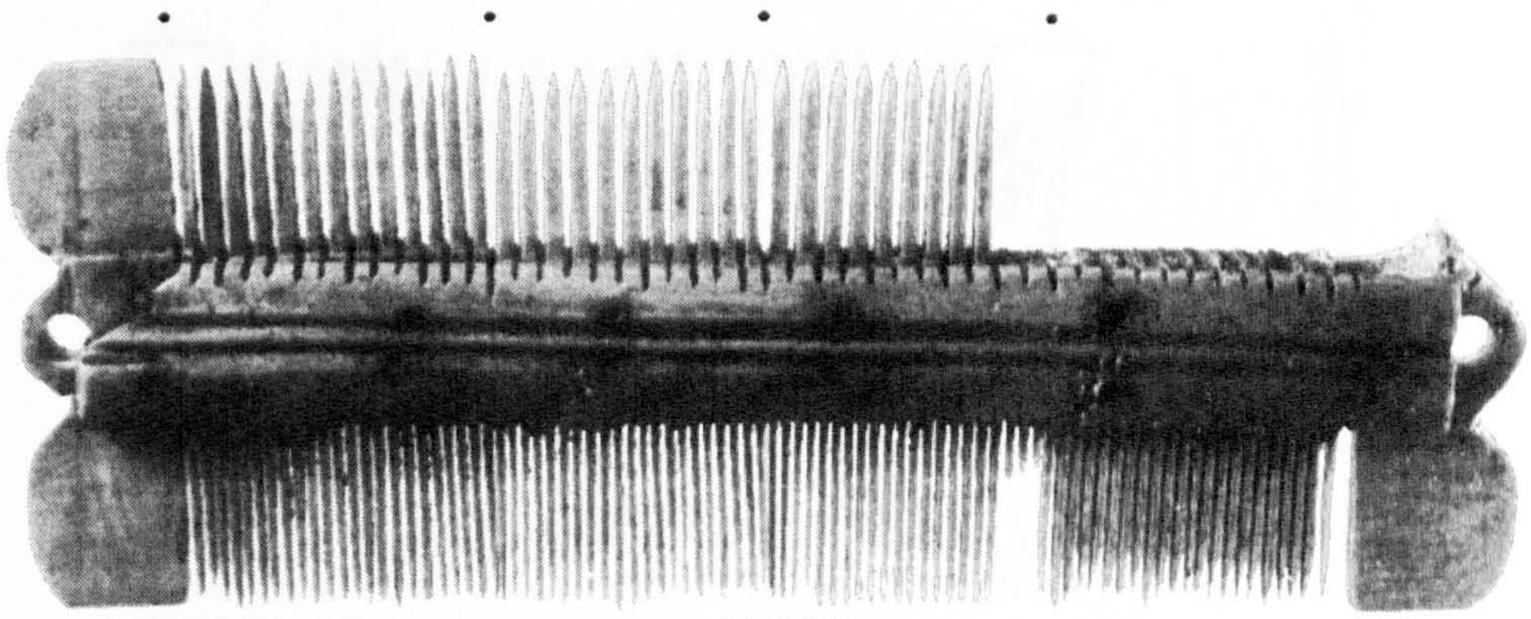
D50

D285

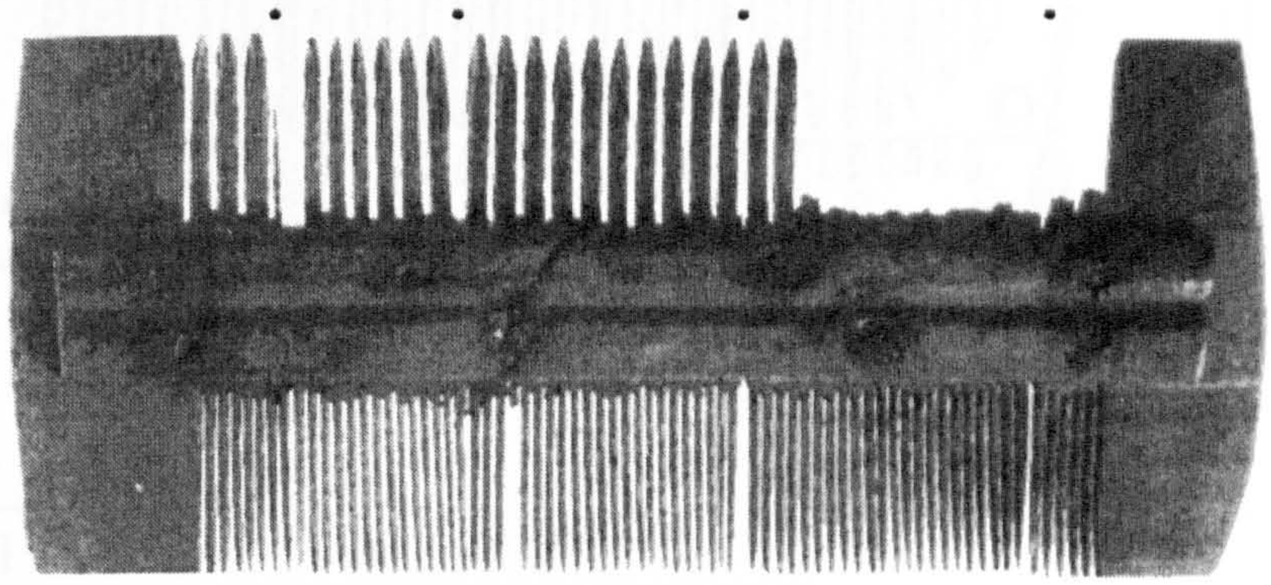
D385

D390

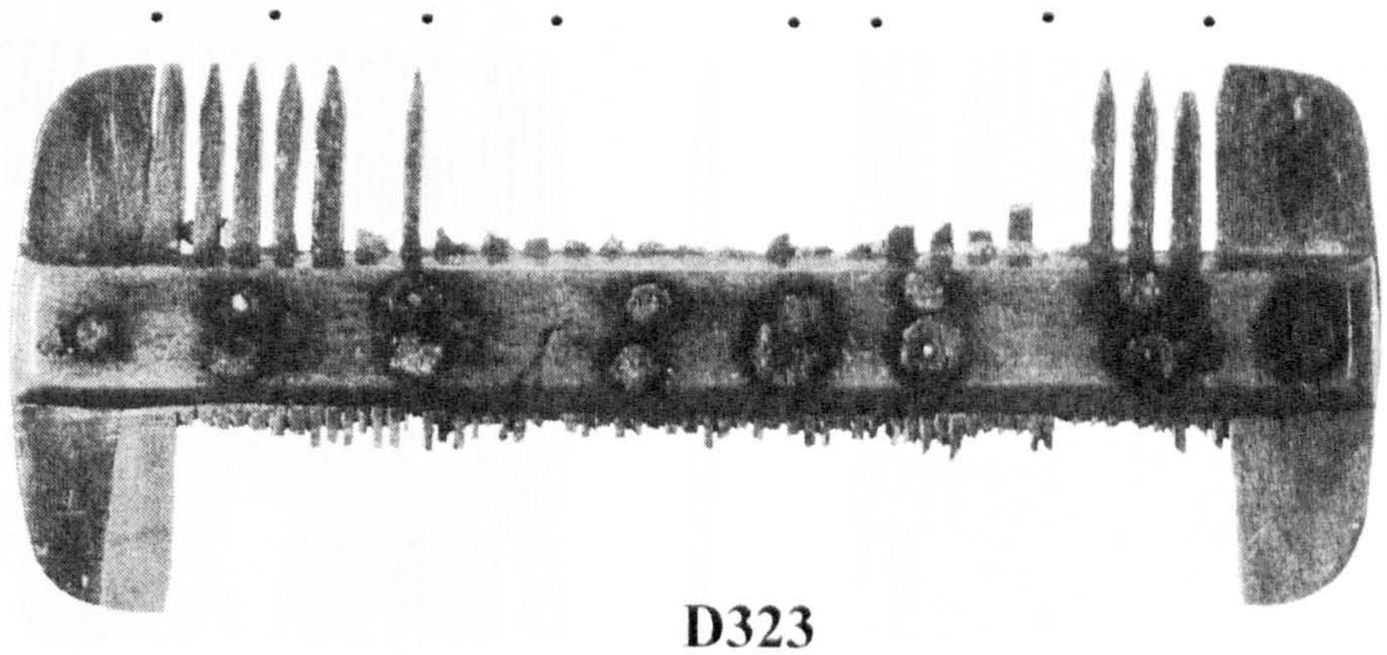
Fig. 6.6 Combs featuring pairs of rivets set vertically or obliquely



D382

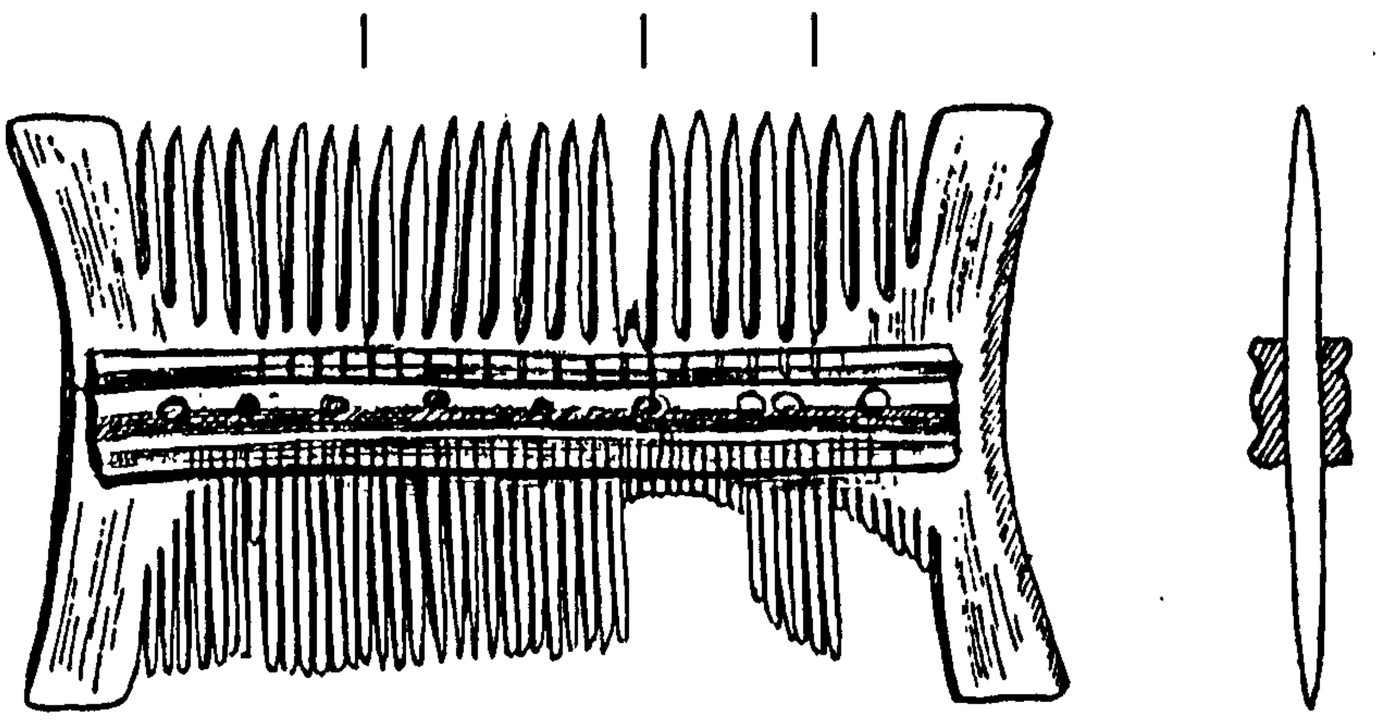


D383

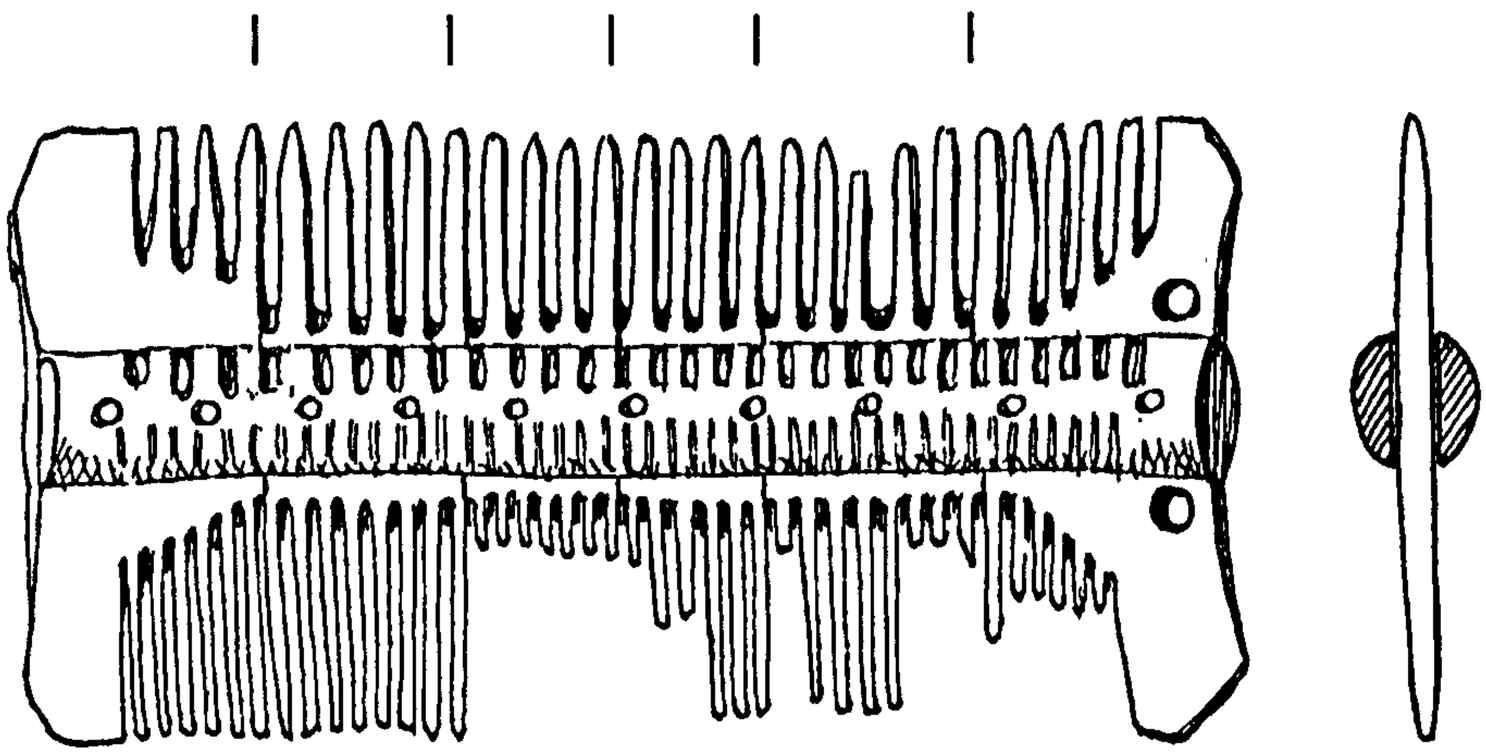


D323

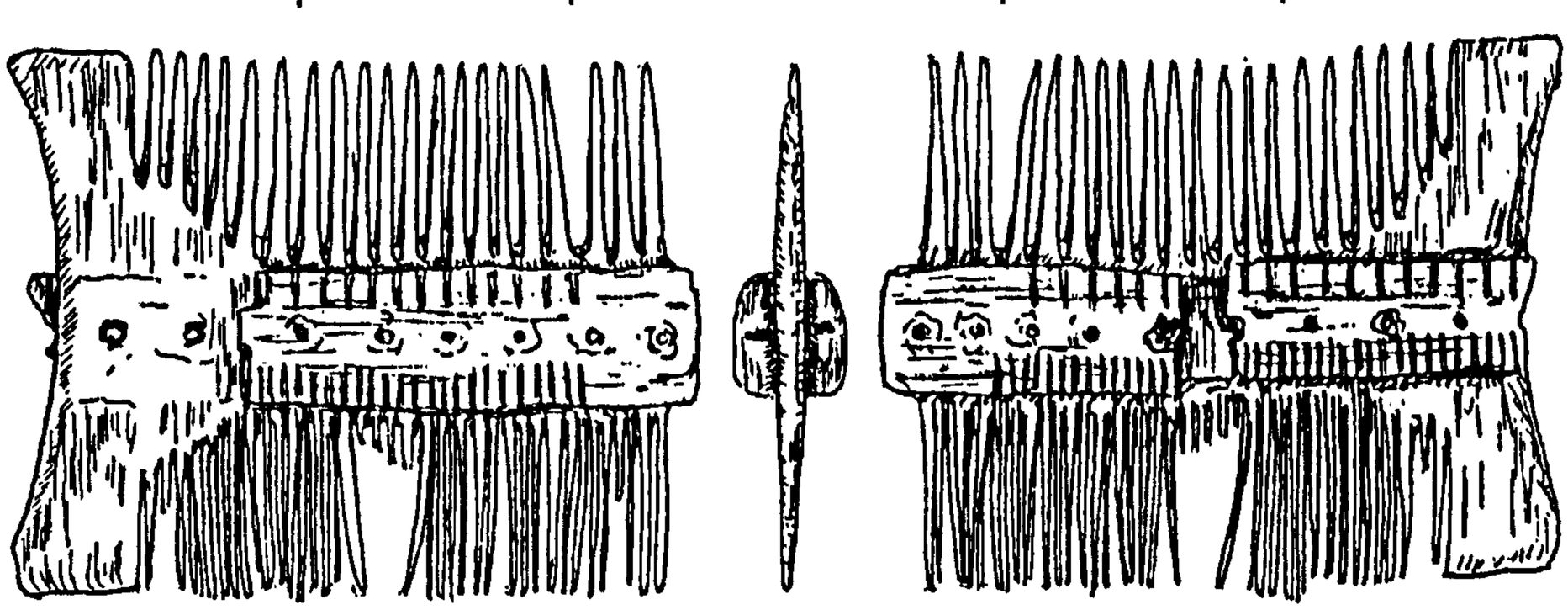
Fig. 6.7 Combs featuring a single row of numerous rivets



D529

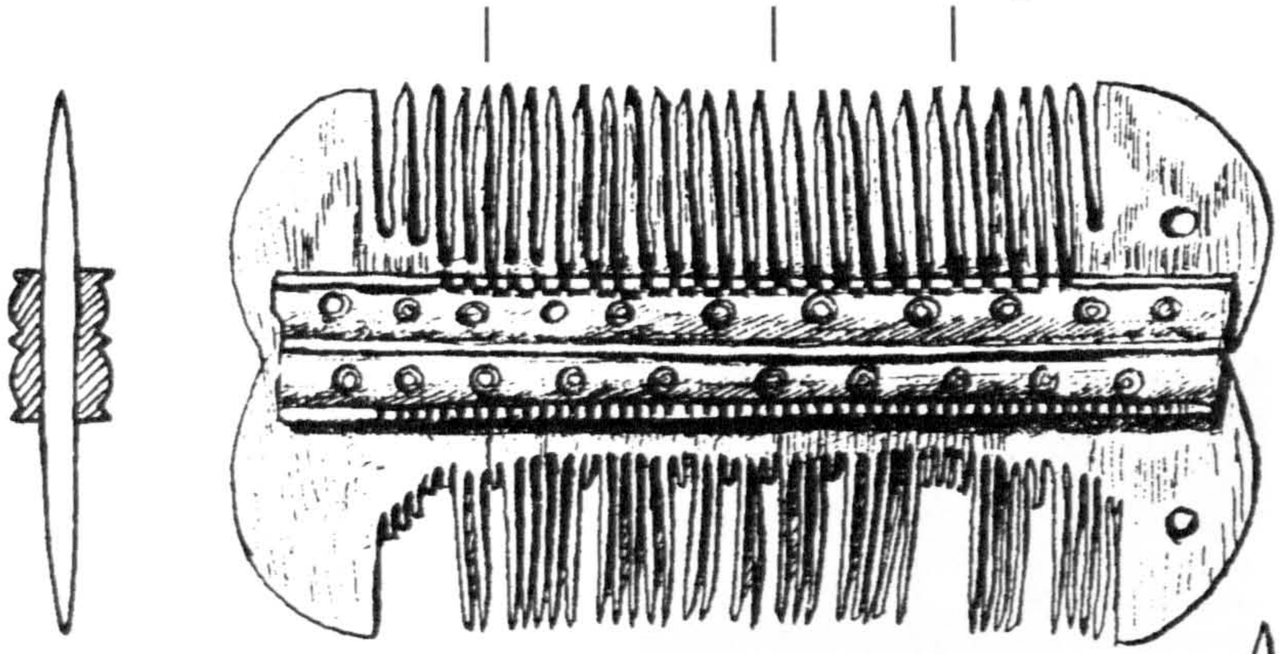


D192



D526

Fig. 6.8 Combs featuring two rows of numerous rivets



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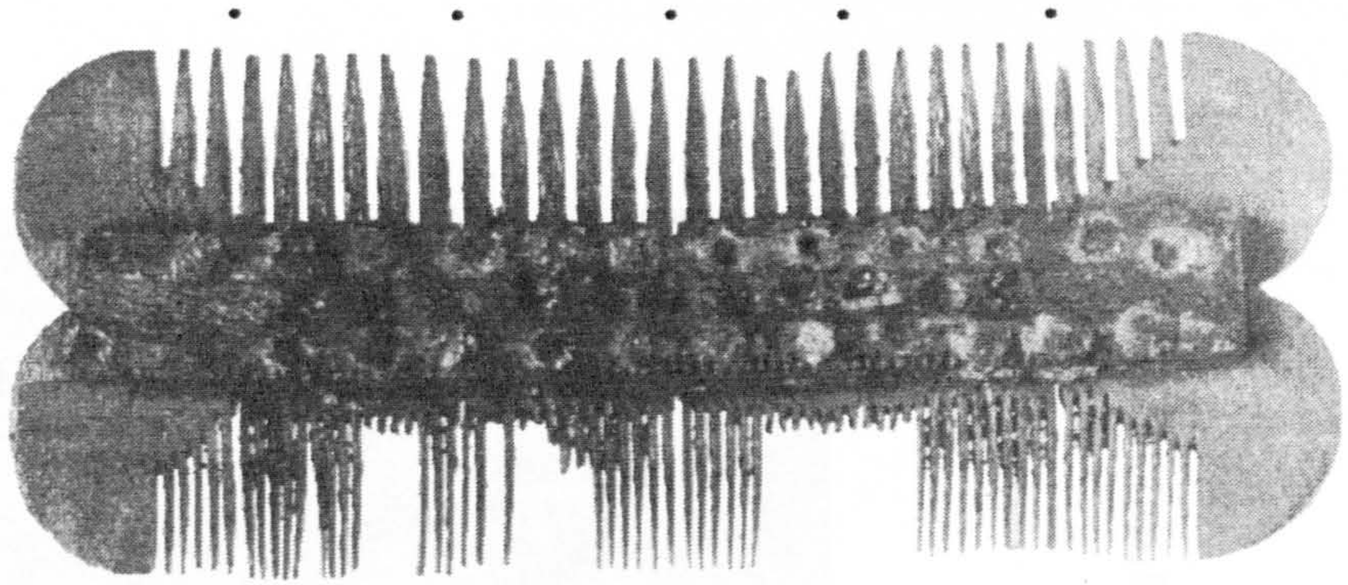
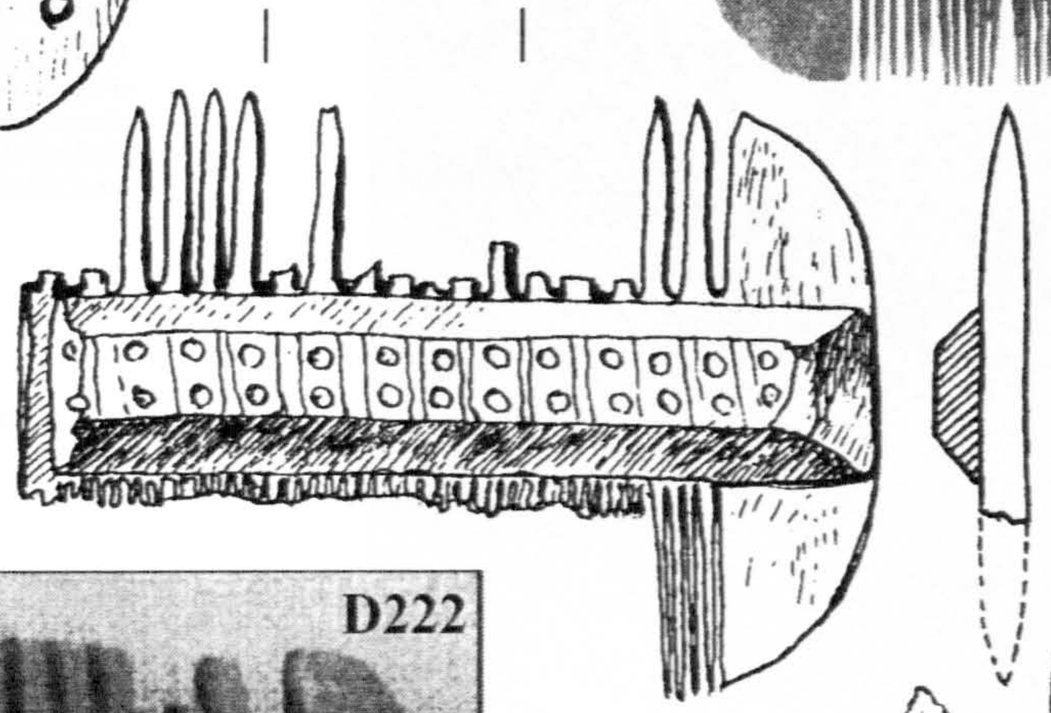
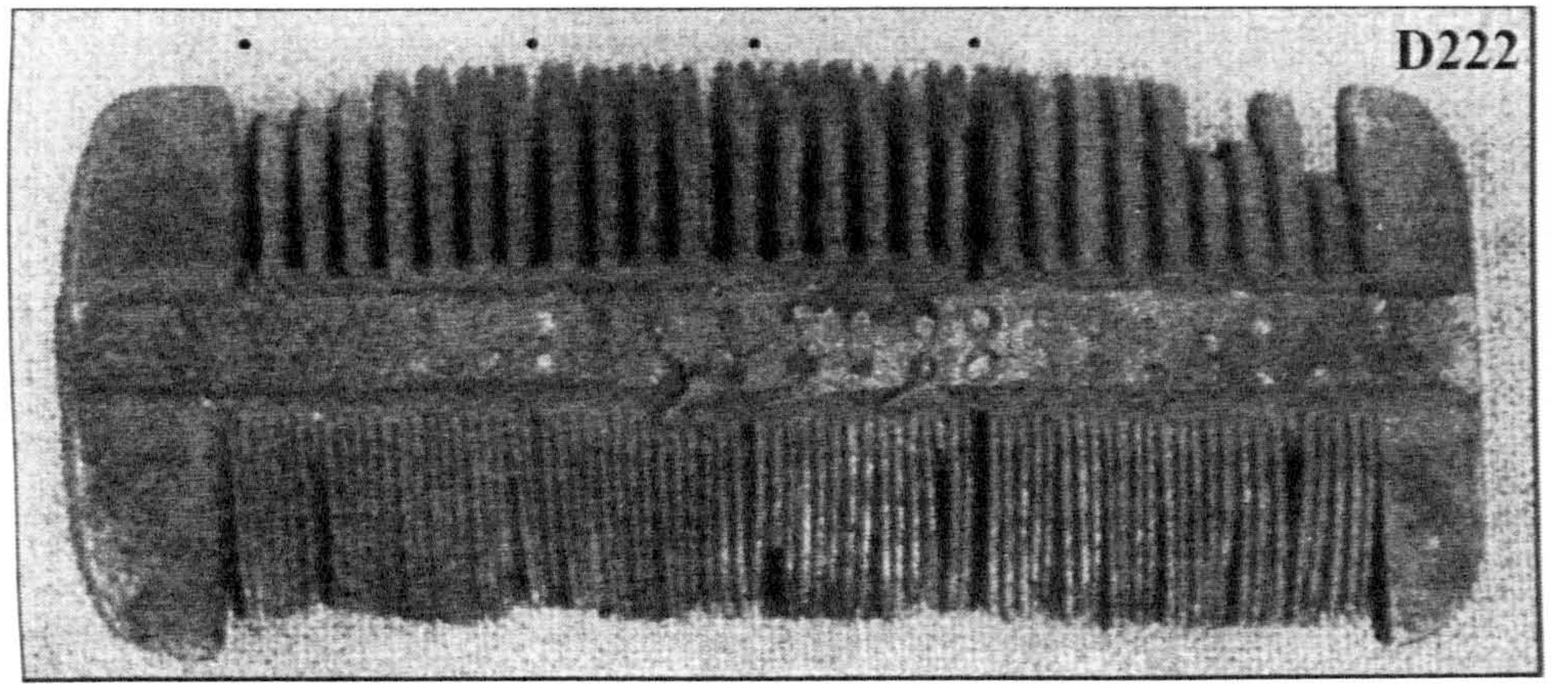


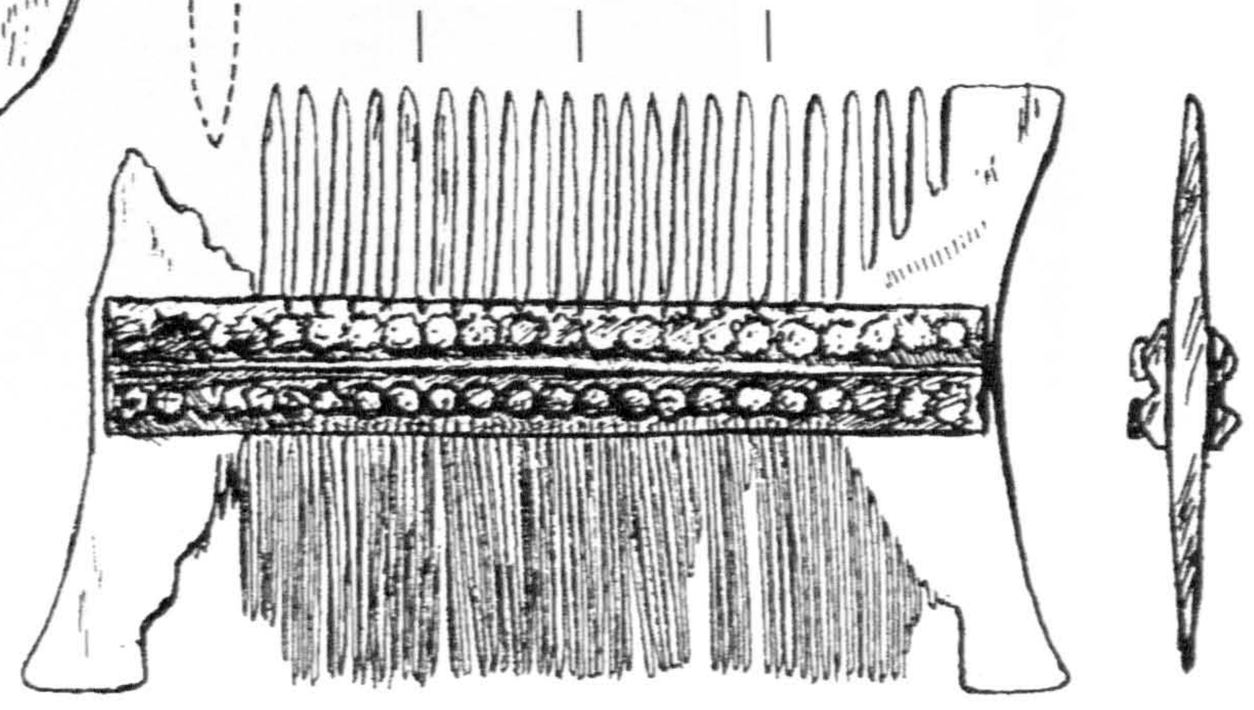
D418



D425

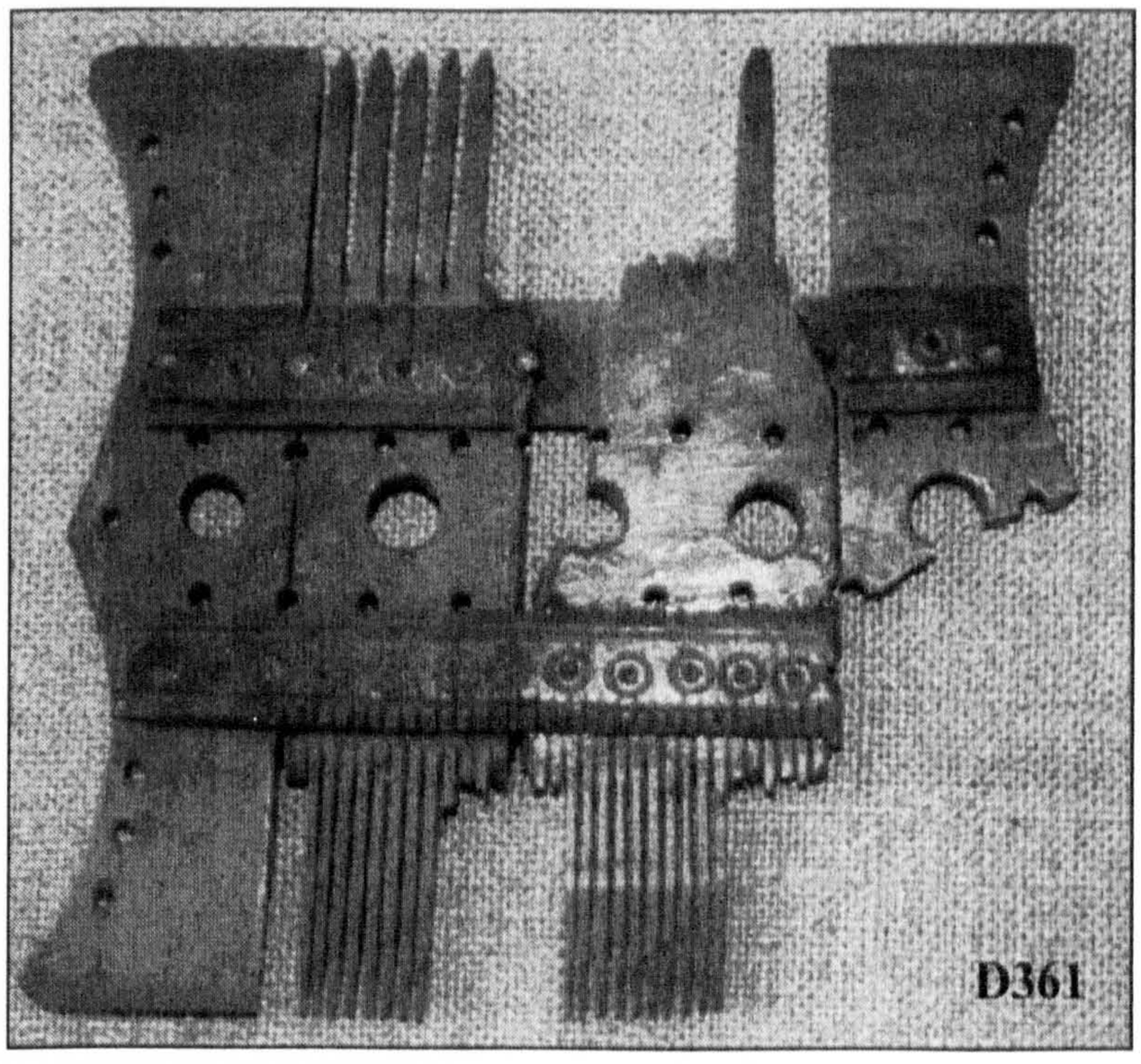


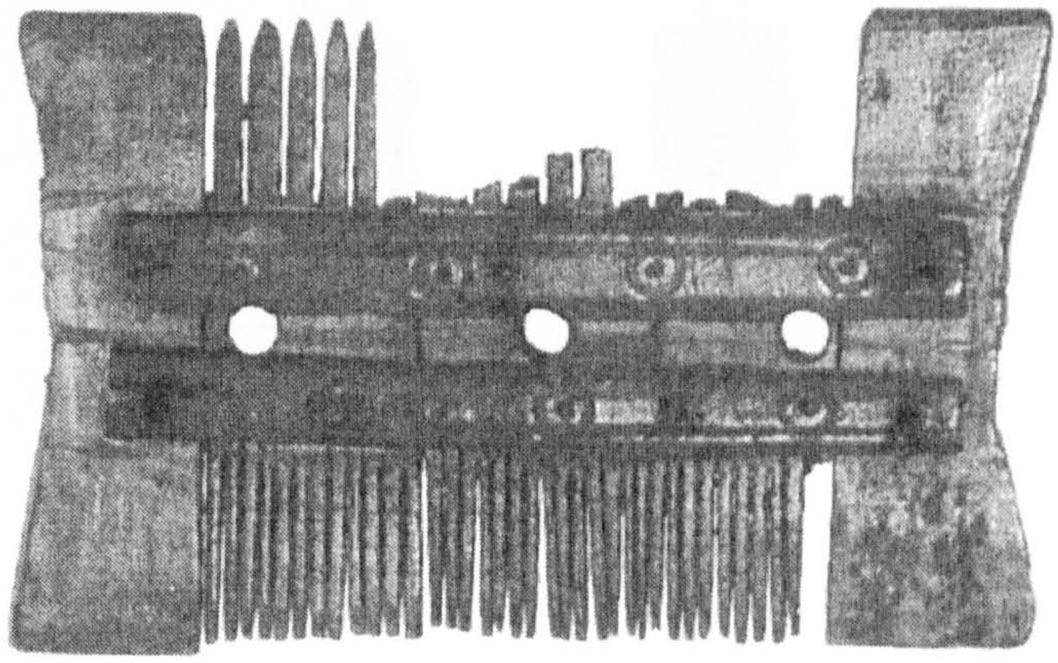
D222



D112

Fig. 6.9 Combs featuring two pairs of side-plates

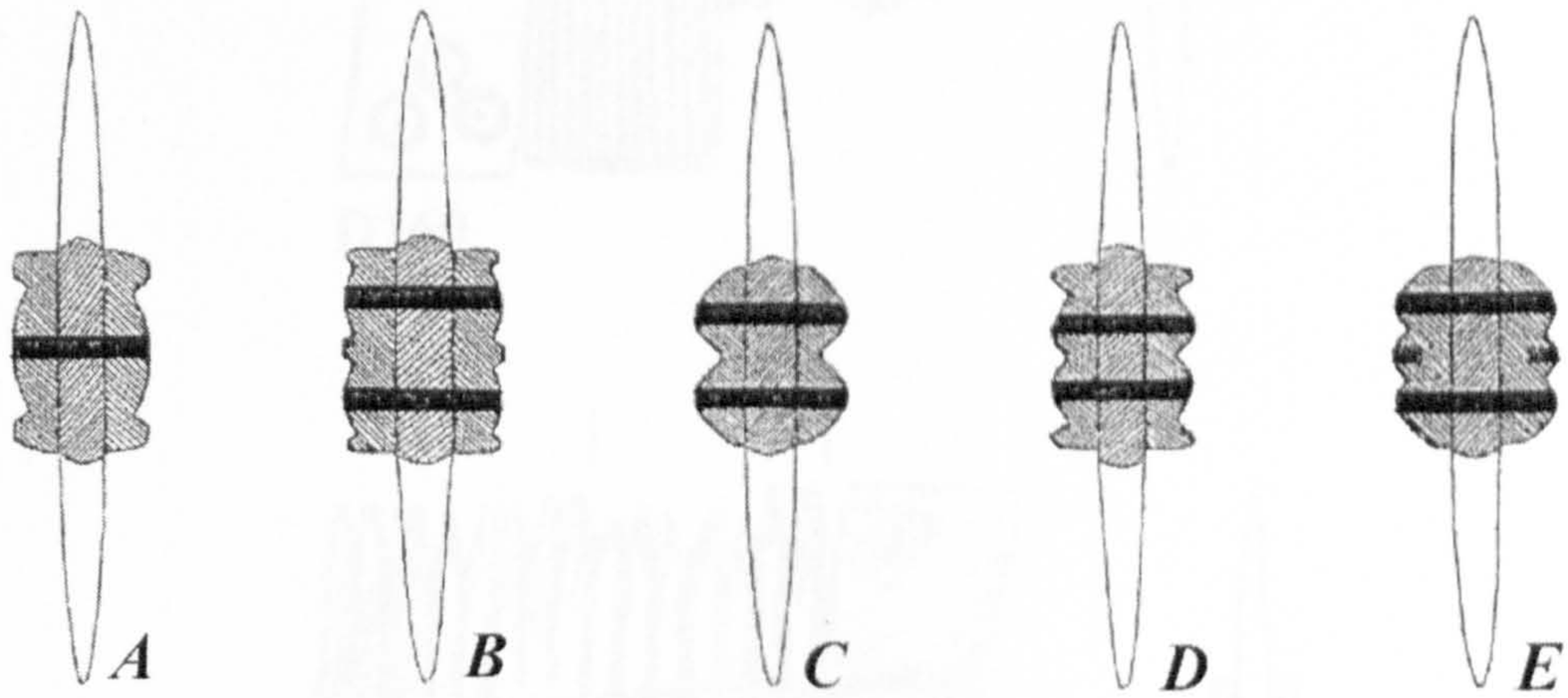




D420

Fig. 6.10 Variants of sinuous cross-sectional side-plates on the evidence from Lund (after Blomqvist 1943) and Novgorod

A-E - Blomqvist's variants



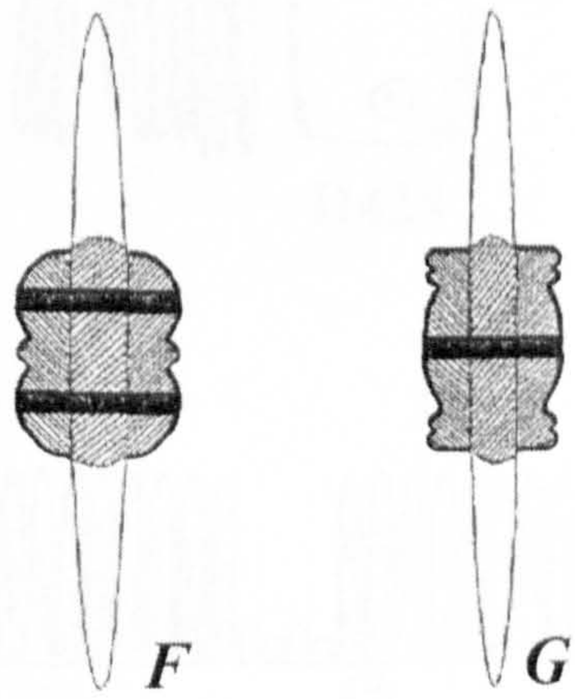
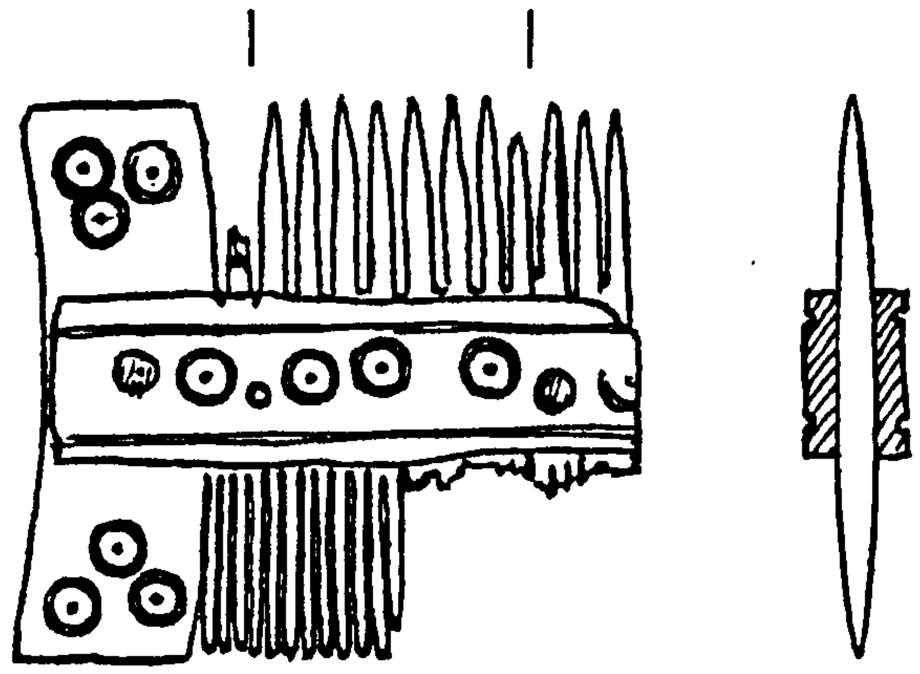
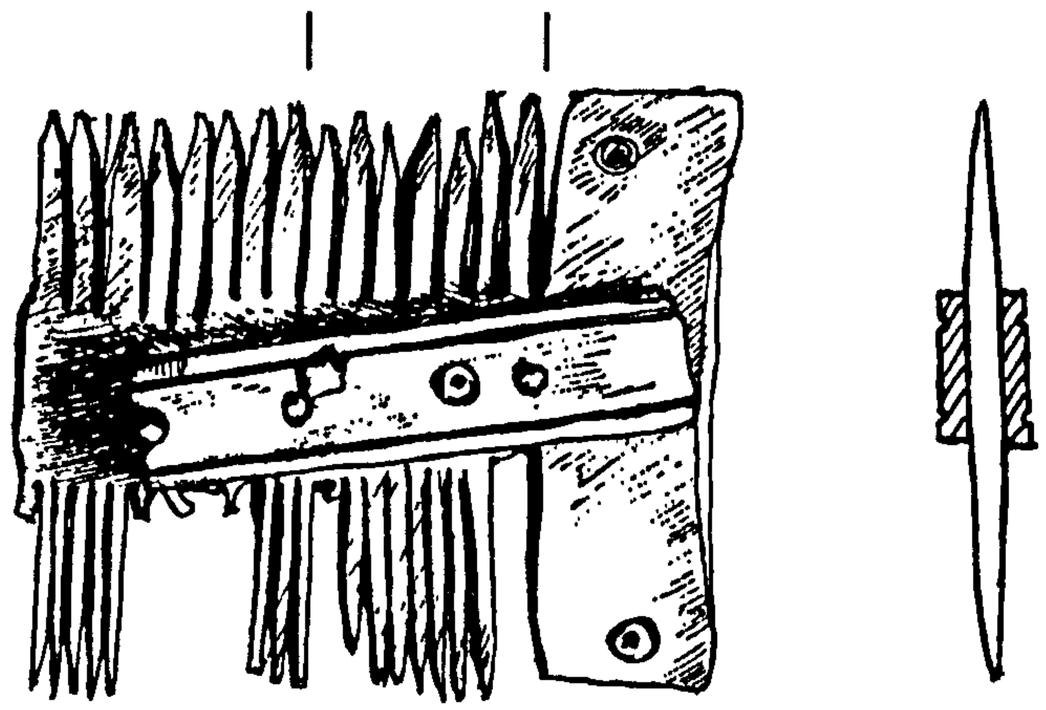


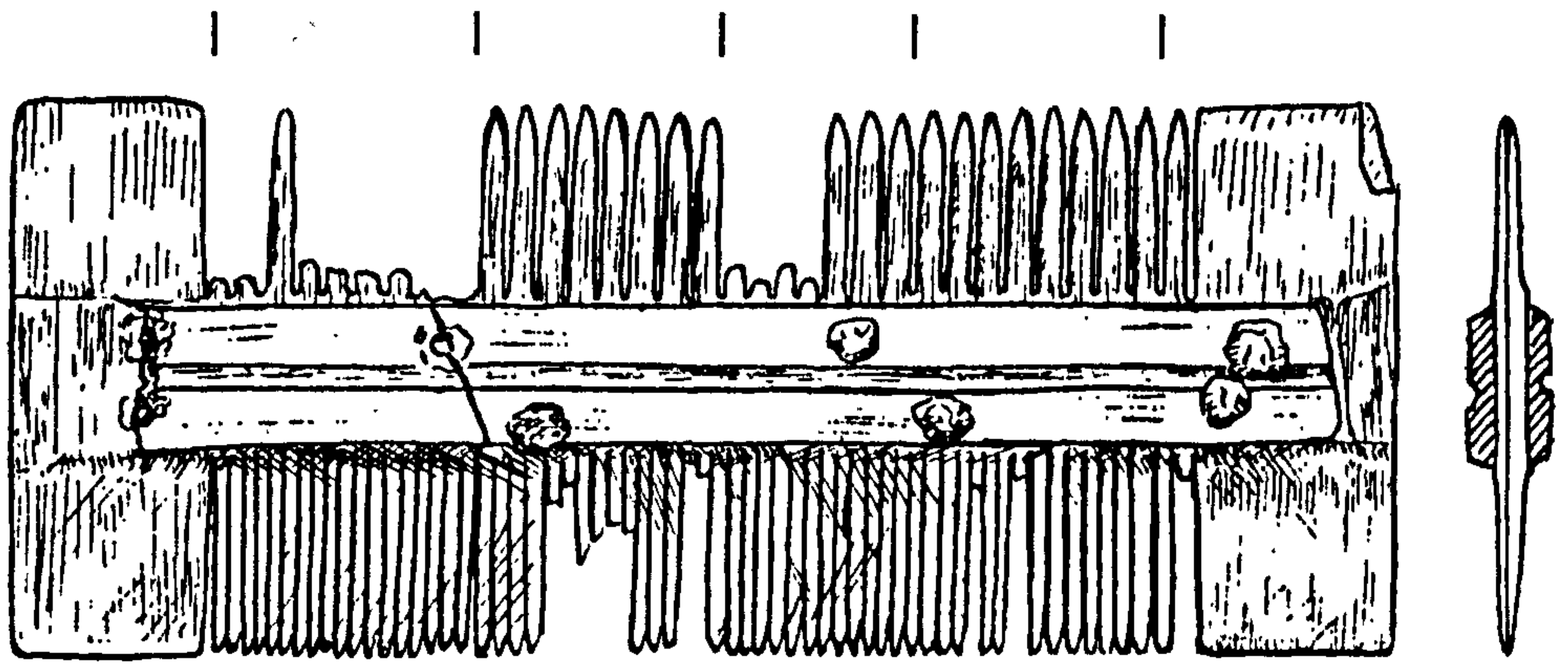
Fig. 6.11 Combs featuring flat rectangular cross-sectional side-plates



D160

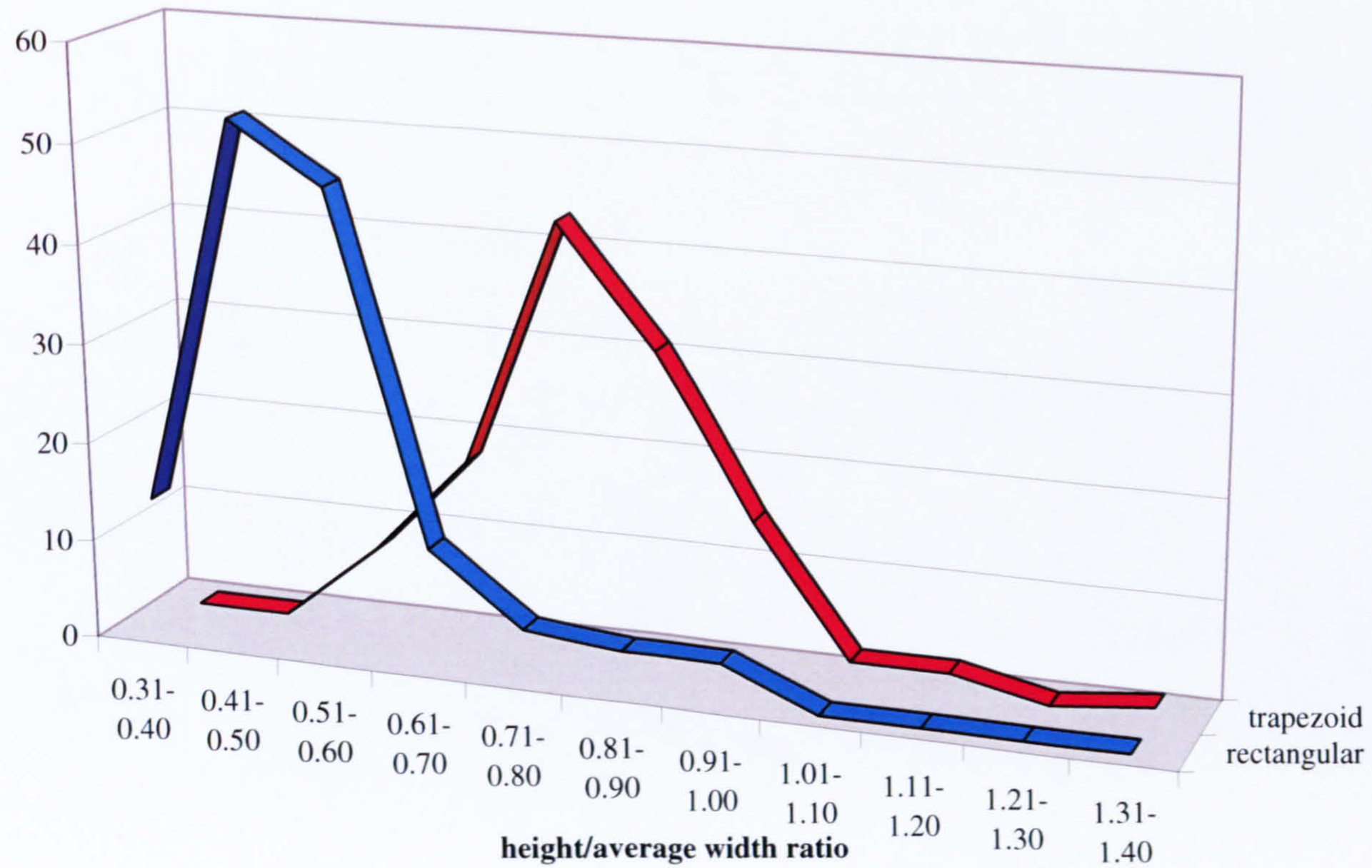


D428



D180

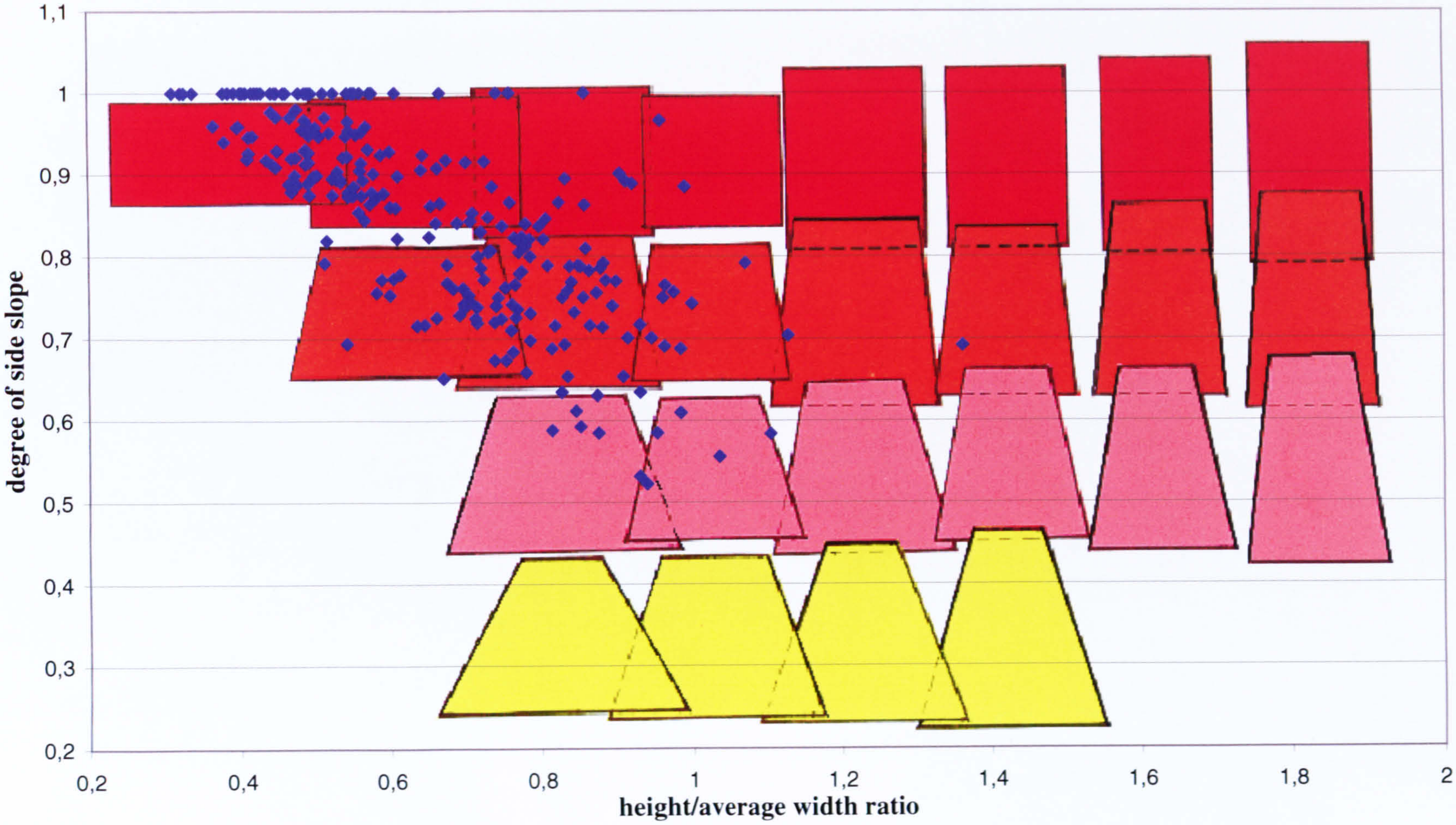
Fig. 6.12 Proportions of rectangular and trapezoid class 3 combs



Σ 259 (239/120)

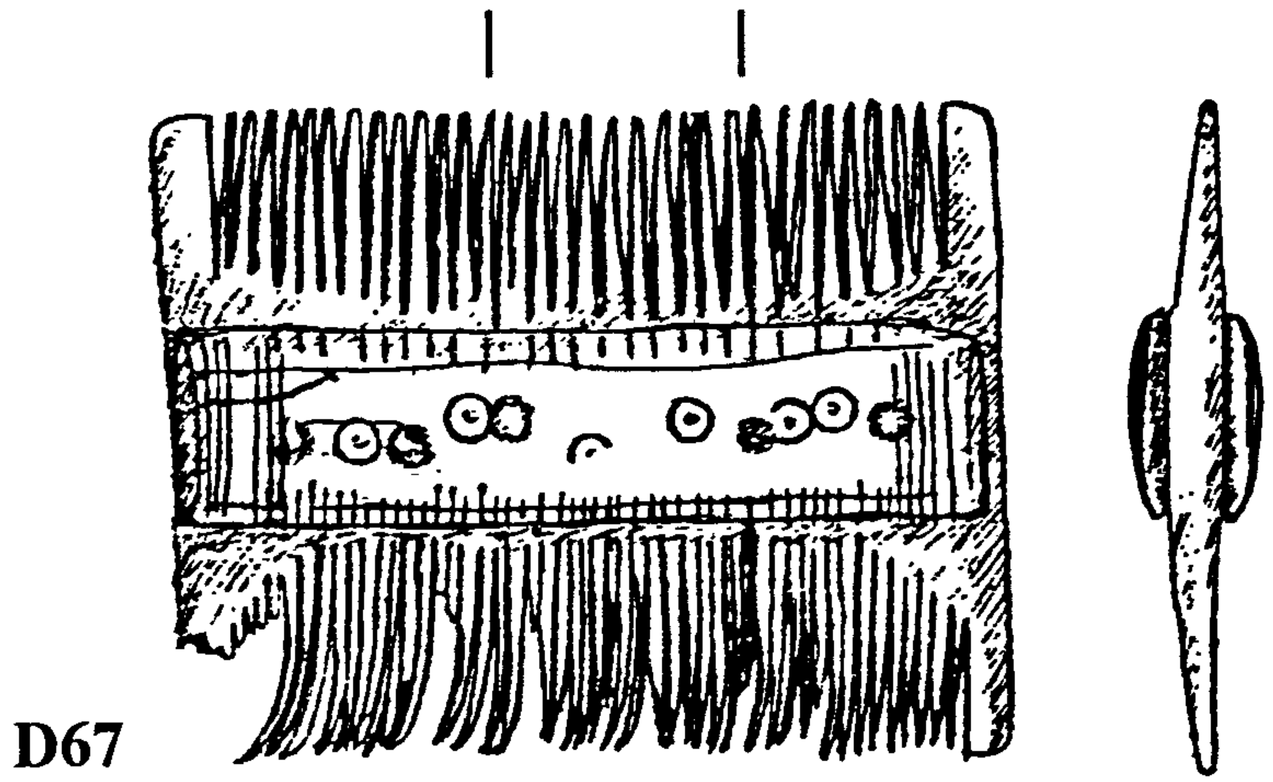
	0.31-0.40	0.41-0.50	0.51-0.60	0.61-0.70	0.71-0.80	0.81-0.90	0.91-1.00	1.01-1.10	1.11-1.20	1.21-1.30	1.31-1.40
rectangular	14	53	47	12	5	4	4	0	0	0	0
trapezoid	0	0	8	18	43	31	15	2	2	0	1

Fig. 6.13 Double-sided composite combs. Basic forms

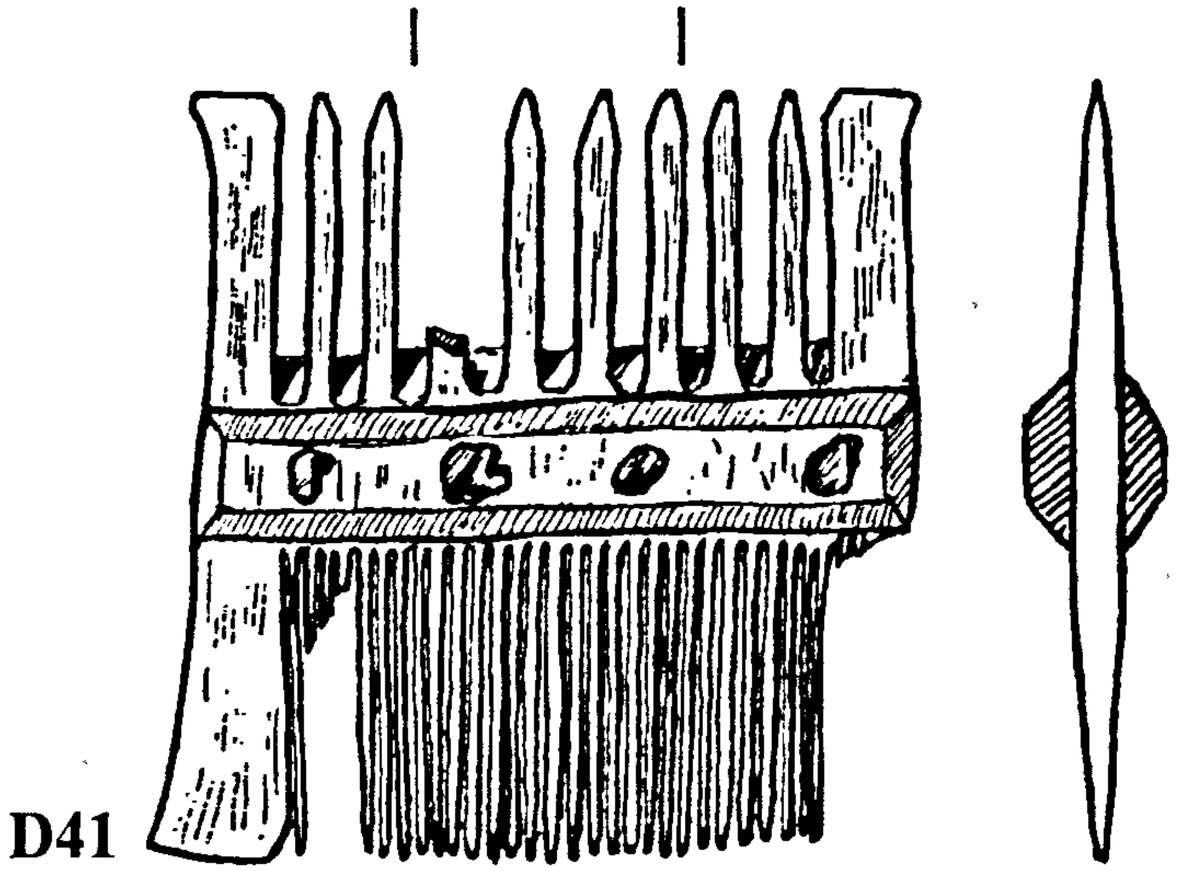


Σ 257

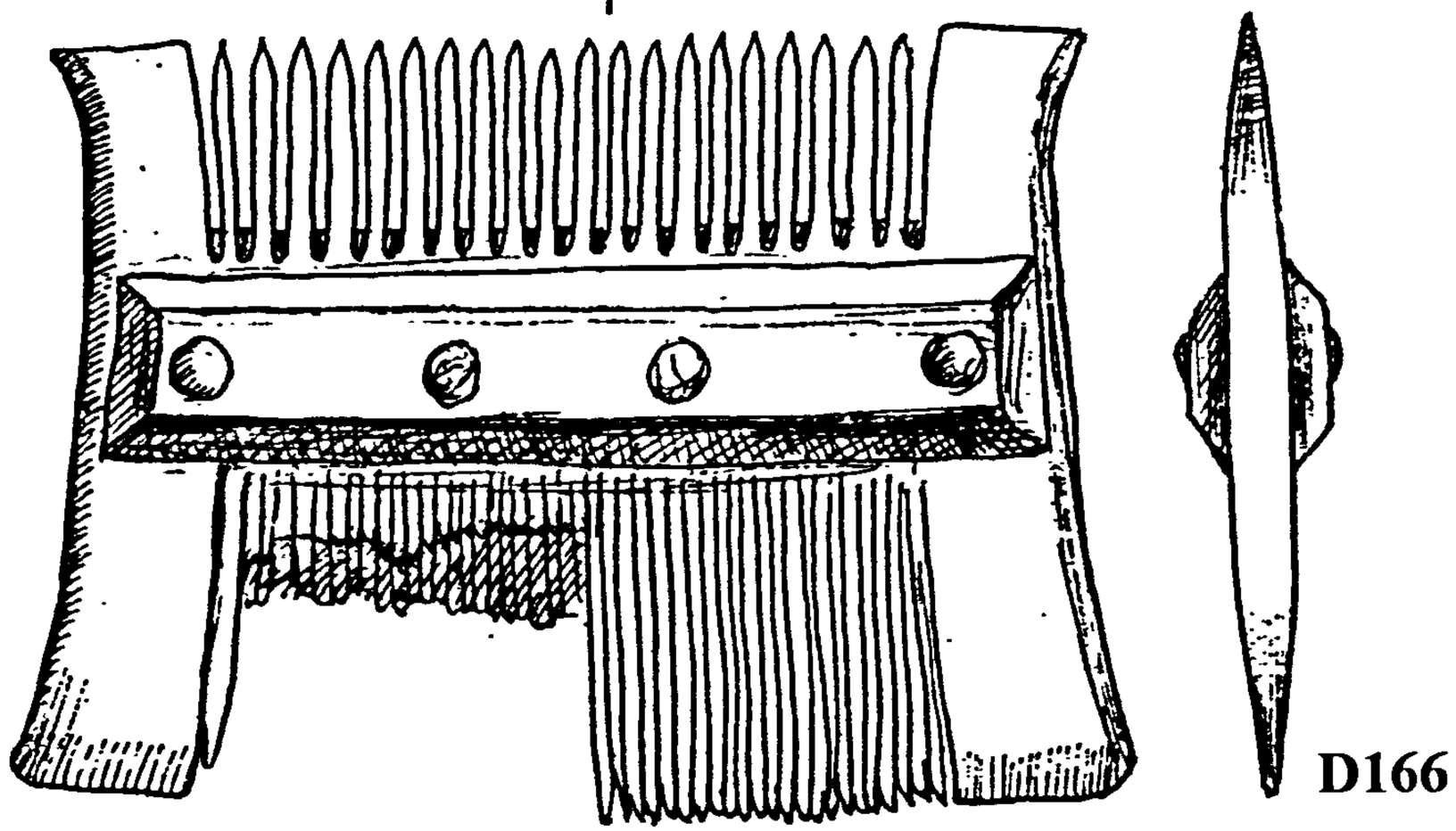
Fig. 6.14 Rectangular outlined combs of squat and square proportions



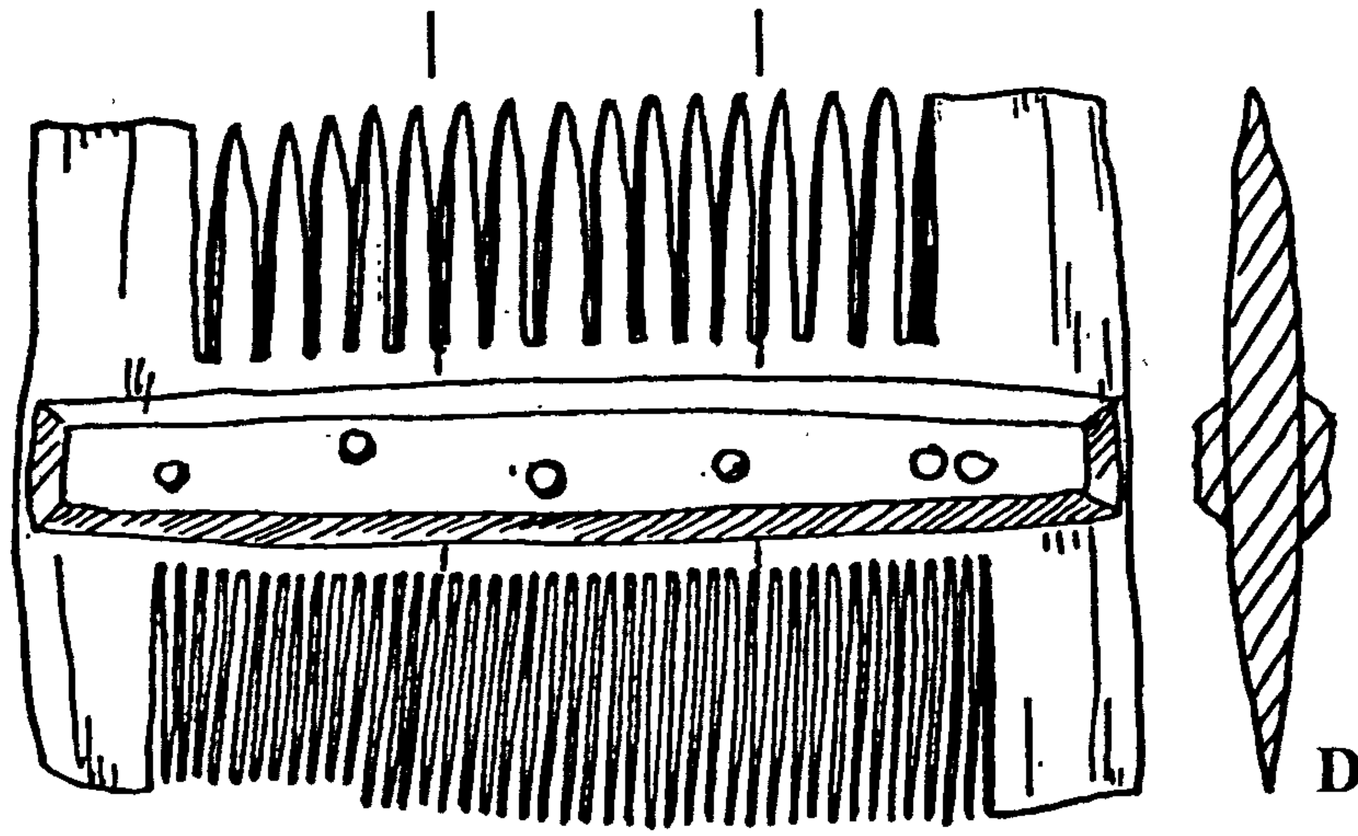
D67



D41

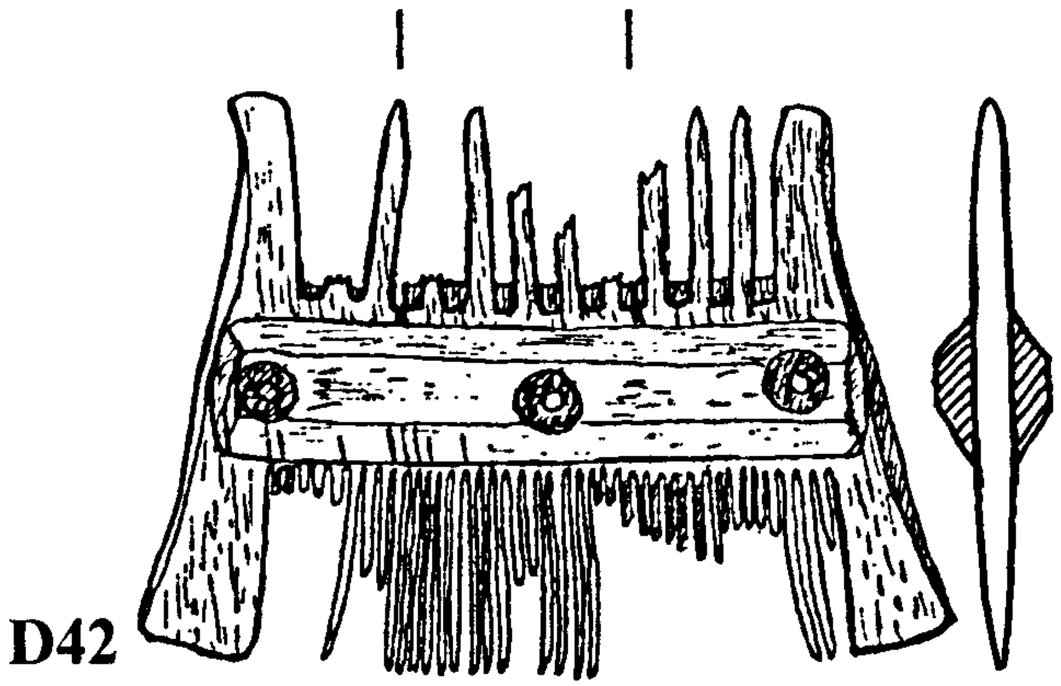


D166

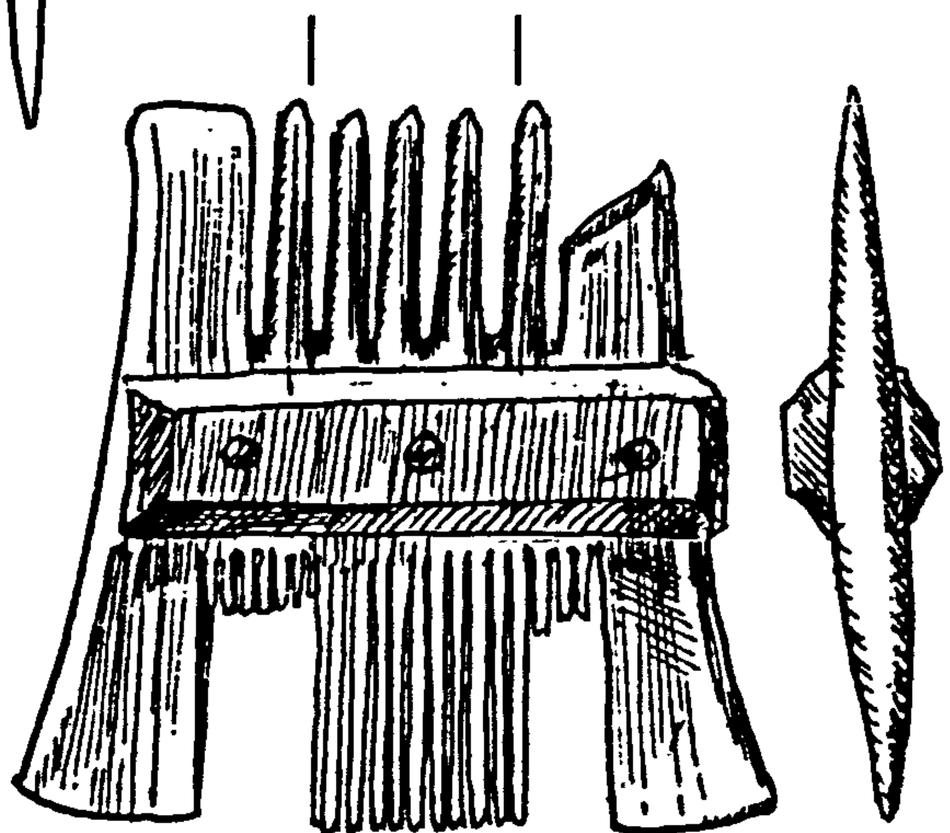


D92

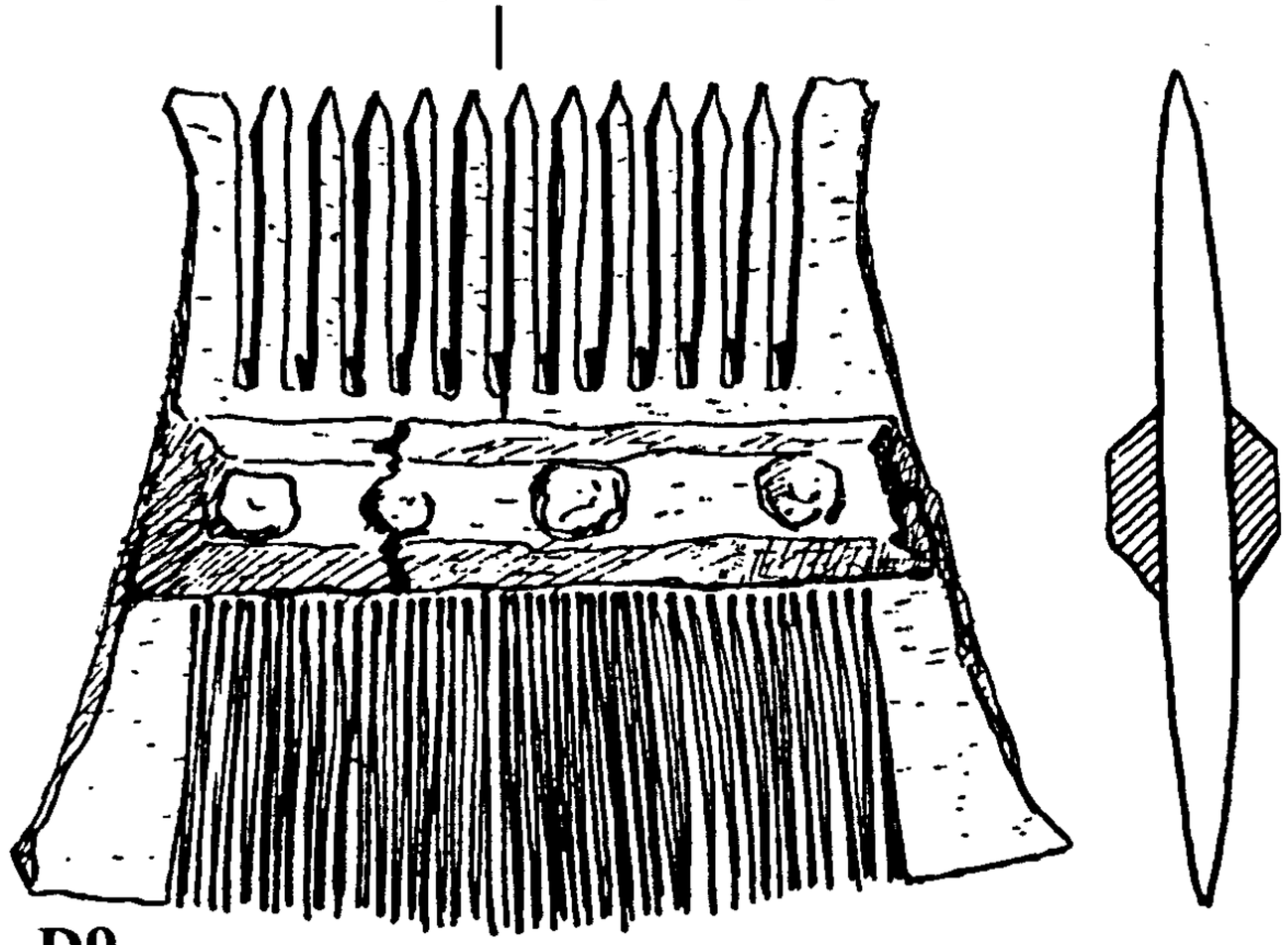
Fig. 6.15 Late 12th - early 13th century trapezoid combs of squat, square and vertically elongated proportions



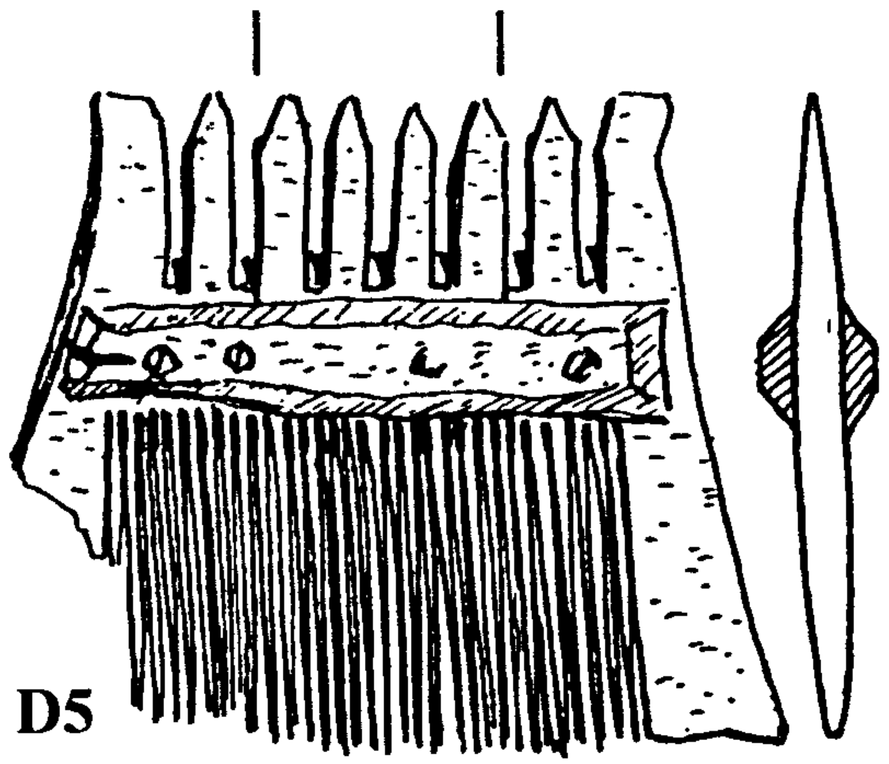
D42



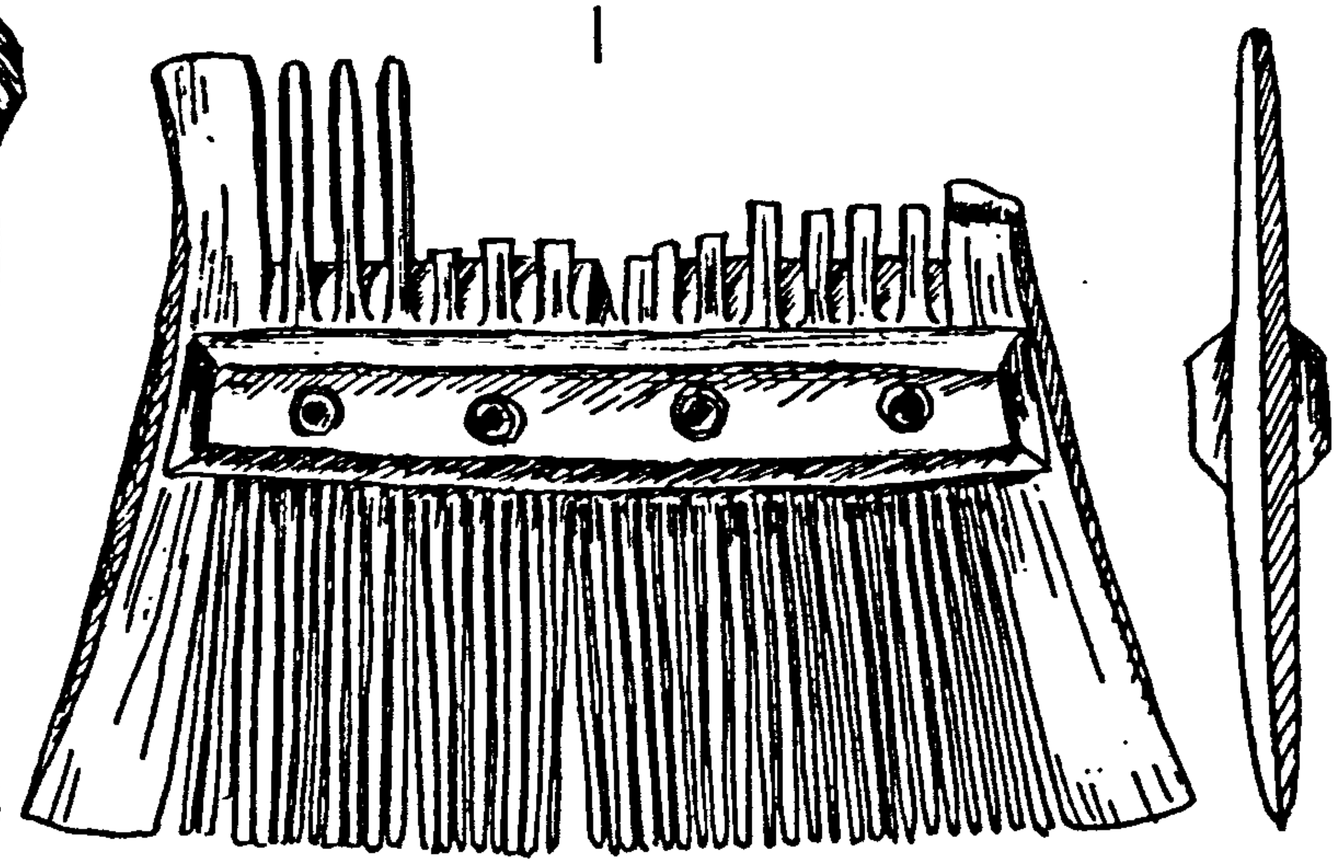
D171



D9

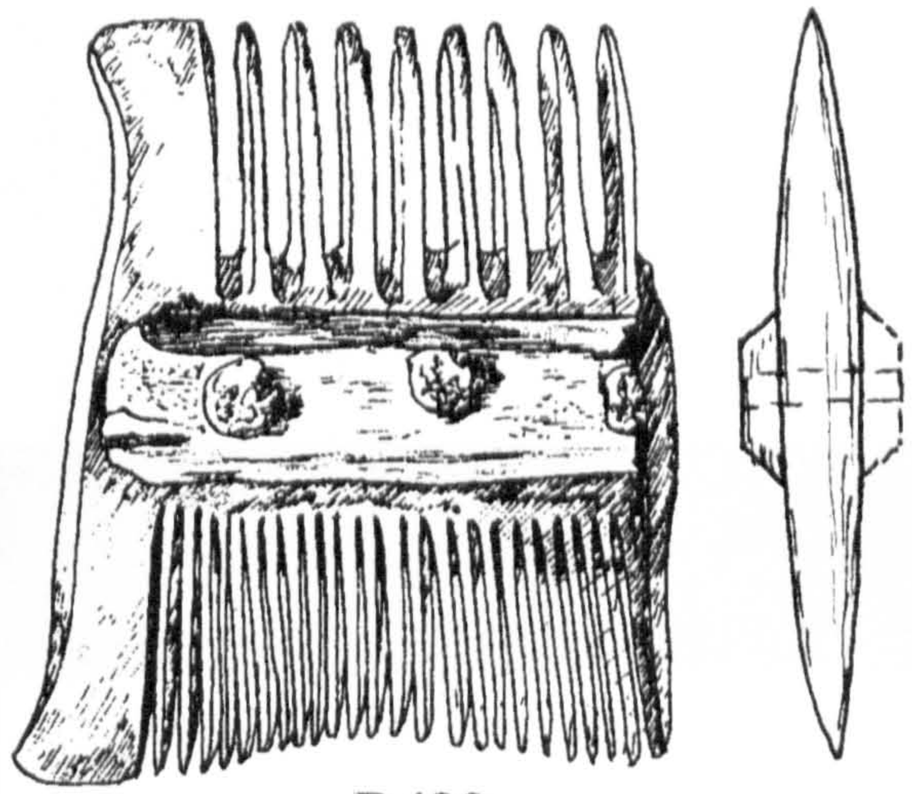


D5

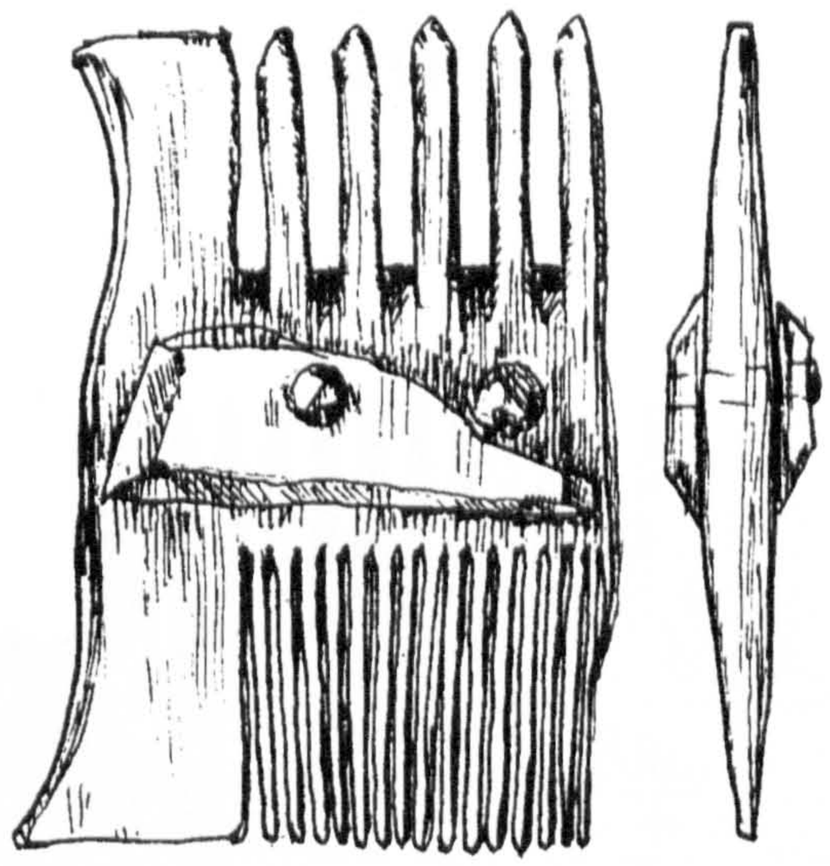


D522

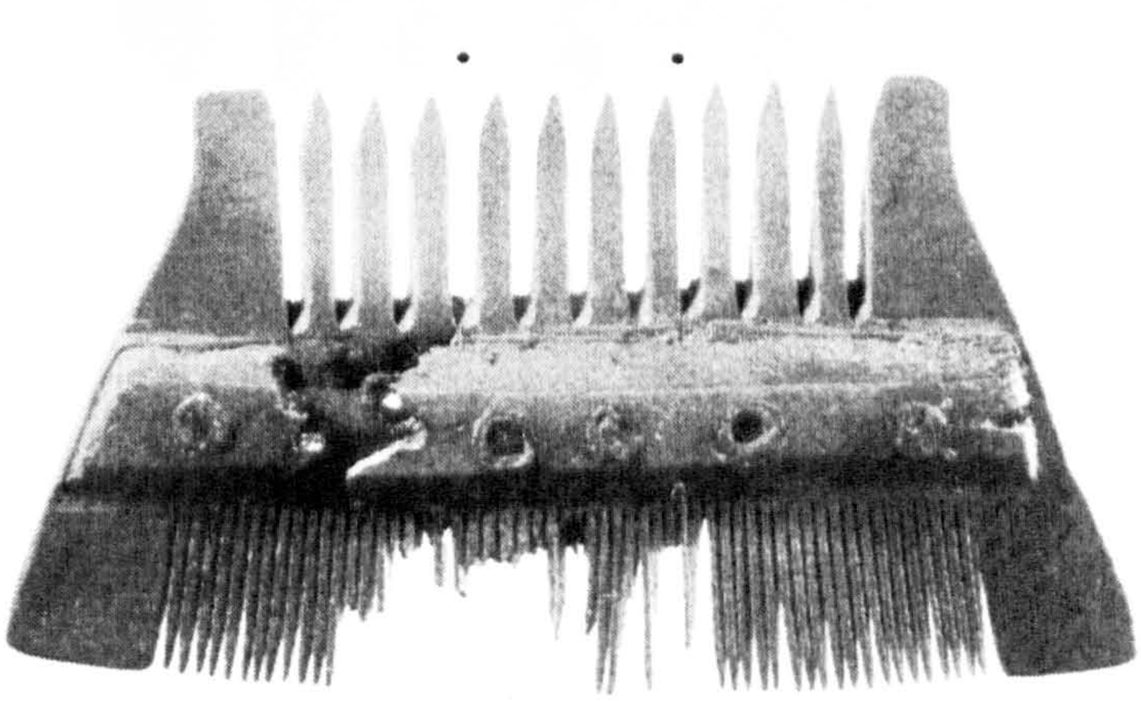
Fig. 6.16 Lavish curves featured on some concave (1) sided class 3 combs



D422

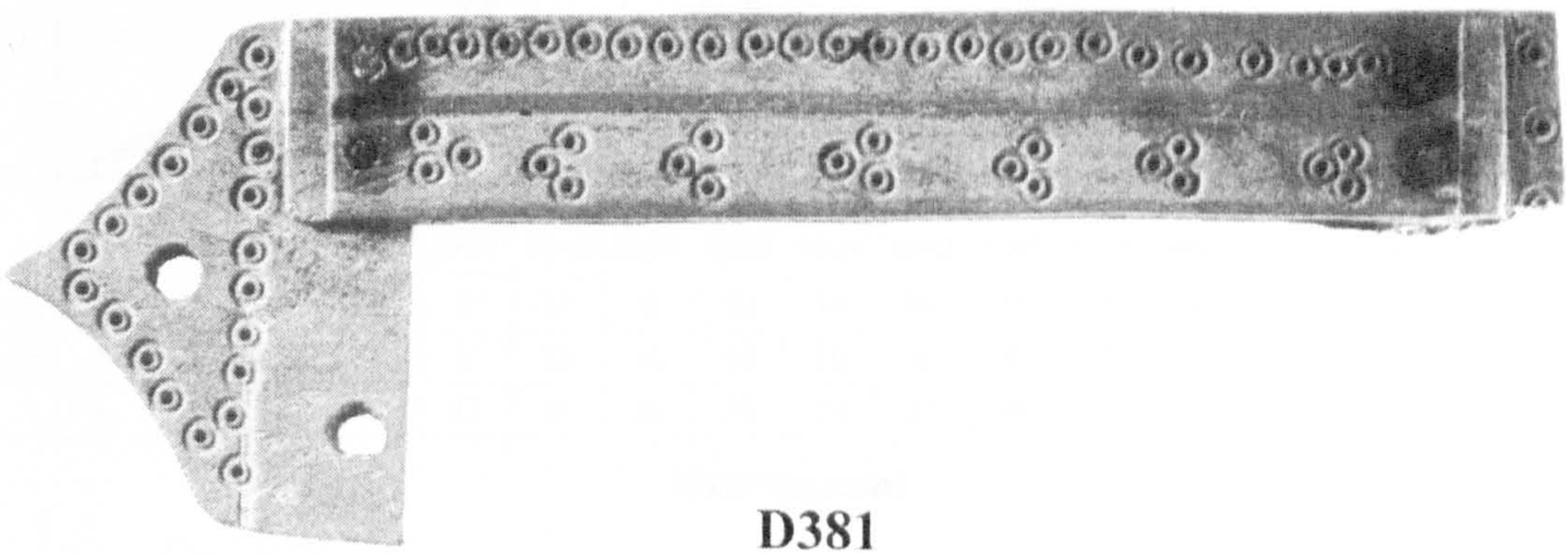


D172

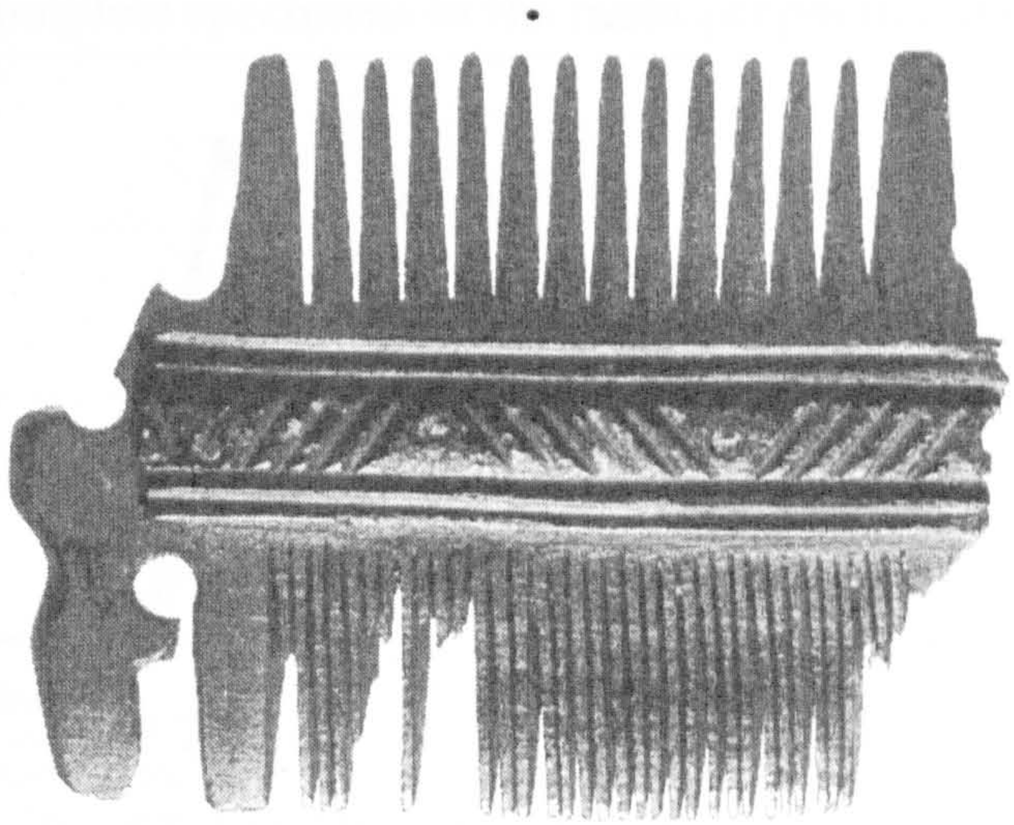


D389

Fig. 6.17 Early 13th century comb and comb case with ornate end-plates



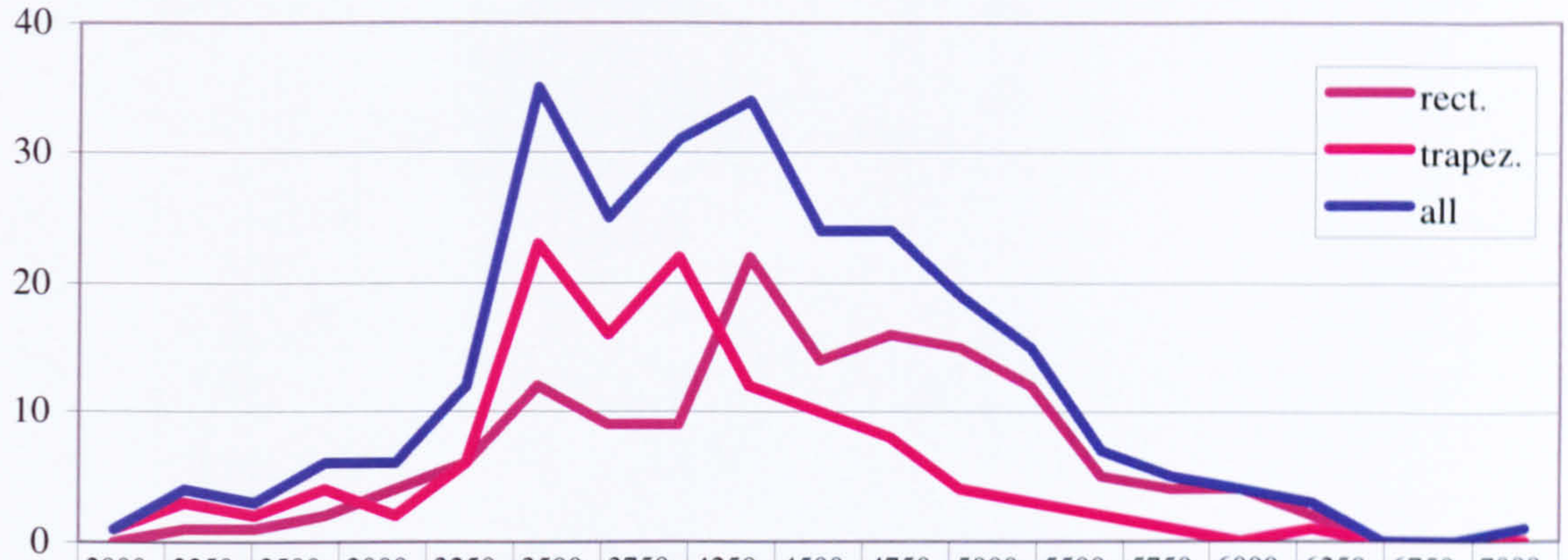
D381



D387

Fig. 6.18 Double-sided composite combs. Sizes

a) of complete specimens in the main forms

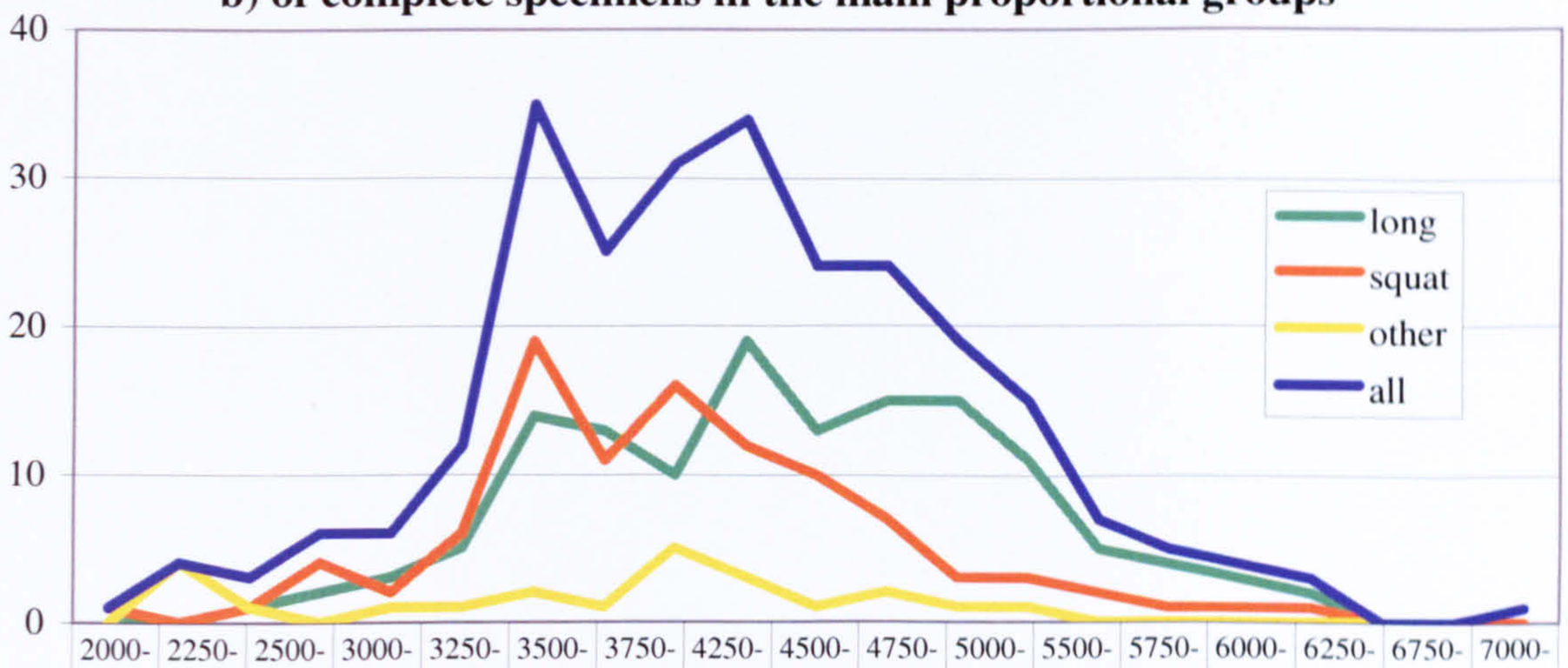


	2000-2249	2250-2499	2500-2749	3000-3249	3250-3499	3500-3749	3750-3999	4250-4499	4500-4749	4750-4999	5000-5249	5500-5749	5750-5999	6000-6249	6250-6499	6750-6999	7000-7249
rect.	0	1	1	4	6	12	9	22	14	16	15	5	4	4	2	0	1
trapez.	1	3	2	2	6	23	16	12	10	8	4	2	1	0	1	0	0
all	1	4	3	6	12	35	25	34	24	24	19	7	5	4	3	0	1

Sizes (sq.mm)

Σ 259 (139/120)

b) of complete specimens in the main proportional groups



	2249	2499	2749	3249	3499	3749	3999	4499	4749	4999	5249	5749	5999	6249	6499	6999	7249
long	0	0	1	3	5	14	13	19	13	15	15	5	4	3	2	0	0
squat	1	0	1	2	6	19	11	12	10	7	3	2	1	1	1	0	0
other	0	4	1	1	1	2	1	3	1	2	1	0	0	0	0	0	1
all	1	4	3	6	12	35	25	34	24	24	19	7	5	4	3	0	1

Sizes (sq.mm)

Σ 259 (135/100/24)

Fig. 6.19 Sizes of class 2a combs and class 3 specimens of trapezoid outline and squat proportions

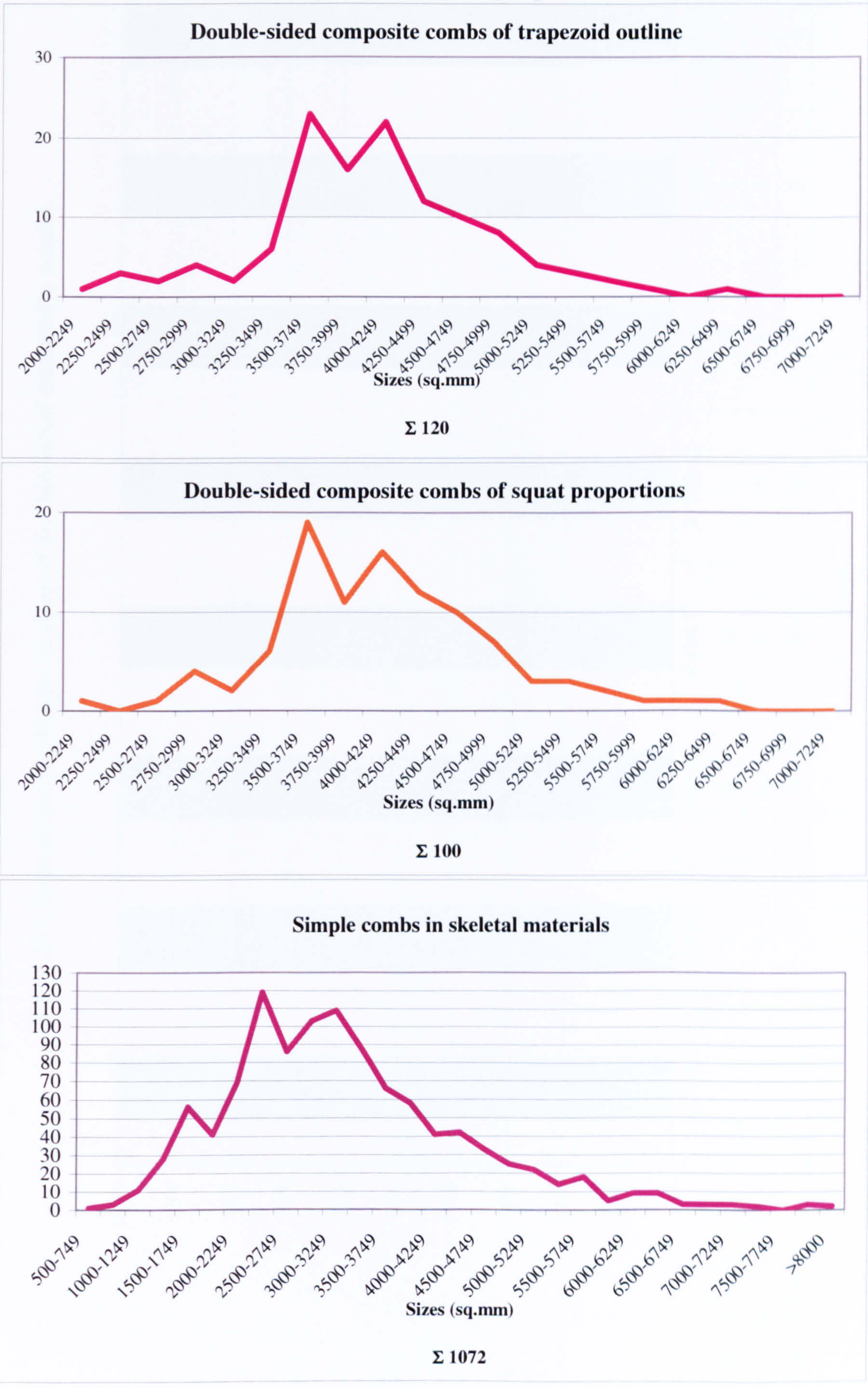
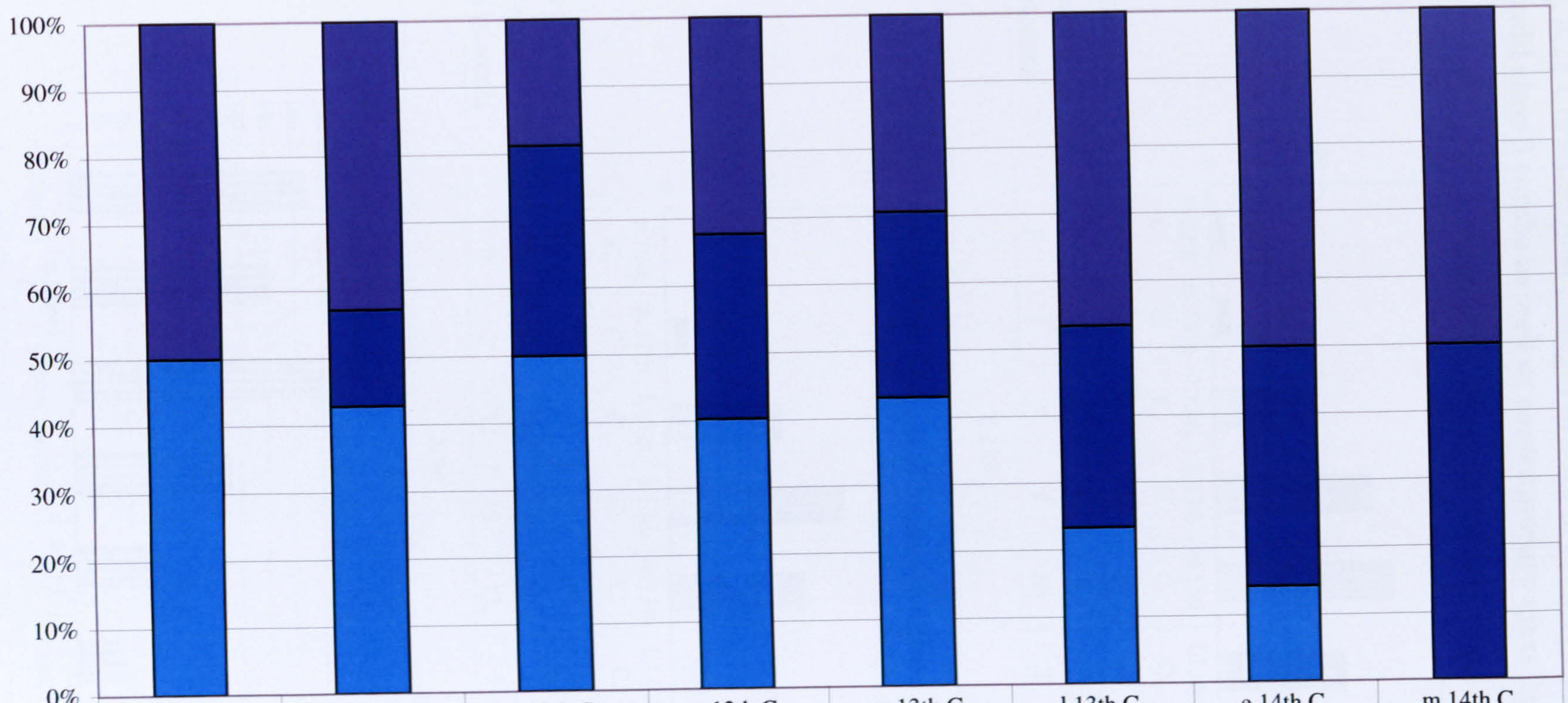


Fig. 6.20 Chronological changes in sizes of double-sided composite combs

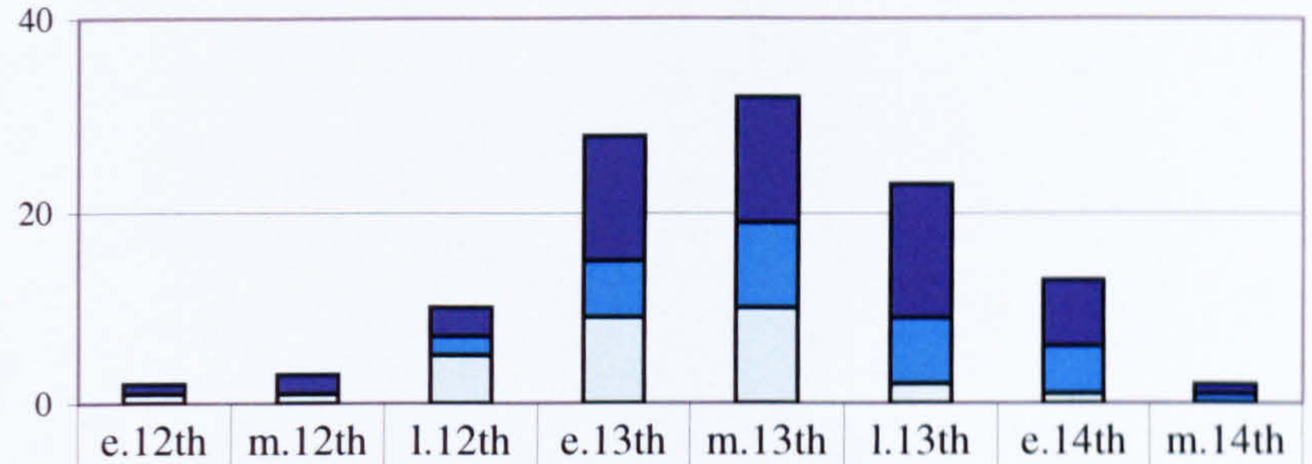


	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.
Large (S>4759)	1	3	6	20	17	14	7	1
Medium (4087<S<4760)	0	1	10	17	16	9	5	1
Small (S<4088)	1	3	16	25	25	7	2	0

Σ 259

Fig. 6.21 Chronological changes in sizes of rectangular and trapezoid class 3 combs as well as contemporary class 2a combs

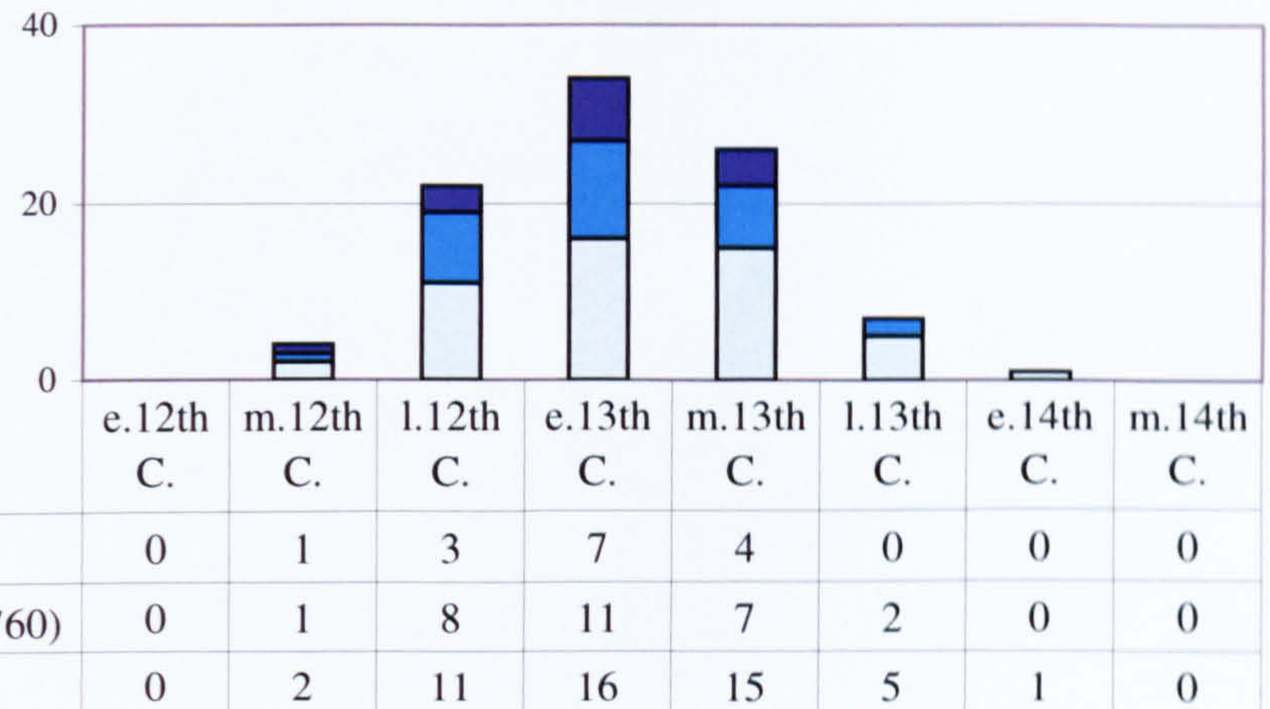
a) class 3 combs of rectangular outline



	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.
Large (S>4759)	1	2	3	13	13	14	7	1
Medium (4087<S<4760)	0	0	2	6	9	7	5	1
Small (S<4088)	1	1	5	9	10	2	1	0

Σ 113

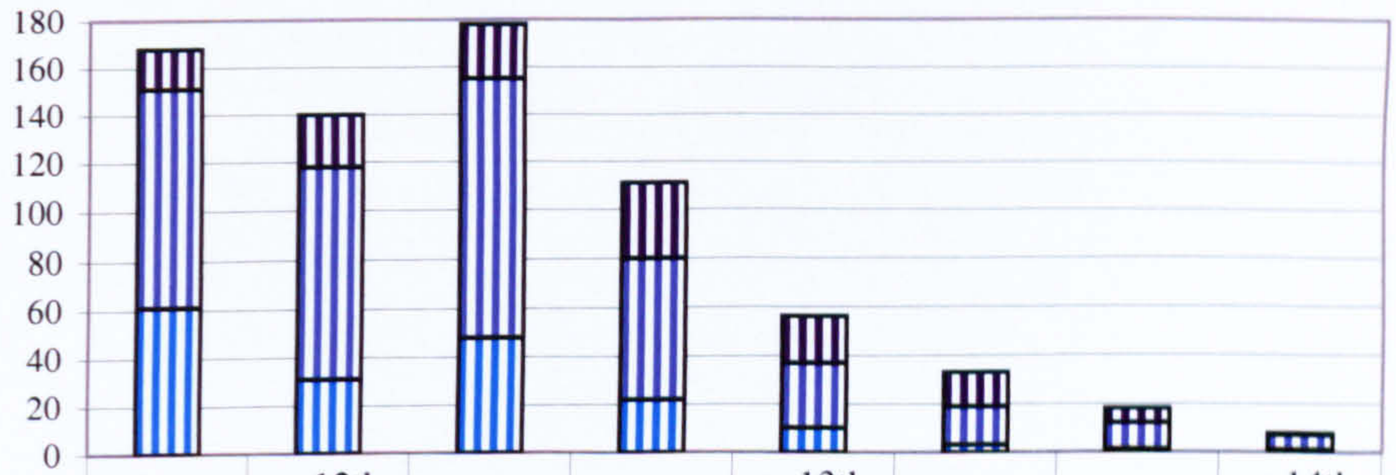
b) class 3 combs of trapezoid outline



	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.
Large (S>4759)	0	1	3	7	4	0	0	0
Medium (4087<S<4760)	0	1	8	11	7	2	0	0
Small (S<4088)	0	2	11	16	15	5	1	0

Σ 94

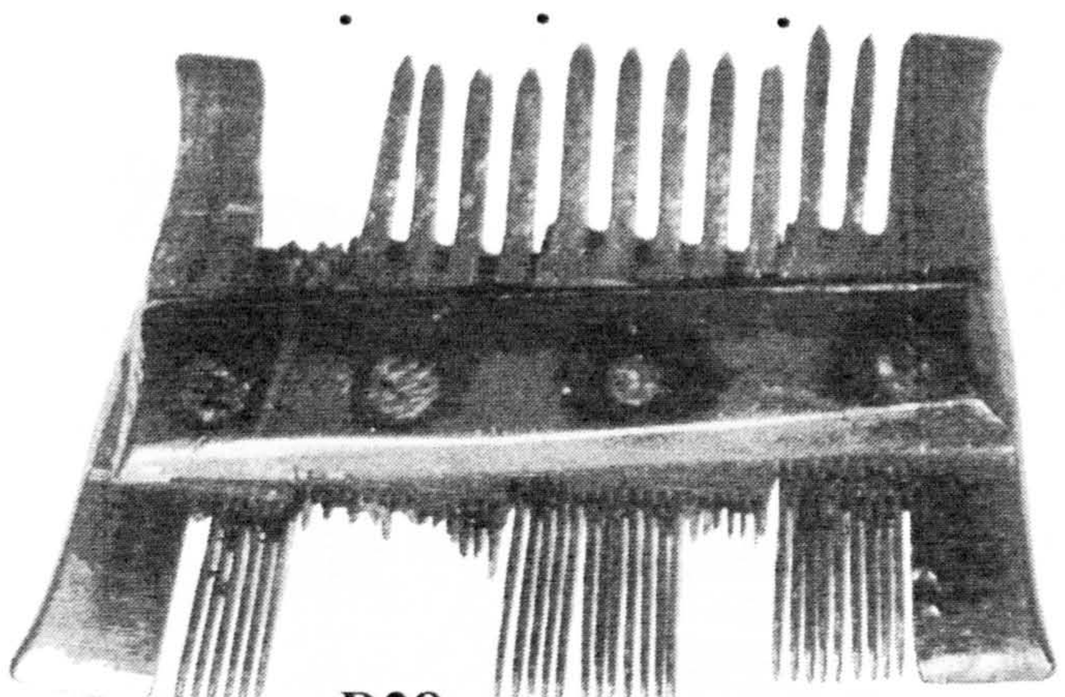
c) class 2a combs



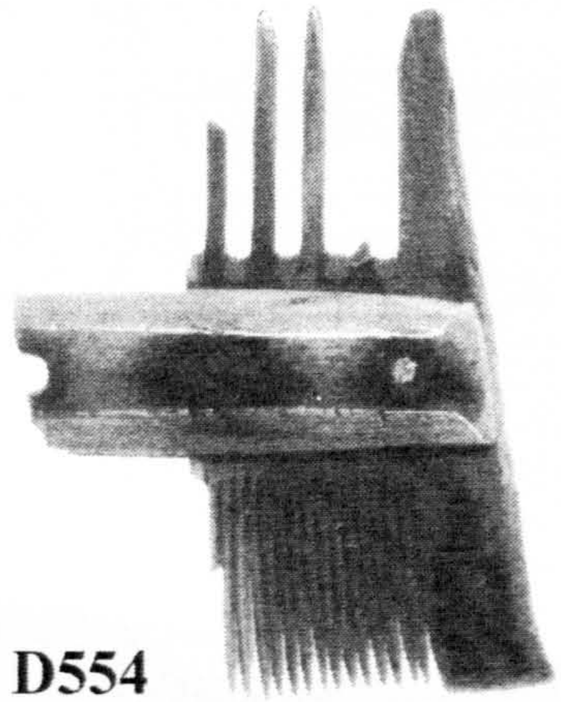
	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.
Large (S>4323)	17	22	23	31	19	14	6	1
Medium (S 2476-4323)	90	87	107	58	27	16	11	6
Small(S<2476)	61	31	48	22	10	3	1	1

Σ 712

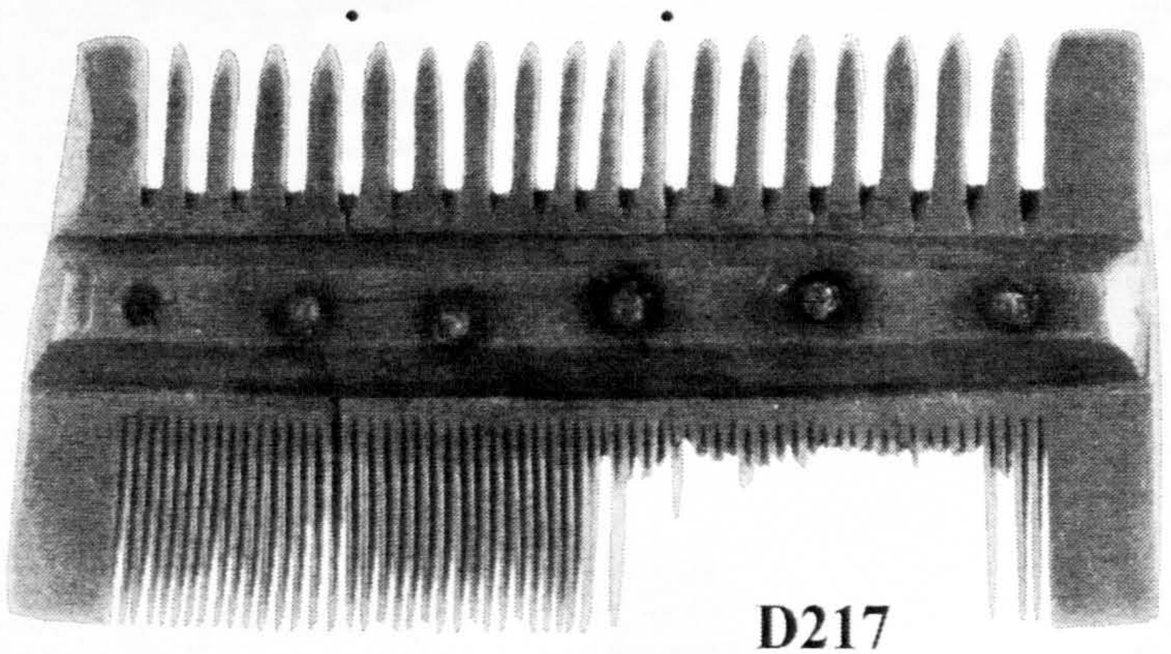
Fig. 6.22 Class 3 combs featuring billets in walrus ivory in combination with antler or bone side-plates



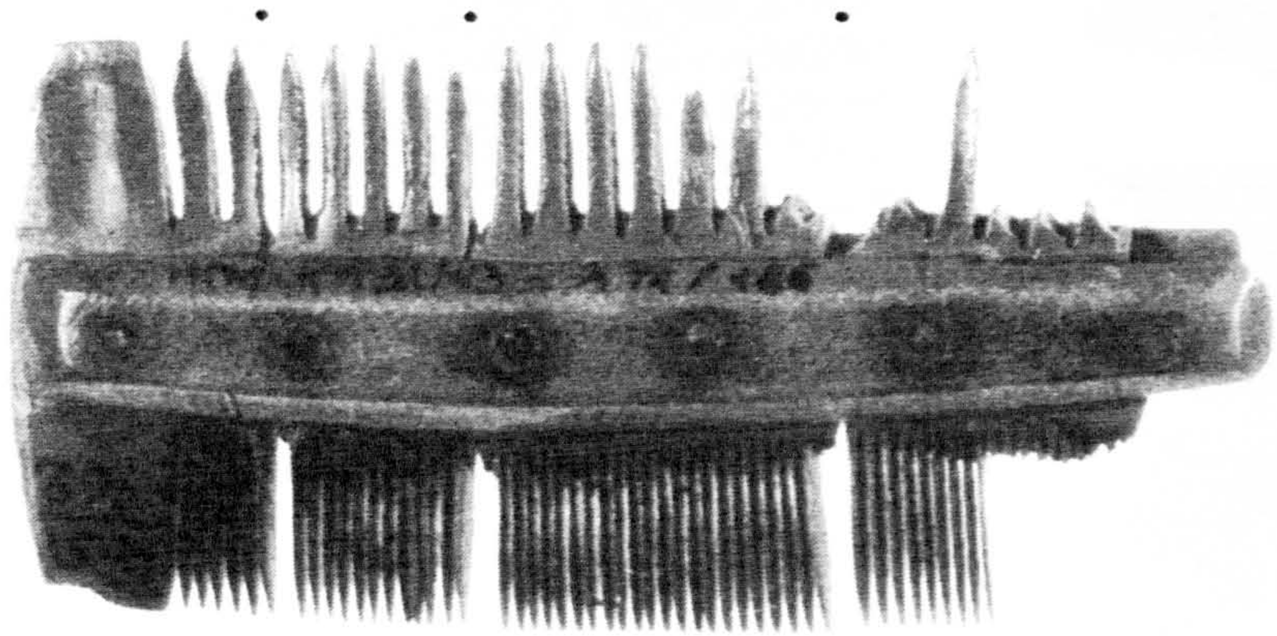
D28



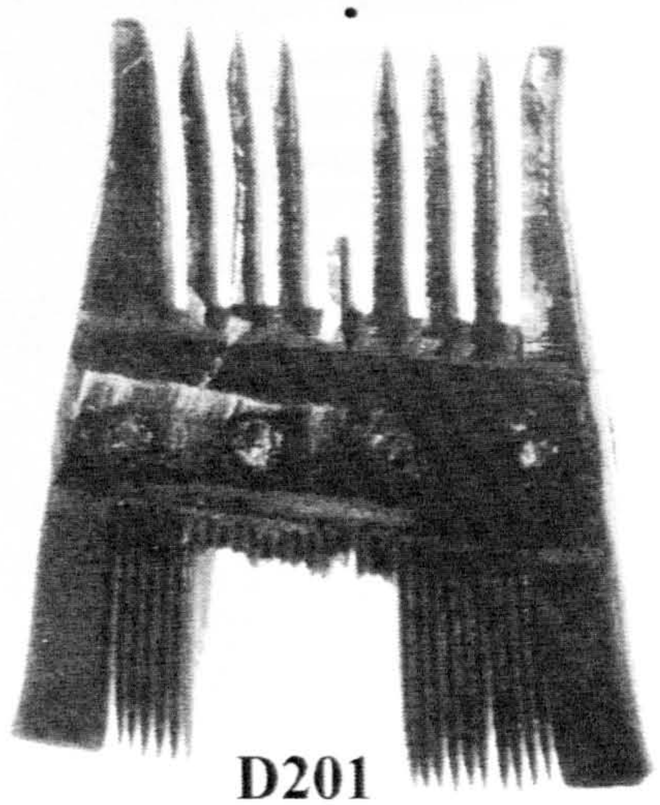
D554



D217



D374



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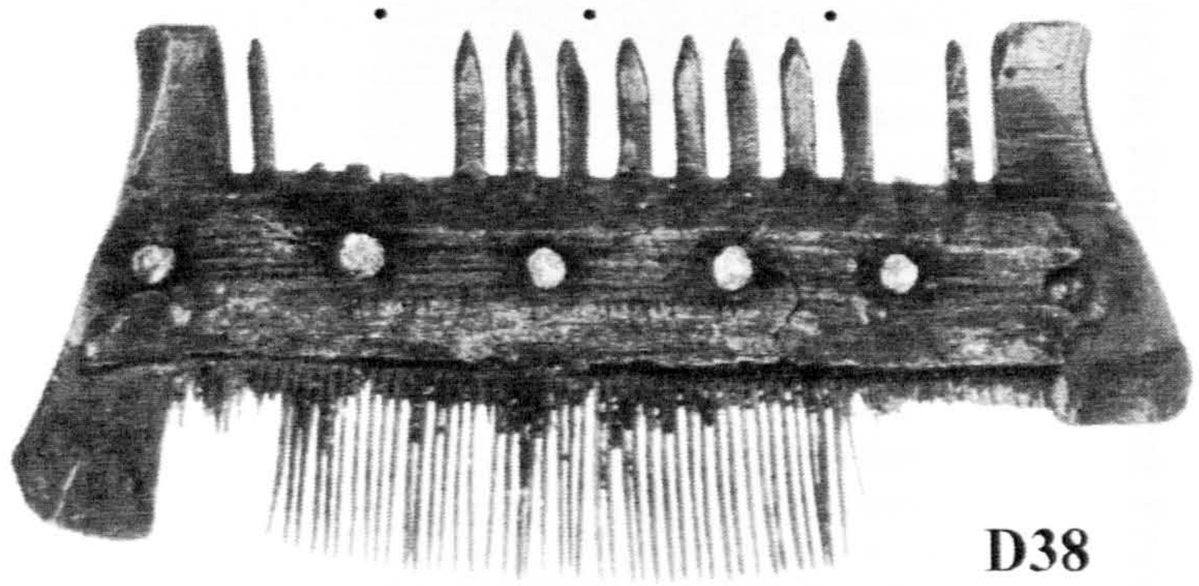
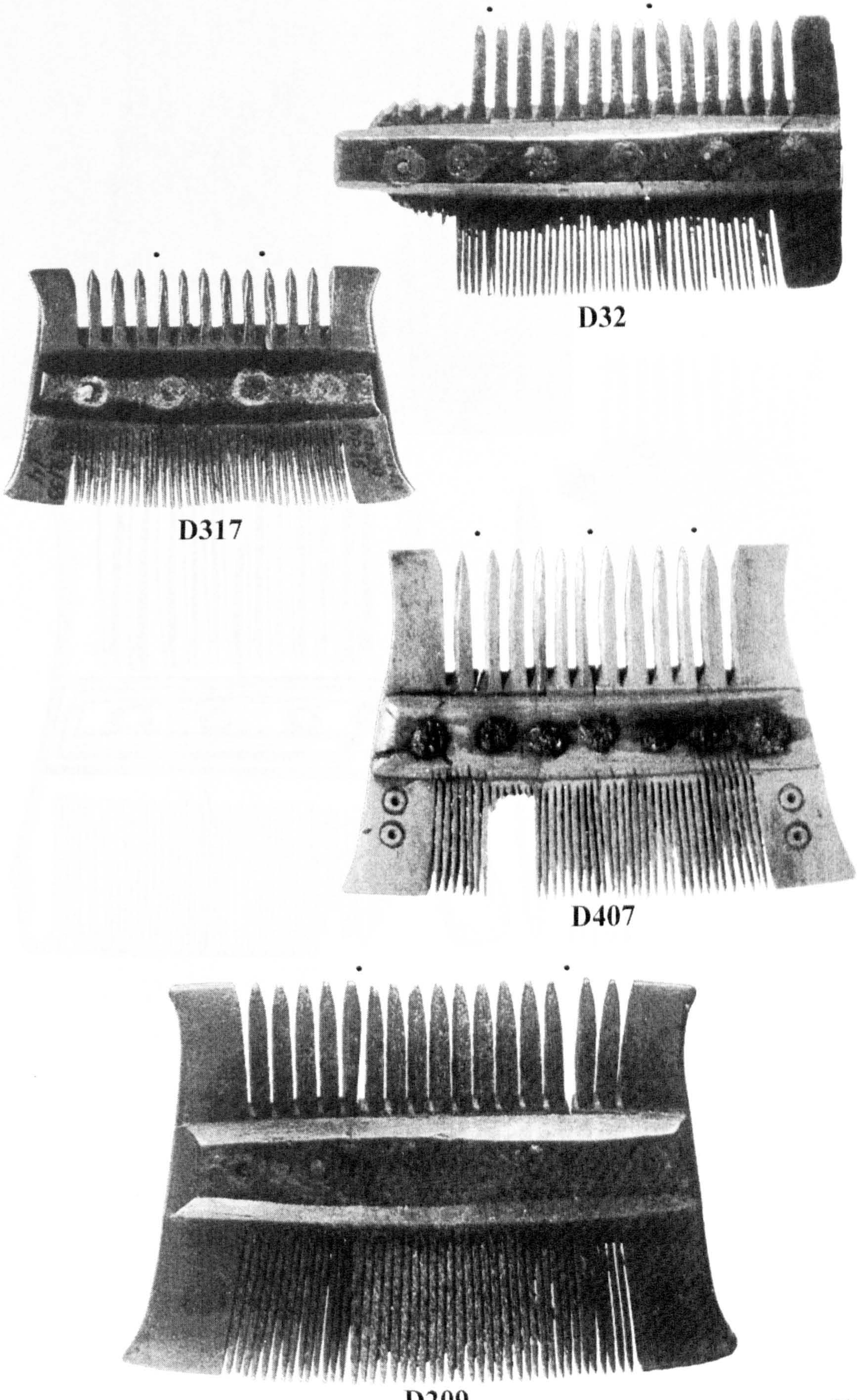


D38

Fig. 6.23 Common types of class 3 combs from the First Period



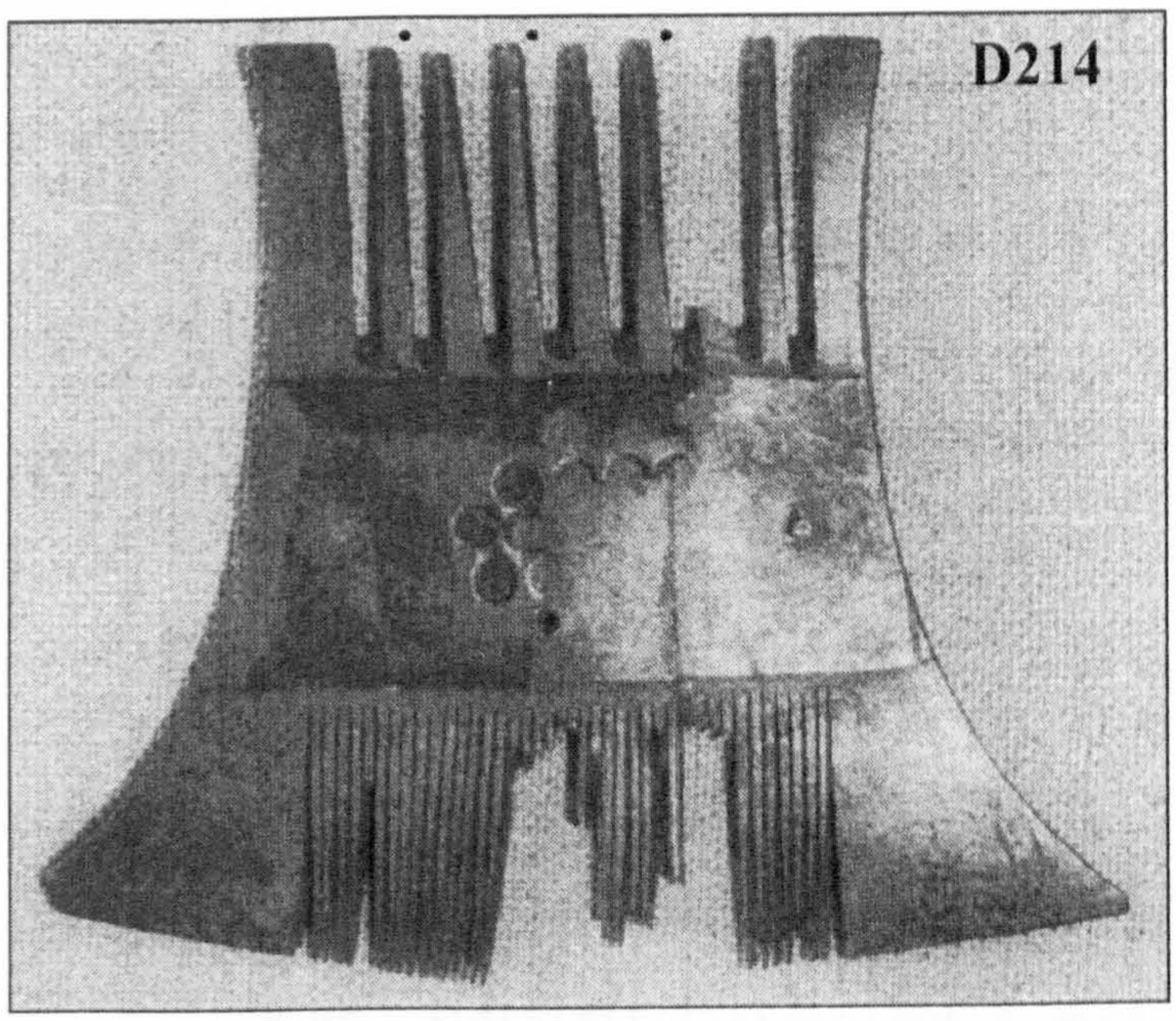
D32

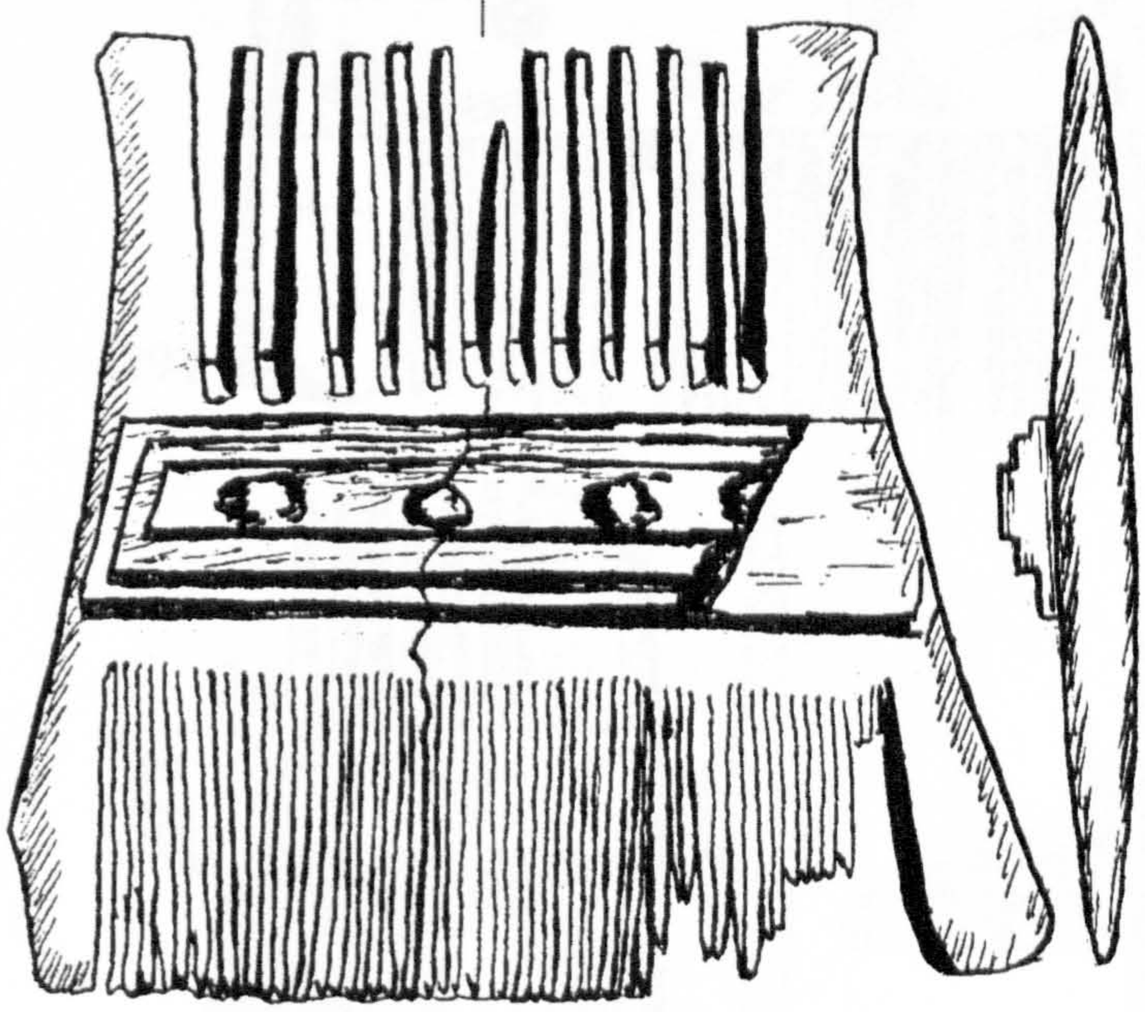
D317

D407

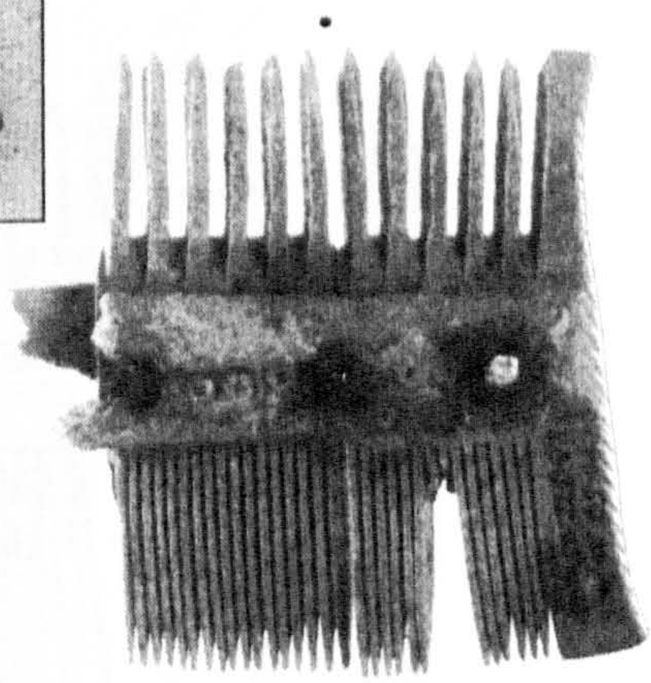
D209

Fig. 6.24 Decorated class 3 combs from the First Period

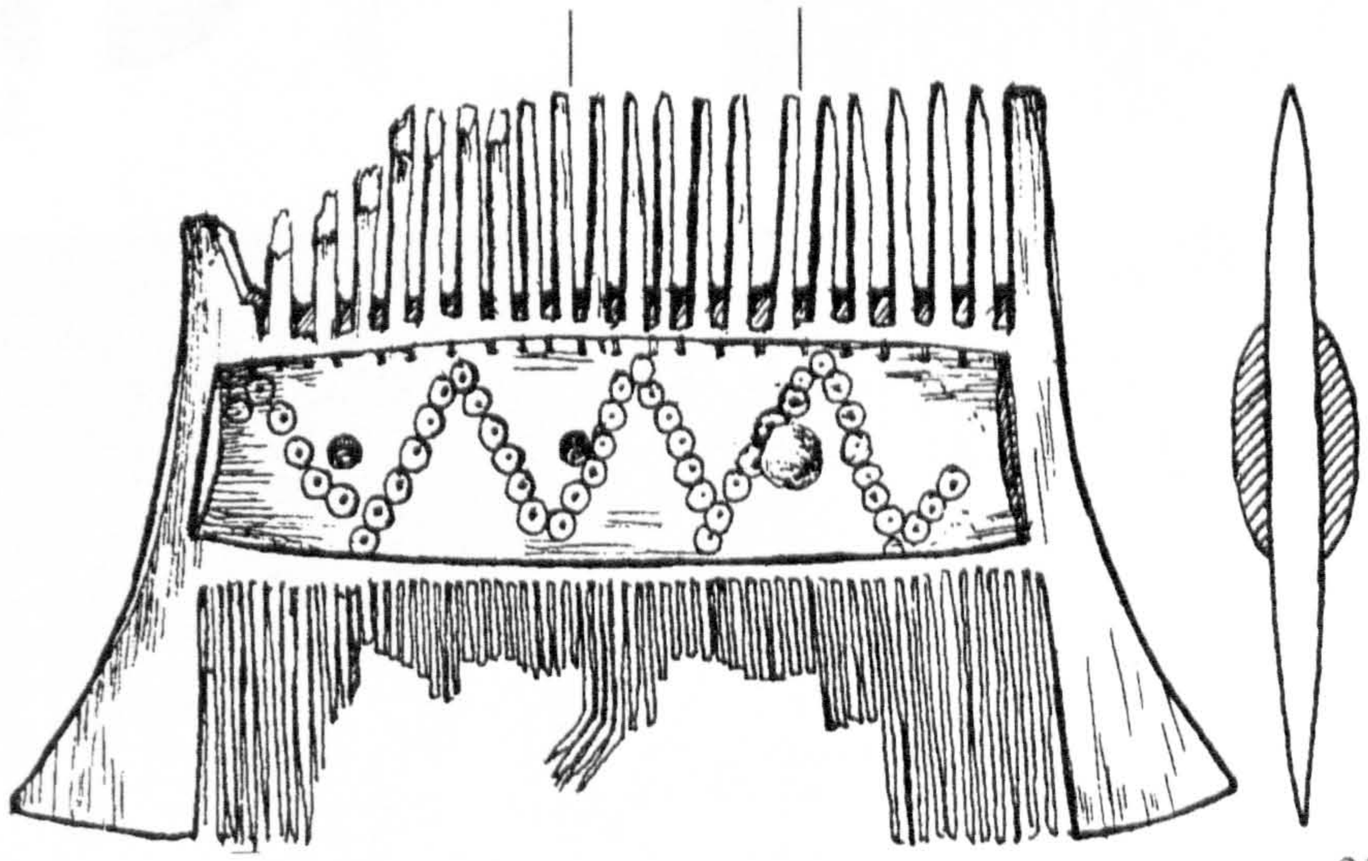




D104

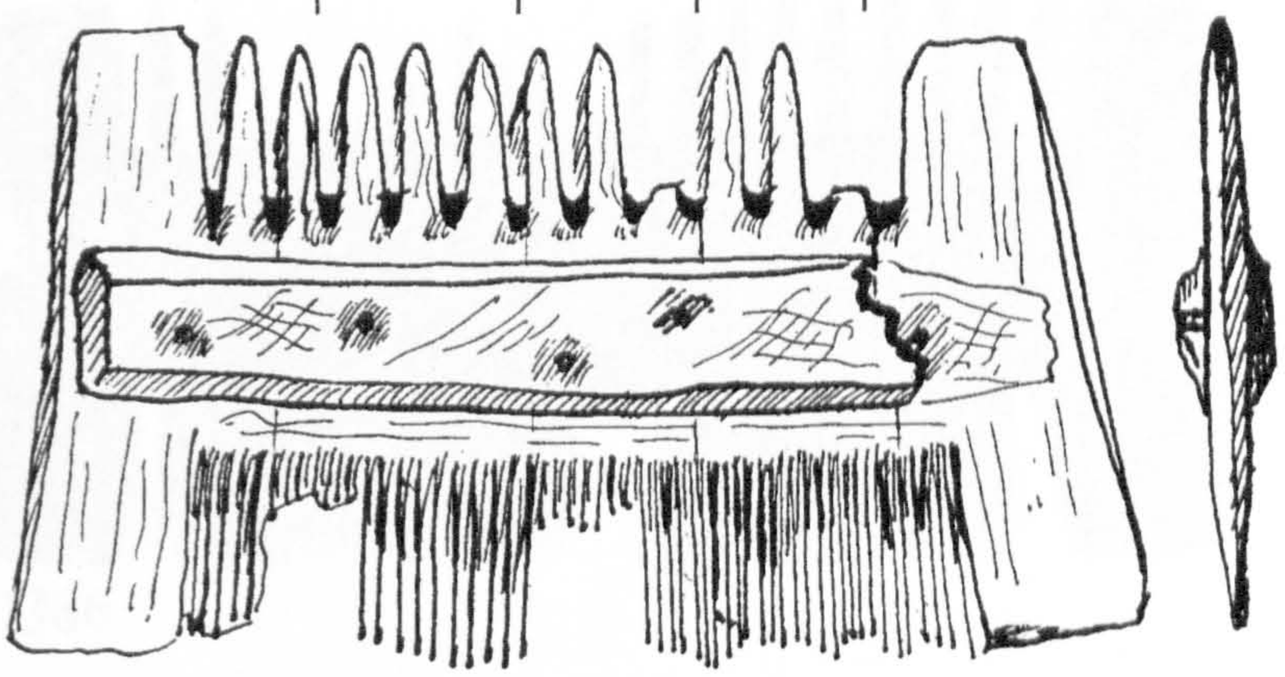


D249

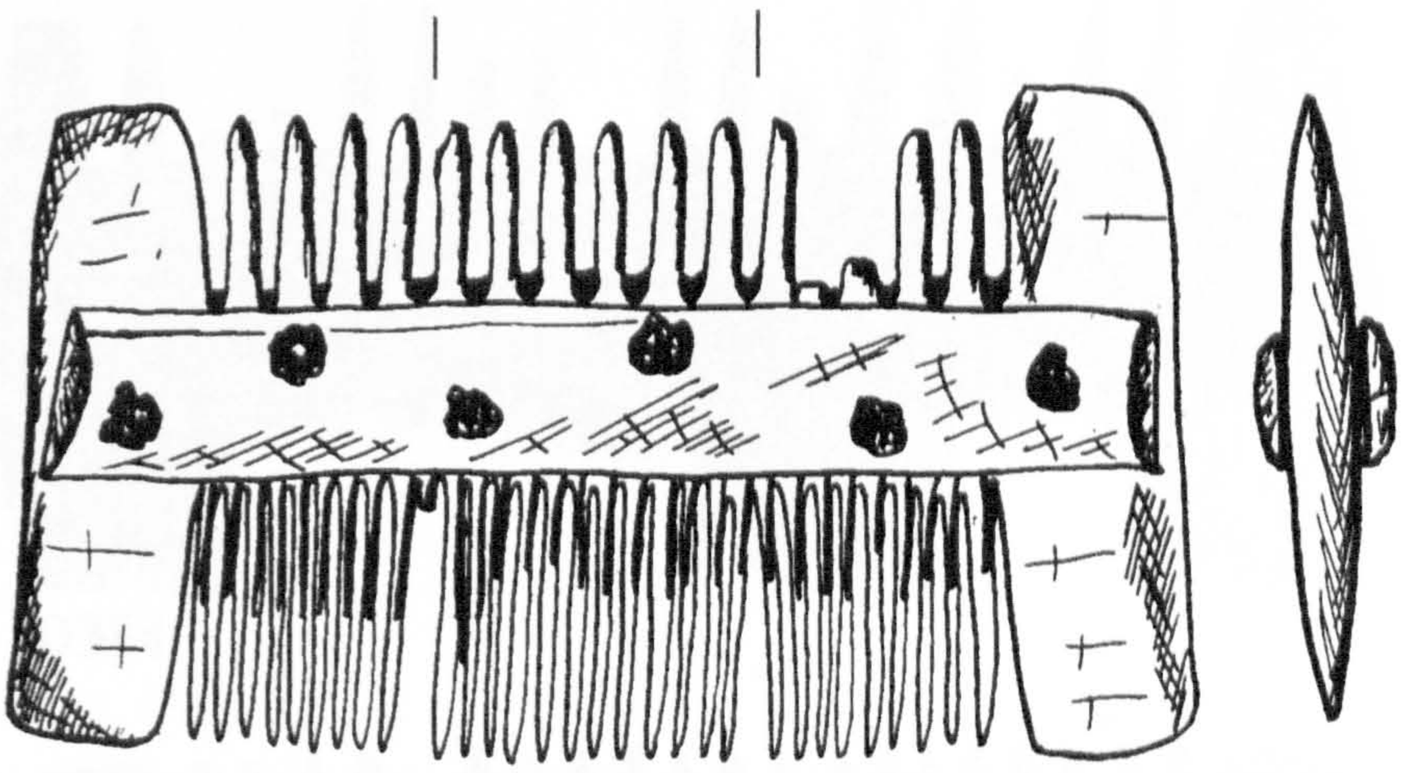


D69

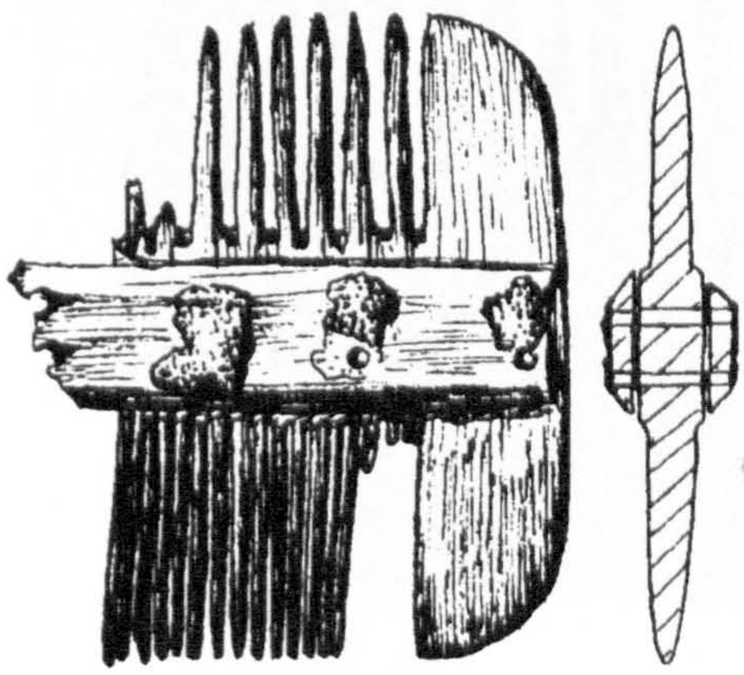
Fig. 6.25 Undecorated combs of the Second Period



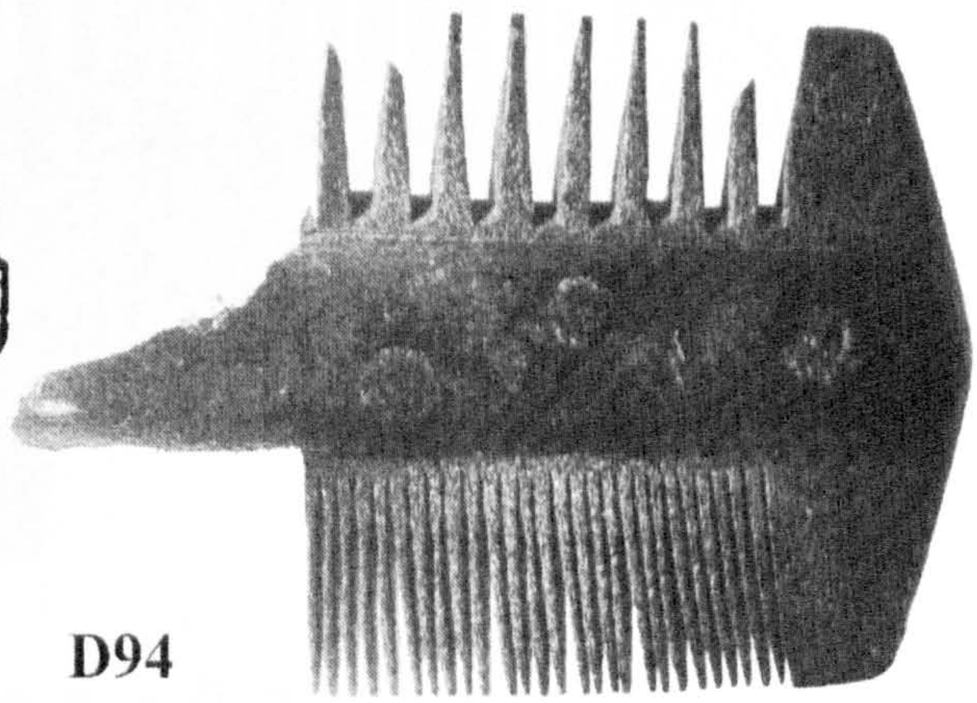
D83



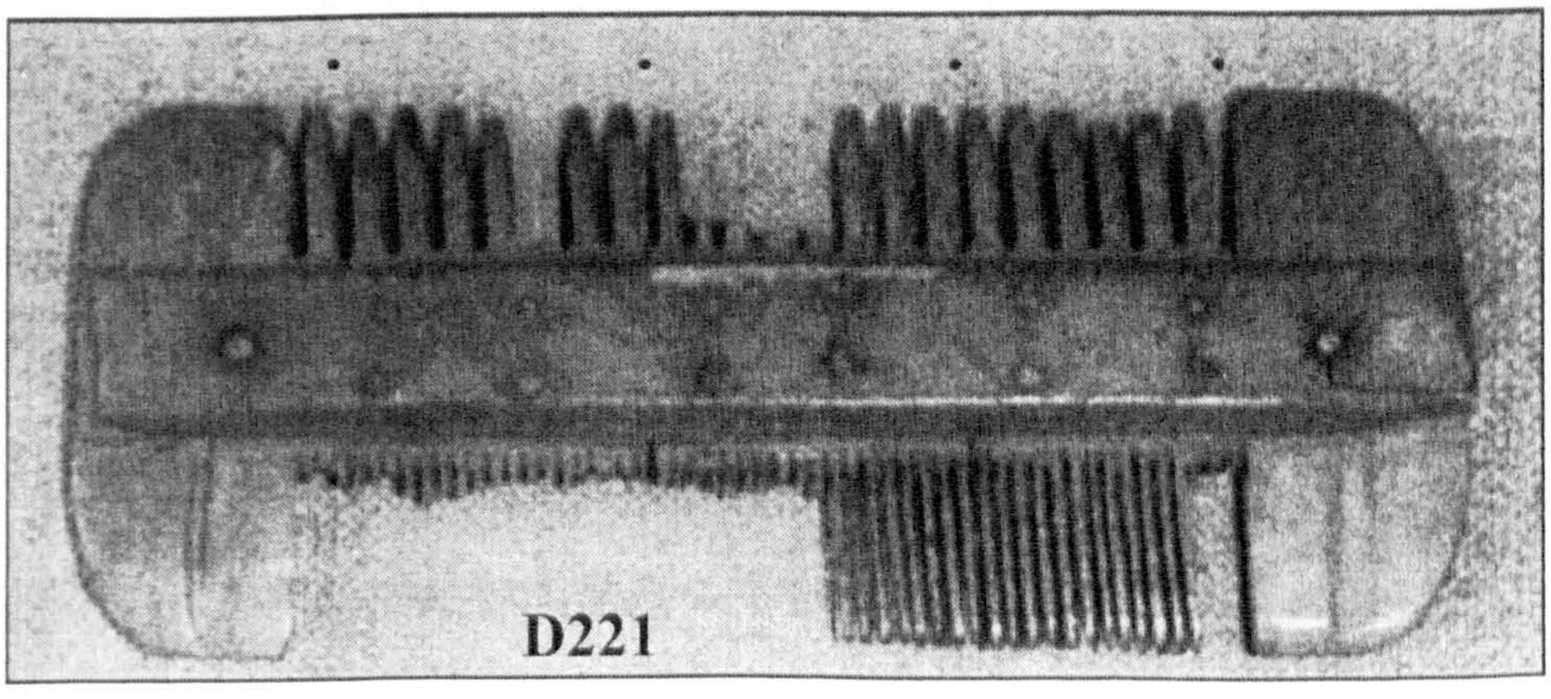
D91



D142

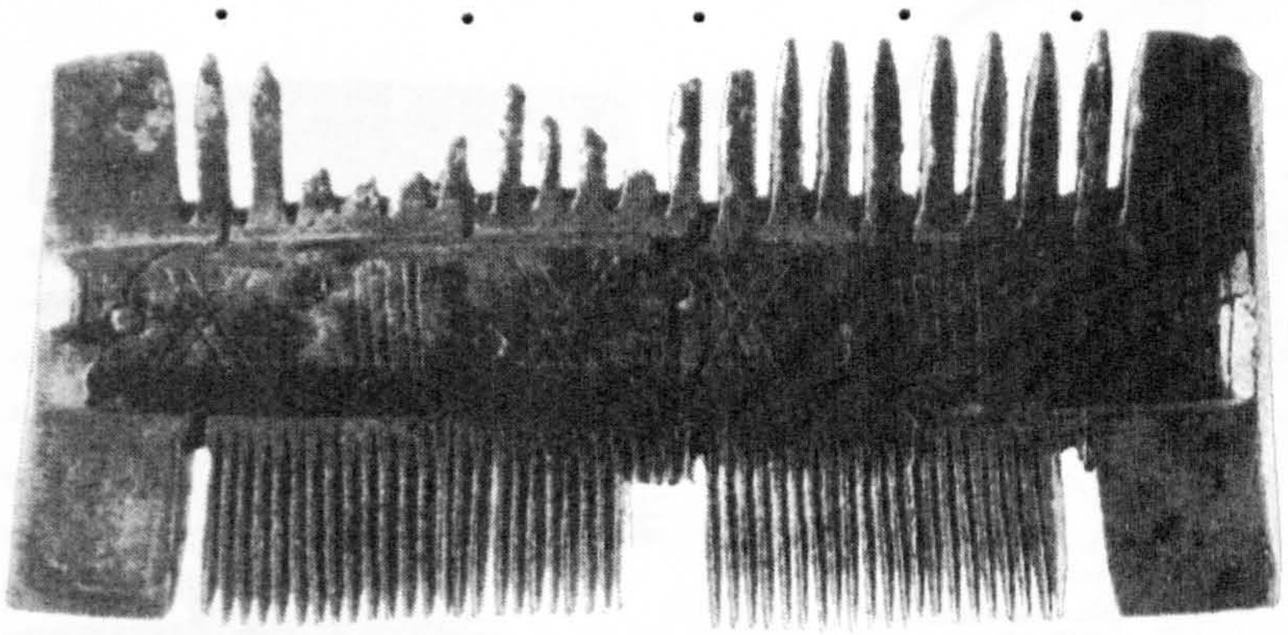


D94

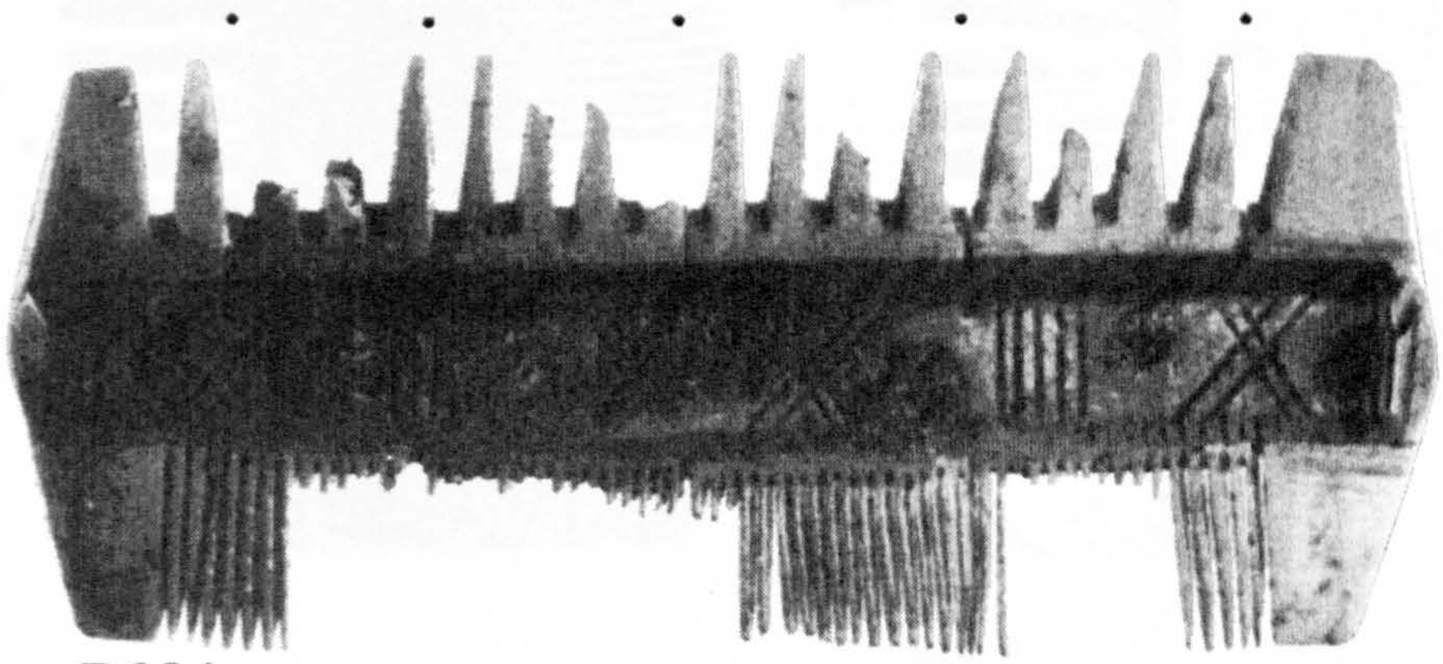


D221

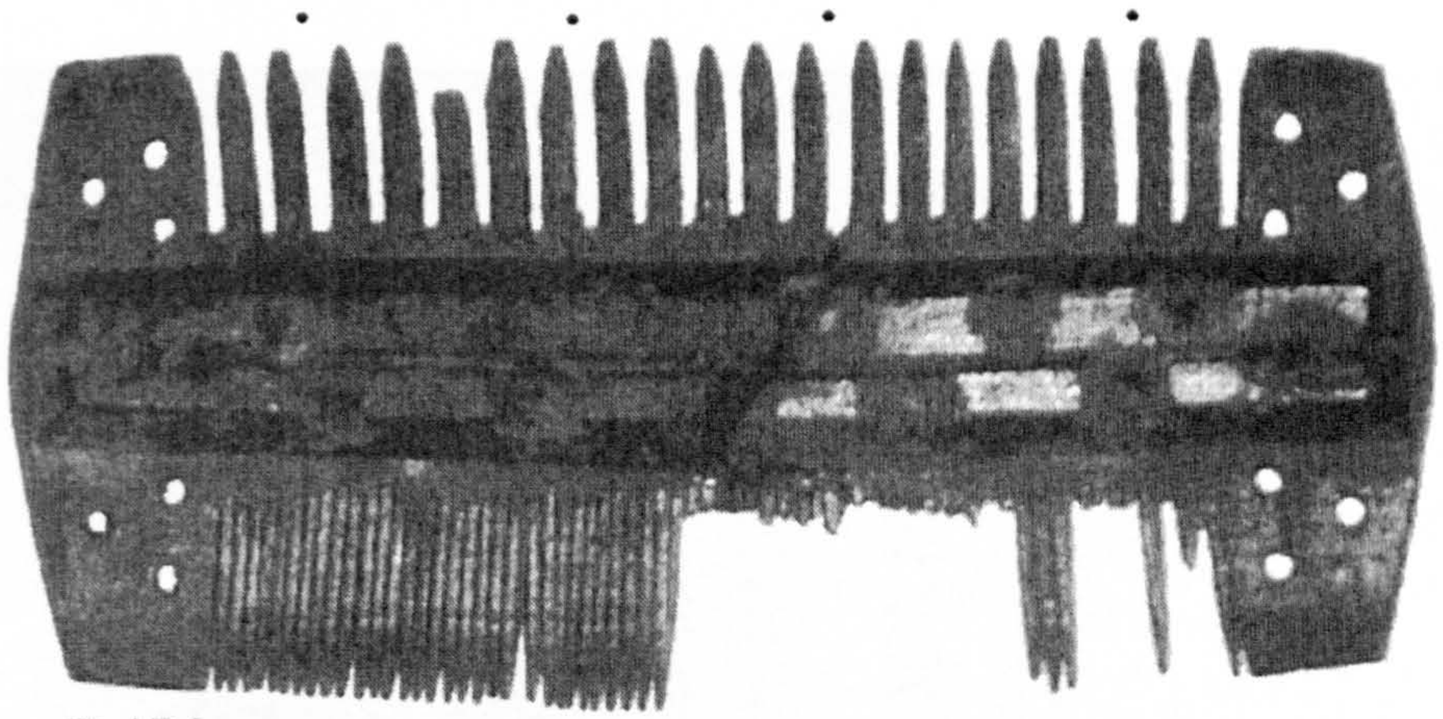
Fig. 6.26 Combs with linear decorations from the Second Period



D386



D384



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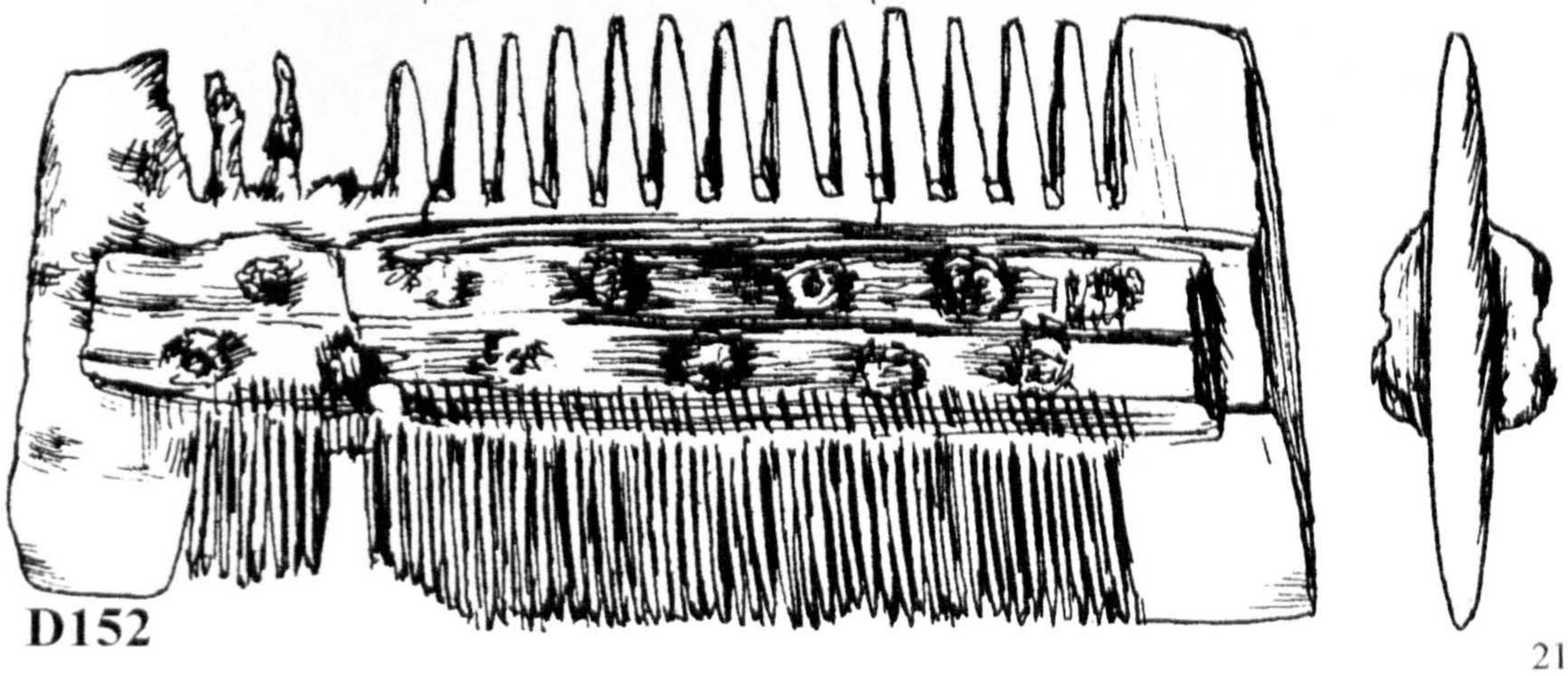
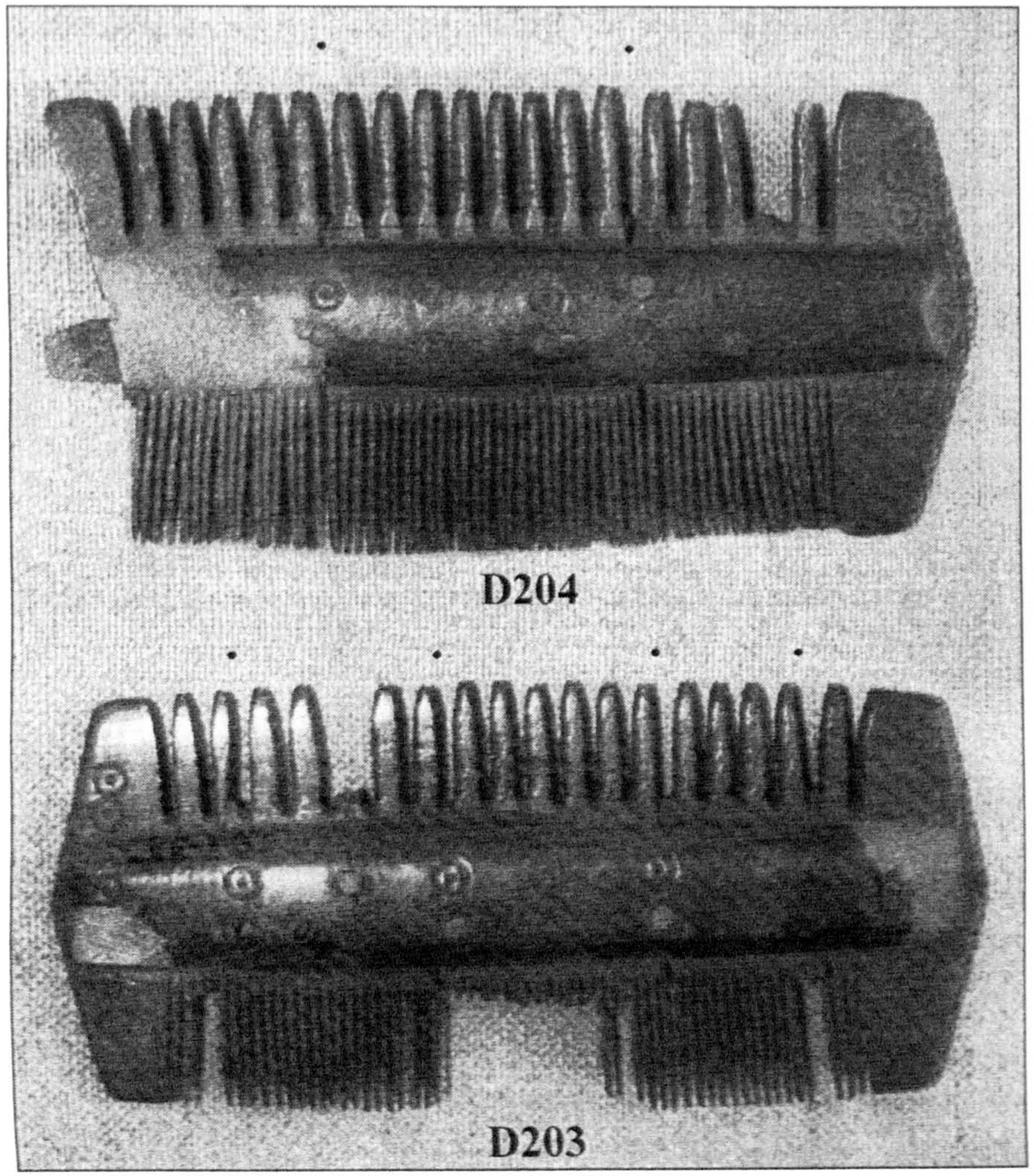


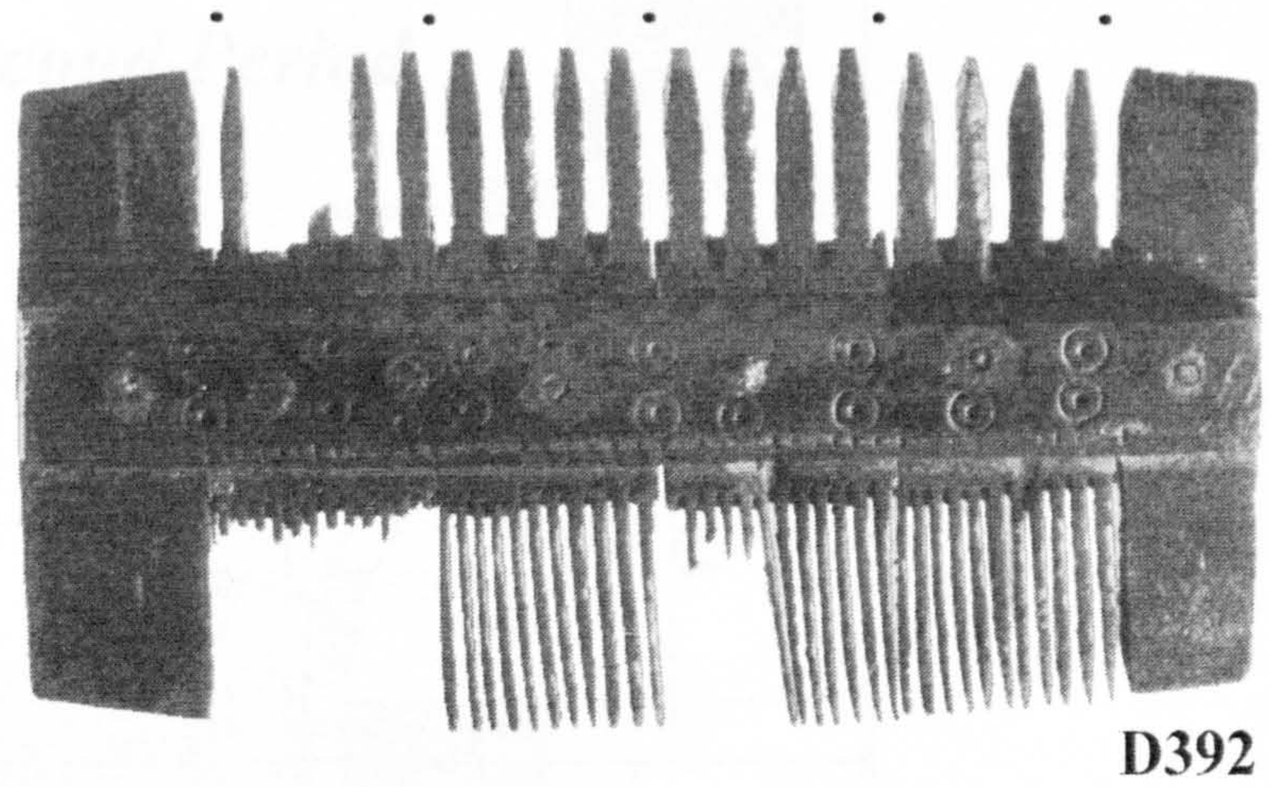
D152

Fig. 6.27 Combs with RDB decorations from the Second Period

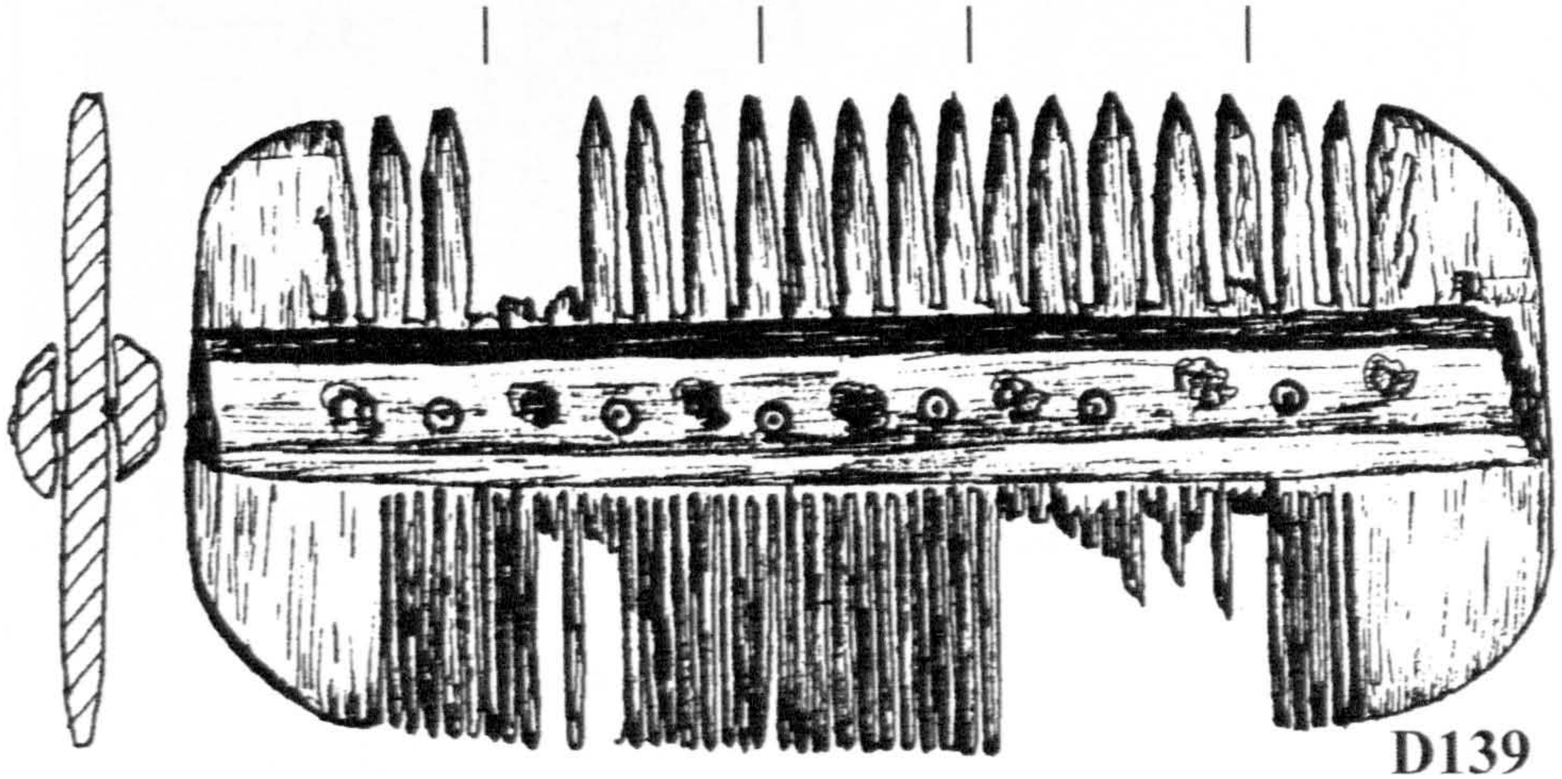


D204

D203

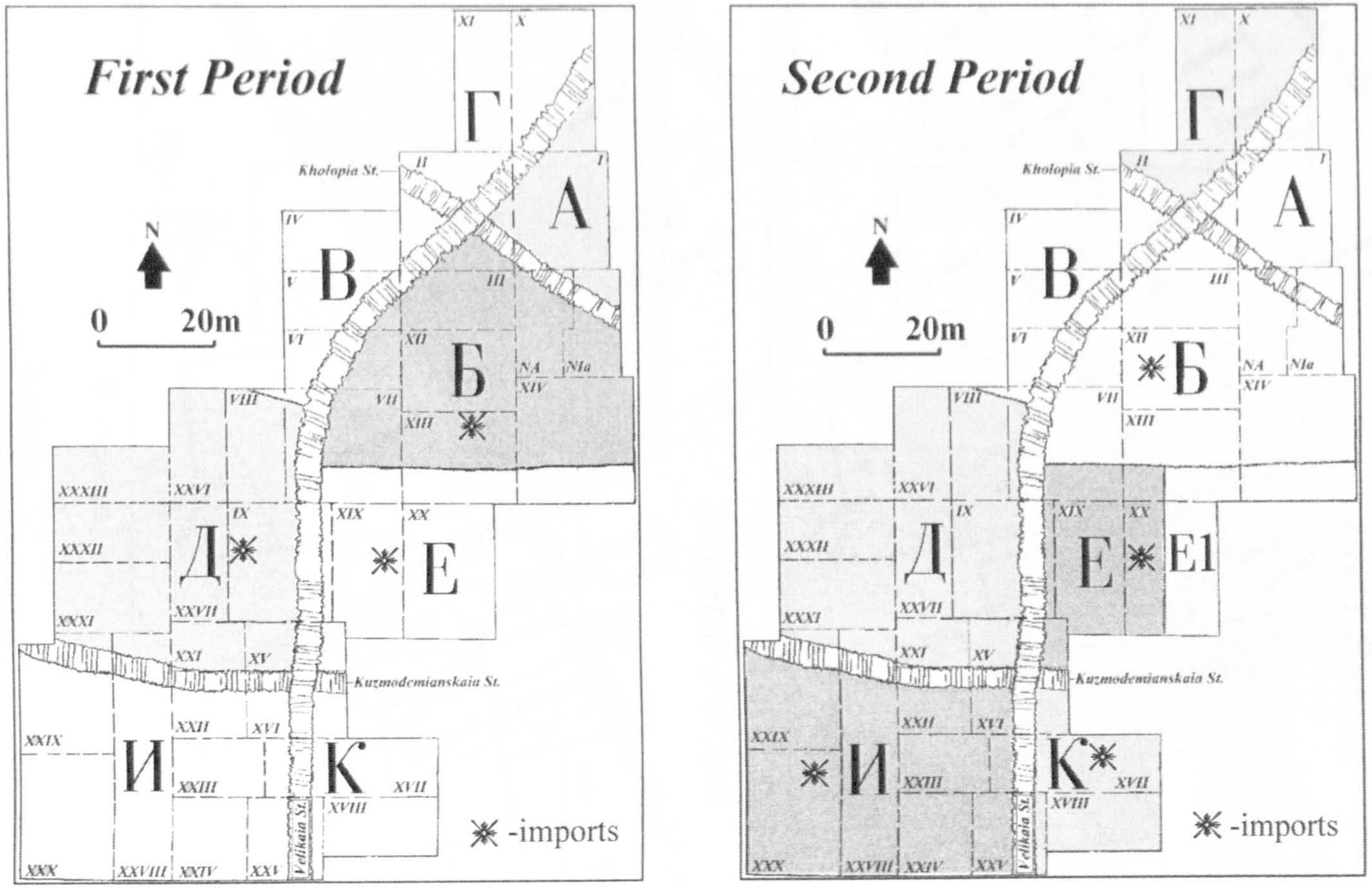


D392



D139

Fig. 6.28 Chronological and spatial distribution of class 3 combs on the properties of the Nerevsky End (Nerevsky site)



low concentration

medium high concentration (average and up to 50% above average)

high concentration

Fig. 6.29 Chronological and spatial distribution of class 3 combs on the properties of the Liudin End (Troitsky site)

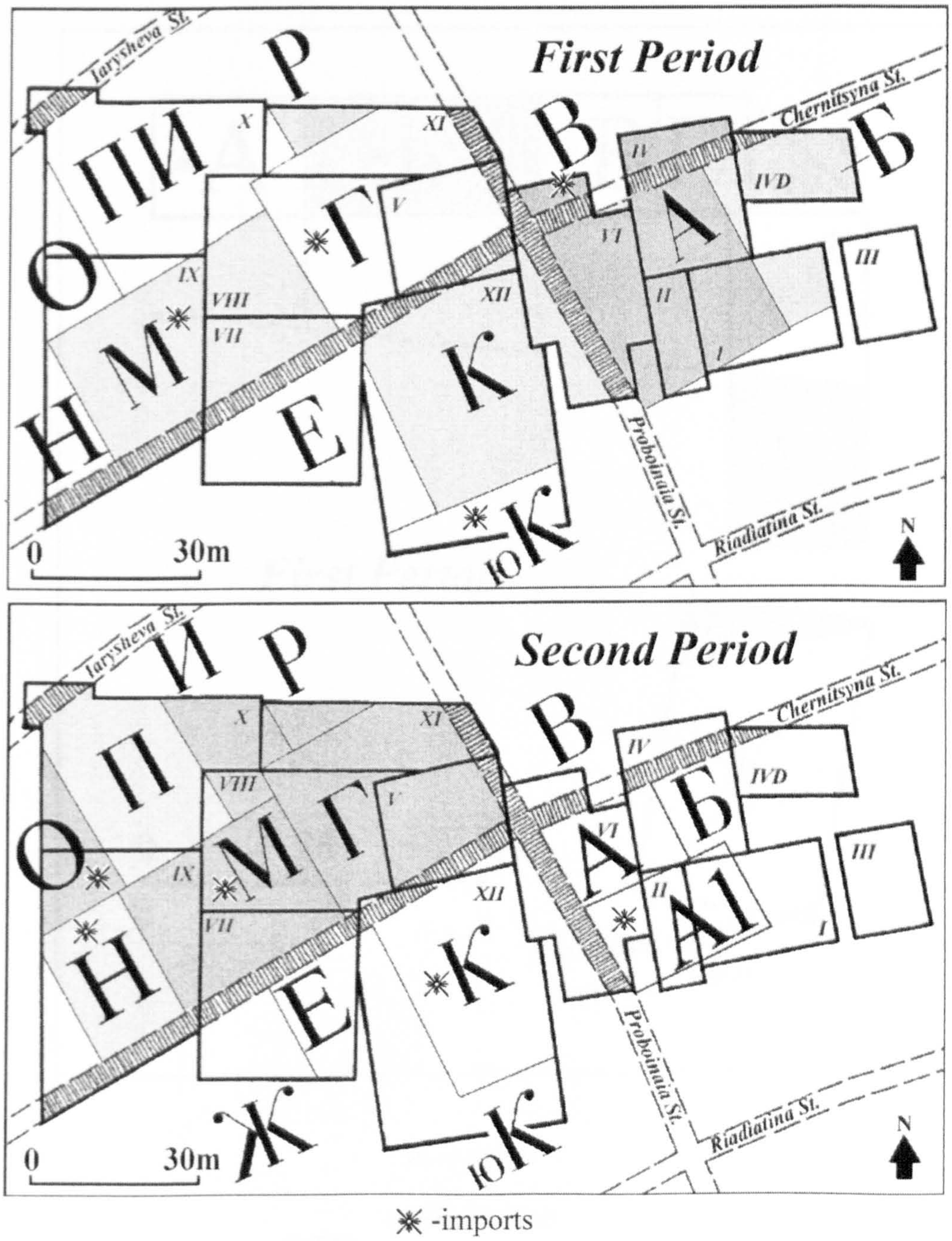


Fig. 6.30 Spatial distribution of class 3 combs deriving from the deposits of the First Period on the properties excavated within the Fedorovsky site

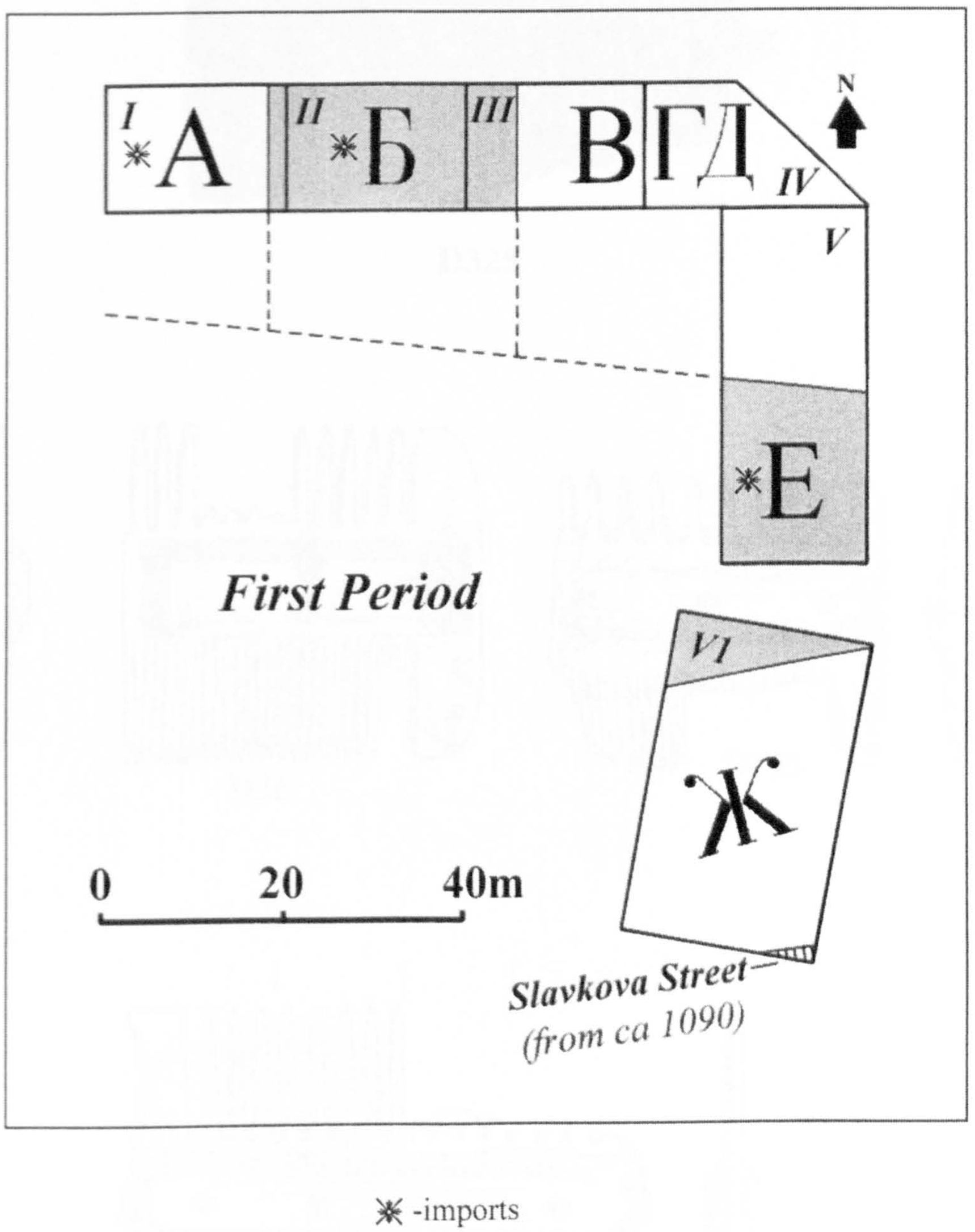
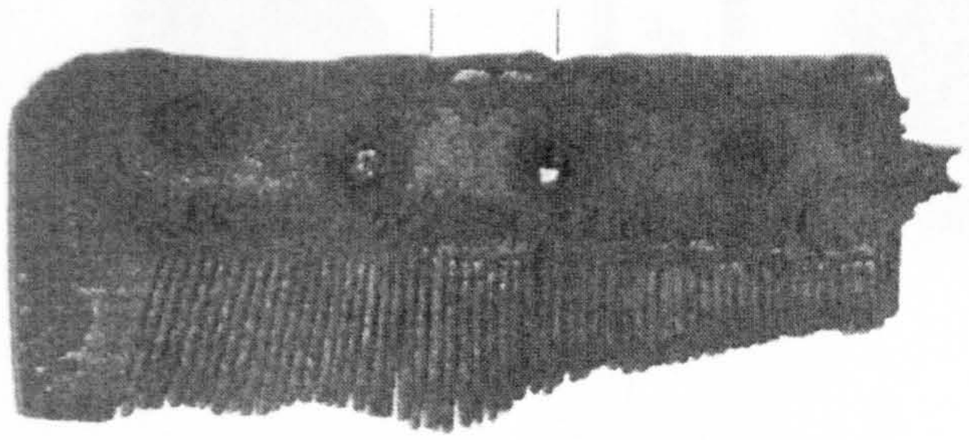
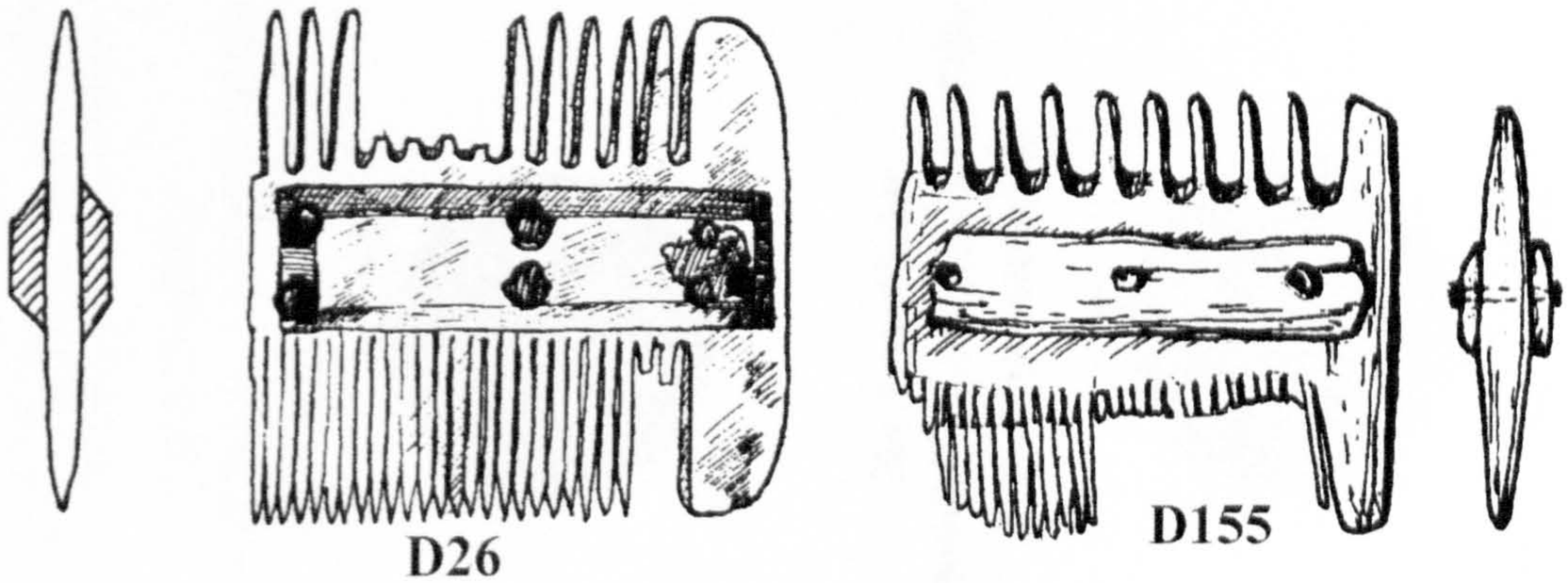


Fig. 6.31 Repaired class 3 combs

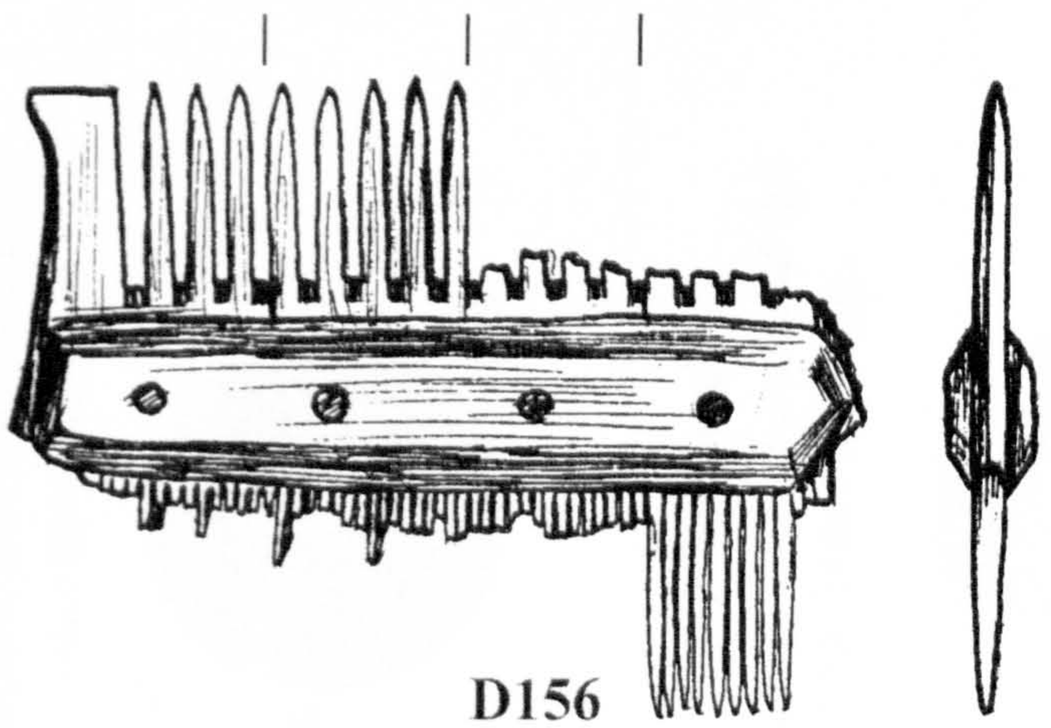


D325



D26

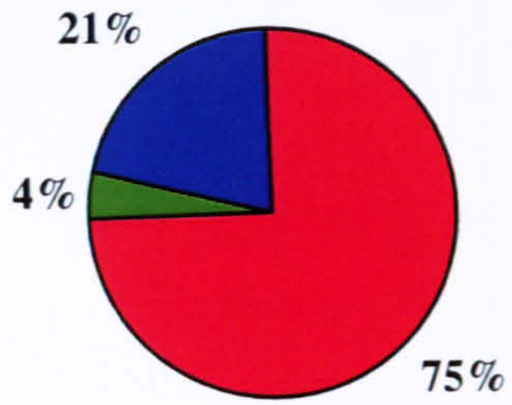
D155



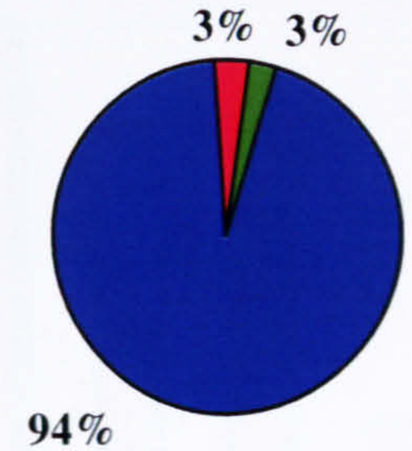
D156

Fig. 7.1 Repertoires of mutually common classes of combs in the medieval towns of Novgorod, Trondheim and Schleswig

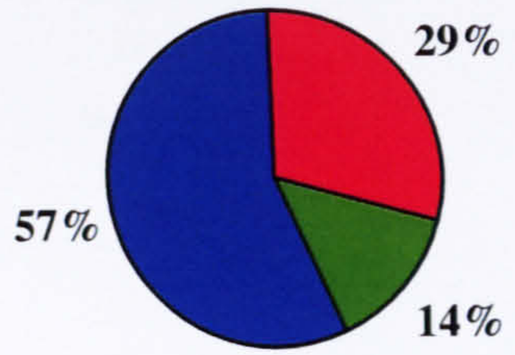
1a) Novgorod Troitsky I-XII (deposits of the 11th-12th centuries)



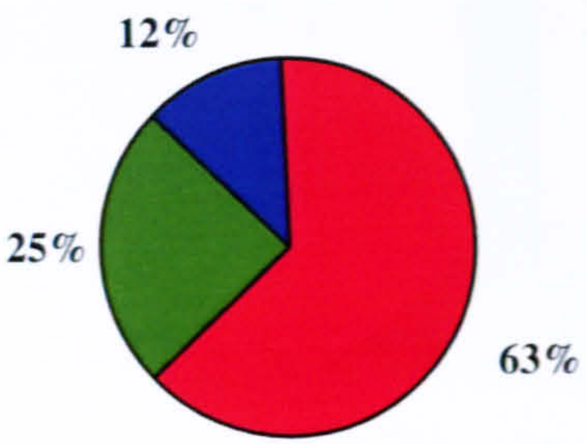
1b) Trondheim 'Folkebiblioteks' (deposits of the 11th-12th centuries)



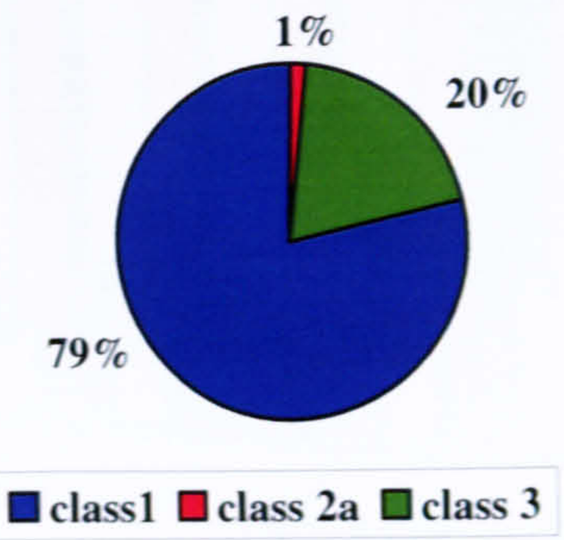
1c) Schleswig 'Plessenstraße' (11th -12th centuries)



2a) Novgorod Troitsky I-XII (deposits of the 11th-14th centuries)



2b) Trondheim 'Folkebiblioteks' (deposits of the 11th-14th centuries)



2c) Schleswig 'Schild' (11th -14th centuries)

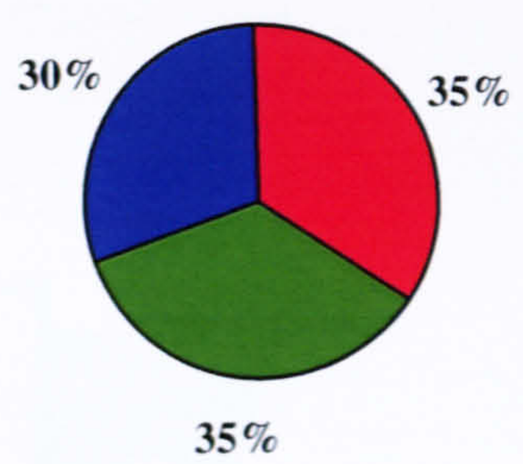


Fig. 7.2 Chronological distribution of combs on the evidence from the Troitsky site, trenches I-XII (1973-2000)

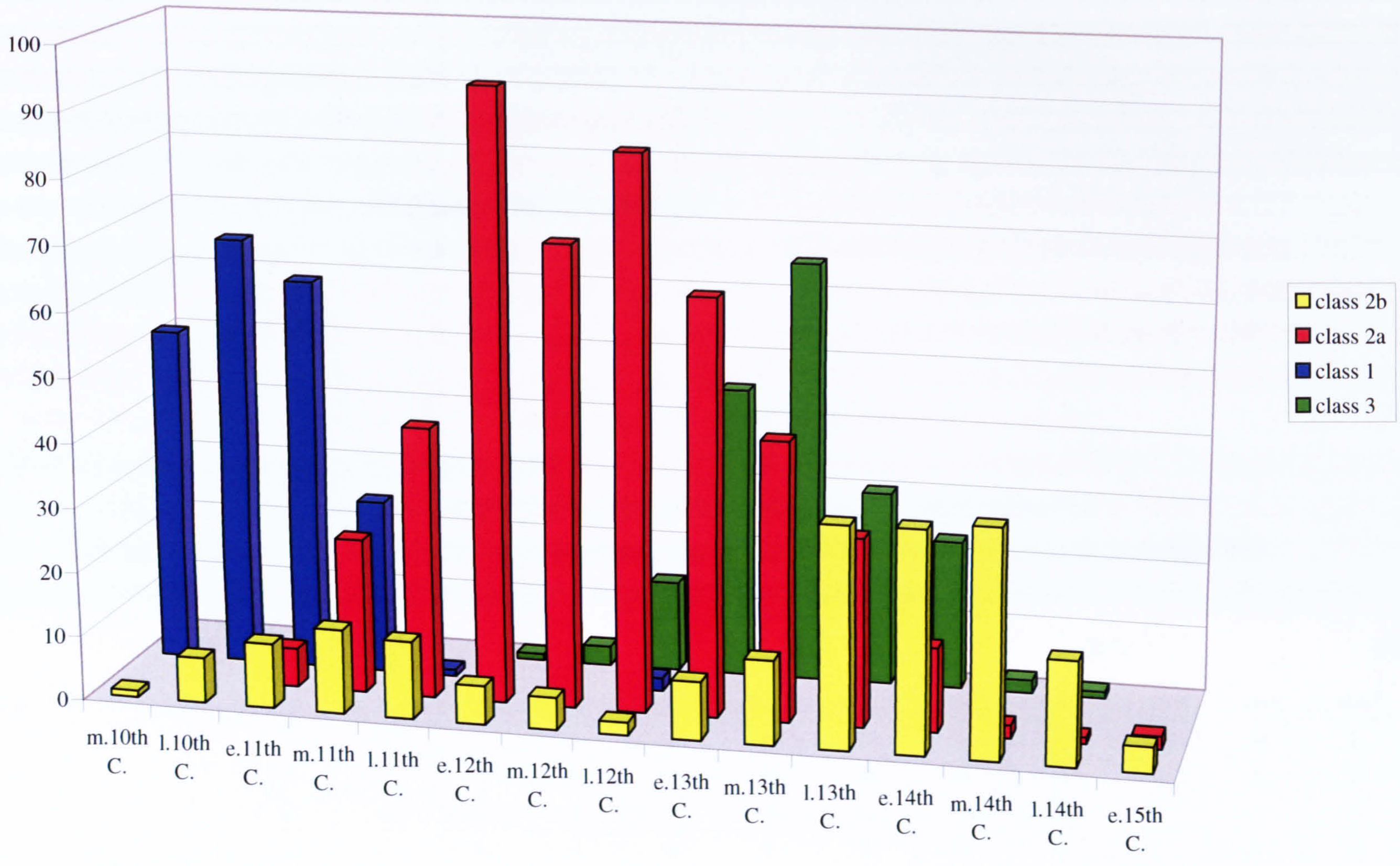
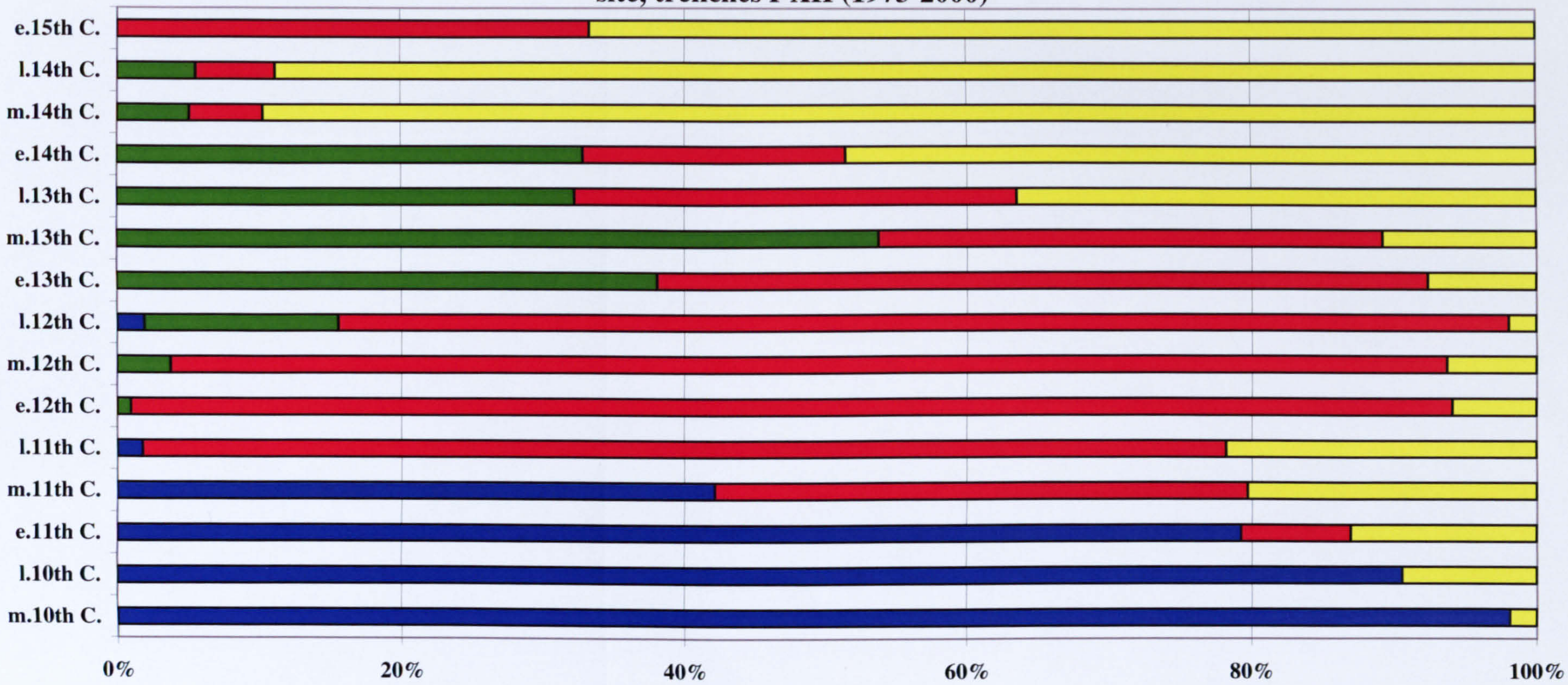


Fig. 7.3 Chronological changes in the comb repertoire in Novgorod on the evidence from the Troitsky site, trenches I-XII (1973-2000)



	m.10th C.	l.10th C.	e.11th C.	m.11th C.	l.11th C.	e.12th C.	m.12th C.	l.12th C.	e.13th C.	m.13th C.	l.13th C.	e.14th C.	m.14th C.	l.14th C.	e.15th C.
class 2b (201)	1	7	10	13	12	6	5	2	9	13	34	34	35	16	4
class 2a (476)	0	0	6	24	42	94	71	85	64	43	29	13	2	1	2
class 3 (184)	0	0	0	0	0	1	3	14	45	65	30	23	2	1	0
class 1 (210)	52	67	61	27	1	0	0	2	0	0	0	0	0	0	0