IV.

NOTES ON MATERIALS FOUND IN A KITCHEN MIDDEN AT HILLSWICK, SHETLAND, WITH SPECIAL REFERENCE TO LONG-HANDLED COMBS.

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Plates XIII-XVIII.

The bone implements, broken bones, portions of pottery-ware, and shells, which are described in the first part of this paper, were found by me whilst on a tour in Shetland during the month of September 1870.

On the western side of the Mainland of Shetland, in the parish of Northmavine, and jutting out into St Magnus Bay, is Hillswick Ness, a peninsula connected with the mainland by a low-lying isthmus, washed on the western side by the Atlantic Ocean, on the eastern side by Urie Firth or Hillswick.[1] In the centre of this isthmus stands Old St Magnus Kirk,[2] between which, and on the western side of the isthmus, is a small voe, called Sandwick ;[3] and at the southern corner of this voe is an outcrop of sand, from the base of which the present sea-beach shelves.

This portion of the isthmus, like every little plot in Shetland, has had

[1] Wick means a "voe" or "bay."

[2] Reid's "Shetland," p. 12.

[3] Captain Thomas' Chart of Shetland Isles.

a special name given to it, viz., West Air; but it forms a part of the town of Hillswick.

The outcrop is contiguous to the present sea-beach, and is distant only about 20 yards from the average high-water mark; it is necessarily exposed to the wearing and tearing-down action of the waves in tempests; and I was informed[1] that scarcely a winter passes by but what the sea encroaches on the land at that place, breaks down and washes away more or less of the outcrop. And this has been going on within the memory of some of the oldest inhabitants.

An idea of the savage force of the waves on this coast during storms may be conceived, when I state that at one place the waves uptear and upheave masses of rock, many of which are fully a ton in weight, and "carry them like so many pebbles to the shore behind."[2]

Again, near Stennis fishing station,[3] which is close to Hillswick, the ground for 40 yards or so from the cliff edge is plentifully bestrewn with large pebbles, broken portions of rock, &c., which have been washed over the granite cliffs, which are at least 30 feet in height. At the time I saw the out-crop, it was quite evident that the hand of man had assisted in breaking it down, for at one point it presented a good vertical section, which had been made sometime previously, for the purpose of forming a saw-pit.

By means of this section, the various layers composing the outcrop were easily recognised, and were presented in the following order, commencing at the top (measurements are given in inches):—

Loamy soil from which grass grew,	Average depth,		12
Yellow beach sand, ...	,,	,,	30
Shell layer, ...	,,	,,	8
Large and small pebbles embedded in sand,	,,	,,	27

The average height of the upper layer above the level of the sea was 7 feet. The layers varied in thickness in different parts, and were not quite horizontal, but dipped somewhat to the south-west. The layers were undulated, and on account of progressive subsidence having been going on were slightly terraced. The shell layer was divided into two parts,

[1] By the Rev. James Sutherland, to whom I now express my sincere thanks.

[2] *Vide* "Art Rambles in Shetland," by Reid, pp. 19 and 20, and Sketches; also, Dr Hibbert's "Shetland," pp. 527, 529.

[3] *Vide* Reid, *loc. cit.*, p. 20. (Cannon) (1.)

—*one*, the thicker portion, about 8 yards in width, which merged into a thinner but more compact stratum of shells, that extended on either side for about 20 yards. The average thickness of the compact shell-layer was 2 inches; whilst the depth of the thicker part varied, being 10 inches in the centre, and 2 inches at its sides, thus tapering off from centre to sides; and on tracing it inland by digging, it slowly decreased in width and depth, and ended at the distance of 5 yards from the cut edge.

It was in the thicker part of the shell-layer, of apparently artificial formation, that the above-mentioned materials were found. The compact shell-layer presented the usual segregated appearance of an ancient sea-margin. In some parts three terraces were distinguishable, as if three of these ancient sea-margins were present instead of one; but these appearances could easily be accounted for by the underworking of the water, and the nearest strip of the old sea-margin having sunk bit by bit. I think that the evidence was stronger in favour of depression than of upheaving. In the other layers I observed no peculiarities.

Shells.—The shells were chiefly large forms of the following edible mollusca:—Most abundant—Ostrea edulis, *Linn.*; Patella (vulgata?), *Linn.* (depressed and other varieties); Cardium edule, *Linn.*; Mytilus edulis, *Linn.*; Littorina littorea (Turbo littorea of *Linn.*) Less abundant —Buccinum undatum, *Linn.*; Tapes virginea *or* Venus virginea, *Linn.* The shells generally were in a very soft and friable condition.

Pottery.—No entire vessel was found. The pieces are about ten in number; they vary in size, in thickness, and in the coarseness of the material from which they have been made. Some are nearly $\frac{1}{2}$ inch thick, and others only $\frac{1}{4}$ inch. Some are made of fine material, others contain coarse grains of quartz, &c. They evidently do not all belong to the same vessel. They have been subjected to the action of fire, many of them still retaining soot or soot-staining externally, whilst two pieces have in their concavity a *thick* crust, of a dirty black colour. This crust is composed chiefly of *soot*; and it is undoubted evidence of the fire having come into contact with the interior of the vessel or vessels, of which these two pieces form parts. On the external or convex surface of one of the pieces are some rude ornamental lines; these consist of straight lines crossing one another, and forming rectangular spaces. They are pretty symmetrical,

and appear to have been made by some sharp-pointed implement, and not by the finger-nail. This ornamentation only extends over a portion of the piece, therefore it is probable that several such ornamented patches may have been on the exterior of the vessels. The same piece has one of its margins quite smooth; this has formed the mouth of the vessel. The pottery, of which these are portions, must be looked upon as culinary or other utensils, rather than urns.

Bones, consisted chiefly of splintered long bones, portions of ribs and vertebræ, short tarsal and carpal bones, a few scapulæ, and ossa innominata of various animals; besides, there were a few whole bones, and portions of the skulls of various animals, several lower jaws and teeth. They belong chiefly to bos and ovis. There are also present adult and young teeth of *Cervus elaphus* (stag or red-deer), and one or two bones of the *Cervus capreolus* (roe-deer). The bones of birds and fishes were also found.

Since some authors have remarked the absence of certain portions of the skeleton generally in these shell-patches, it may be of interest to state in a tabular form the number of the different bones present; and I have done so, keeping separate the whole from the broken bones.

Table of Bones.

18 broken portions of cranial bones.
13 inferior maxillæ, with teeth,
Chiefly of the sheep, the red-deer, and roe-deer.
4 entire first cervical, and 3 entire second cervical vertebræ.
15 broken dorsal, and 3 lumbar vertebræ,
Chiefly sheep and red-deer.
5 broken scapulæ; 2 gnawed,
All of sheep, except one, which was of red-deer.
7 broken parts of the pelvic bones; 3 gnawed.
9 humeri, broken; 1 bearing marks of cutting; 1 gnawed.
15 radii and ulnæ; 6 had been split.
Tibiæ, 2 whole; 19 broken and split; 1 belonged to red-deer.
Tarsal and carpal bones, 5.
Metacarpal and phalangeal, 22,
8 of which were partly split and gnawed.

104 broken portions of ribs; 5 gnawed; 6 bearing marks of cutting.
A few bones of birds and fishes, but so broken, and so few, as not sufficient to determine species.

Some of the bones are entire, others splintered, broken, and cracked, as if for the extraction of marrow. Not a few possess teeth marks. There are several other marks of cutting, that must have been produced by human agency. Two pieces of bone bear marks of fire; one piece, about an inch long (a portion of a rib), is charred at one end, and the rest is fire-cracked. The other piece is also about one inch long, is conical, and looks like the core of a sheep's horn. It is burnt quite black into charcoal. If Rütimeyer's[1] observations be correct, I would infer from them alone that all the above bones are those of domesticated animals.

Bone-Needles, Awls, &c.—One narrow and rounded bone implement, 3·2 inches in length, and of about the thickness of a quill, broken at both ends, but narrower at one end than the other. It appears to be part of a needle. Two awls, made of splinters of the long bones of some animals, very rude, each having one end tapering, rounded off, and pointed. A splinter of bone, with one extremity ground down to a bevelled edge; probably been used for scraping purposes. Portion of the ulna of some animal, with one end sharpened or pointed, but broken: this end bears marks of cutting. Part of the tibia of a sheep, broken above the middle; the splintered end has been ground down and polished, till a simple blunt end remains; the bone has a transverse mark near the articular end; this is either a scratch or a cut.[2] Several other splinters of bone which may have been used as awls, but these, though preserved, I consider "doubtful," and have therefore placed them among the broken bones. Perhaps the most important and interesting objects found in the shell-patch were four of the long-handled combs, made of bone. They lay quite close together. These are described at length hereafter.

What was this shell patch? Was it in connection with a Pictish broch, or simply an isolated shell mound? As to the fact of a broch having been found at this place in the memory of man, evidence is

[1] See Lubbock's "Prehistoric Times," 2d edit., pp. 195 and 196.

[2] Mr Joseph Anderson considers this implement to have been used as a punch, or for some similar purpose, since it resembles very closely such implements.

wanting. But from its low position, from the presence of a kind of stone in certain adjacent buildings similar to what had been used in making a Pictish broch about four miles distant, near Priest-Houland (which I examined), and to such as exists in the Clikamin broch; from the fact that all long-handled combs hitherto found above the Firth of Forth have been found in connection with brochs; also from a want of completion in the chain of brochs, unless this is included, I think it is most probable that a broch had once existed here, but, owing partly to the ravages of man and of the sea, the stones have either been washed away or removed for building purposes, or both; and all that we have left is the shell patch or kitchen-midden of such broch. That buildings once existed there, old inhabitants can affirm; but they say these were fishermen's cottages or huts, and that they were dismantled by the sea and by man.

I ought also to mention that the old kirk of St Magnus is supposed to have existed at a spot not more than 30 to 40 yards south of this patch, and that its burial-ground approached even nearer. There can be no doubt that these buildings, both hut and kirk, were entirely unconnected with the shell patch.

The Long-Handled Combs.

I now proceed to give the results of a detailed examination of these implements. Although numbers of combs of this form have been found and are duly reported in the proceedings of the various Antiquarian and Geological Societies, yet in no place is there given a detailed description of them. Thinking the present find a good opportunity for contributing to a more exact and minute knowledge of these combs, I have endeavoured to supply that want by giving a somewhat minute and detailed description, embracing not only their general form but also certain peculiarities in form; the materials from which they have been made, their ornamentation, comparison with other combs, and interesting data connected with their manufacture, use, and distribution, in the hope that such a description may be of service, not only for future comparison, but in affording another link of evidence that may aid in computing the age of the Pictish brochs, and in furnishing a little more insight regarding the habits and state of civilisation of those who used these implements.

The general description is founded upon the characters of the combs in the possession of this Society, but I have not scrupled to avail myself of the information derived from books and plates, in all cases acknowledging the source of my information.

I wish especially to refer to the very great obligations I am under to Mr Joseph Anderson, keeper of the Society's museum, for his courtesy in allowing me to examine the various specimens of the combs in the museum, and for much valuable information concerning them and others; indeed, it was partially through his advice and that of Professor Turner that I was induced to write this paper.

These combs have had given to them various names, according to the place in which they were found—such as Pictish broch or burgh combs, Kitchen-Midden and Hut-circle combs, long-handled Roman Camp combs, but I think the most expressive and most general term of all is that of *Long-Handled Combs.*

They are made either of bone or deer's horn, more frequently of the latter; Keller has figured one made of yew-wood, which may be said to belong to this class of combs. It is nearly 5 inches long by $2\frac{1}{4}$ wide; its teeth 10 in number, and $1\frac{1}{4}$ inch long.

General Form.—Elongated, possess two expanded extremities and a constricted middle or body; one end is thick and blunt, the other is bevelled and toothed.

The body and the blunt extremity together form the *handle*, and to the toothed extremity I have applied the term of *dental end.*

The handle has two surfaces whose margins are rounded off more or less in different specimens; one surface generally possesses a variable amount of convexity, whilst the other is often flat.

The convex or *external* surface corresponds to the exterior of the compact outer wall of a long or flat bone, or the hardened external layer of horn; but the flat or *internal* surface presents the characters of a longitudinal section through the cancellated texture of a bone or horn.

The blunt end of the comb is usually its thickest part, and is, in most specimens, slightly concave from corner to corner, but rounded off from surface to surface.

[1] Lake Dwellings, plate 5, fig. 21; text, page 34.

The above may be taken as a typical form of the handle, but there are some combs which vary somewhat.

Peculiar Forms.—In some the concavity at the blunt end is present to a marked degree as in the comb found by Mr Benjamin Neeve Peach at Kettleburn,[1] in 1854, now amongst the Kettleburn relics in the museum, in which the distal end of the handle is lobed like the tail of a fish.

Another Caithness broch yielded a comb whose handle, from near the bases of the teeth, tapers sharply to a point, which is surmounted by a large circular knob. This was presented to the Society by Mr George Innes, in 1783.

Madsen[2] mentions several, and figures one of a similar form to the above, but much smaller in dimensions.

The Roman camp combs[3] are similar to the above, except that they are generally surmounted by a square knob.

Mr Farrer[4] found some of these combs with cylindrical handles at a broch in Burray, Orkney.

The combs found in Kent's cavern[5] are similar in form to a shoe-horn, broad at the dental end and narrow at the blunt extremity.

One of the combs found by Mr Petrie in Lingrow broch possesses a similar form, so does the one obtained from the circular building at Uist by Mr Gordon.

Several of the combs possess one or more holes in the handle near to the distal end, probably for the purpose of attaching it to the person by means of a thread or cord, so that it may be carried about by its owner. Such a practice is common among the Esquimaux, North American Indians, and Maories.

Examples of these may be seen in the case of one of Kent's cavern specimens; in both of the combs found by the Rev. Mr Joass[6] in a broch

[1] A Report on the Ancient Remains of Caithness. By Joseph Anderson, Loc. Sec. of Anthropological Society. Memoirs of Anthropological Society, vol. ii., p. 227. 1865-66. Also Proceedings, vol. 6, p. 264; also plate XIII. fig. 2.

[2] Afbildninger af Danske Oldsager og Mindesmærker ved A. P. Madsen, p. 6, Hefte xiii; also plate I. fig. 1.

[3] Proceedings, vol. vii., p. 424.

[4] Ibid. vol. ii. p. 6, and page 157.

[5] Reports Brit. Ass. Committee for 1865–67.

[6] *Vide* Mr Joass' Paper in Archæologia Scotica, vol. v.

near Dunrobin, Sutherlandshire; in the comb found by Mr Gordon[1] "in a circular building at Uist" (a broch) during 1853; in a comb found at Moosedorf—in this comb there are two holes; in a comb found at Nussdorf, also in a bronze comb found in Terramara. The last three are mentioned and figured by Keller.[2]

The dental end and the teeth.—These present great variations in all the combs which I had the opportunity of examining. In those made from sections of deer's horns, or from splinters of the long or flat bones, more especially in those made from the bones of whales, the dental end is bevelled on both sides, but more on the flat or soft side than on the convex side. In those possessing cylindrical handles, where an oblique section has been made through the shaft of the "tyne," bevelling has only been made from one side, and that agrees with the section.

The bevelling generally commences on the surfaces of the handle, from one inch to one inch and a-half from the bases of the teeth.

The teeth may be divided into a central set and a marginal one; each tooth has an attached thick base and a free-pointed apex. Those of the central set each possesses four surfaces and four borders; two of the surfaces are external and internal corresponding respectively with the external and internal surfaces of the handle. The remaining two surfaces are the opposing or lateral surfaces of each tooth. The four borders bound these surfaces, and are best marked near the bases of the teeth; they are rounded off near the apices. This is well seen in the larger Kettleburn comb.

The marginal teeth, two in number, agree generally with the central set, except that they are commonly more massive, and taper more than the other teeth from base to apex, and are usually a little shorter.

Each tooth tapers laterally from base to apex, and also from external to internal surface, but the tapering in all the cases except one, was greater in the latter diameter than the former. The teeth vary in number in different specimens, from six to sixteen. They vary also in size and form, some being short and cuneiform, and only one-fourth of an inch in length, others long and parallel, extending to $1\frac{3}{5}$ inch.

The interdental notches (between the teeth) are variable in width,

[1] Proceedings, vol. iii., pp.122–124.

[2] Keller's Lake Dwellings.

some being so *narrow* as to scarcely admit the large blade of a pocket penknife, others wide enough to allow a blade three times the above thickness to pass between the teeth; the width of the notches in specimens does not depend so much on the girth of the teeth as on the number of teeth present at the dental end; some are less than one-eighth of an inch in width, others one-fourth of an inch.

The "mode of implantation," if such a term is here allowable, is also important. In the typical specimens, the whole series of teeth, from their bases to their apices, usually are quite parallel, and if there is any convergence, it is so slight as to be with difficulty perceptible. In a few, the series diverge so that the width of the dental end at the apices of the teeth is greater than at the bases. Both the convergent and divergent forms have their analogues in the two kinds of combs used by the Esquimaux of the present day. Again, in one of the Hillswick combs, the teeth are set obliquely to the axis of the handle; this also occurs in other combs. In some of the rude specimens, from the bases of the teeth grooves proceed along the bevelled portion of the external and internal surfaces of the handle; these grooves are continuous with the interdental notches, where they are best marked, but they become shallower and more indistinct at the *a-dental* end of the bevelled part of the handle. They are slightly narrower in width than the interdental notches; they vary in length, not only as compared with one another in the same comb, but also in different combs, and they are more deeply indented in the internal cancellated or softer surfaee of the comb, than in the external harder shell of the comb. In many may be seen a faint ridge or ridges, at the base of the groove, dividing it into two or more secondary grooves, and most commonly when these secondary grooves are present, they are not parallel to one another.

Again, in many combs, and especially in those that possess the grooves, the opposing surfaces of the teeth have oblique marks, running with a greater or less amount of obliquity, from one side at the base, towards a portion of the opposite side near the apex; those commencing at the base near the internal surface, crossing those which begin at the base, near the external surface, and vice versa. The interdental notches of combs possessing the above grooves and oblique marks, have, without a single exception, clogged and unfinished bases; a small conical projection of

bone having been left in the cutting, in the bases of each interdental notch between the teeth.

This contrasts strongly with what we see in the well finished combs, possessing sharp and clean teeth without marks, interdental notches well cut down, and a handle, whose bevelled end is devoid of grooves. If careful examination of the teeth of these combs be made, there will, in almost all specimens, be found transverse markings on the surfaces of the teeth, nearer to the apices than to the bases; these are marks caused by the use of these combs, and will be considered in another part of this paper.

Microscopical Structure.—As yet I have only examined the structure of one comb under the microscope; I am indebted to Mr Stirling, of the Anatomical Museum, Edinburgh University, for having kindly mounted for me the sections. They were taken from one of the Hillswick combs, and compared with some sections made from the bones of a long-armed Cape whale, which, from having been subjected to similar influences, and being in a similar condition, permitted a comparison being made.

The late Mr Quekett, the distinguished histologist, in a note to the "Archæological Journal," about the comb found at Kettleburn, said that that comb, and two spheroidal bone balls, which were found along with it, were made from the lower jawbone of a whale.

Now, from an examination of these sections by the microscope, though I could not positively assert that the comb examined was made from a whale's bone, still less that it came from any particular bone; yet I can say, that the appearances presented by the different parts of the osseous tissue in the comb are similar to those seen in sections made from the bones of the Cape whale. With this exception, that the decay has gone on for a longer period in the comb, we have the canaliculi more molecular, and the lacunæ somewhat more blurred from the deposition of the earthy particles; yet the Haversian system, the grouping of the lacunæ, and the characters of the canaliculi, have the same general appearance in both.

Manufacture.—In treating of the mode in which these combs have been made, and of the kind of implement, stone or metal, that may have been employed to form the teeth, I shall limit myself to bringing forward certain facts, and of drawing provisional inferences from these facts.

There can be little doubt that the bones or deer-horns out of which these

combs were made must have been in a comparatively fresh state, for the structure of horn or bone becomes more and more brittle, in proportion as the animal matter is lost, either by age or weathering; and if old bones had been used, in addition to the greater difficulty of cutting long teeth without breaking them, we would expect cutting grooves, where present, with chequered and broken margins, which is not the case in any I have seen. Only two kinds of bones were used, viz., the long and the flat bones. In the former, there is a thick, compact, hard, and ivory-like portion externally, and a cancellated and softer texture internally, and in those combs made from splinters of long bones the compact tissue predominates. In the tabular bones, we have a much thinner compact portion, but a more closely cancellated centre; and in those combs made from these flat bones, the cancellated texture predominates, though here the hard compact portion has been taken advantage of. Although there are three kinds of horn, yet only one kind seems to have been used, viz., that belonging to 'Cervideæ," and when the horns of these animals have been stripped of the "velvet," then we have essentially a bony structure, consisting of a spongy centre, the spaces of which gradually become smaller and smaller, as it merges into the compact tissue of the horn, there being no sharply defined line between the compact and the cancellous texture. The bone composing these horns approaches somewhat in properties the bones of young animals, which are softer than the old bones. Hence this may account for the fact, that horn seems to have been employed in preference to bone, in many cases since it could be more easily cut. Concerning the kind of instrument employed in their manufacture, I have come to the conclusion that saws, or some implement with a filing or serrating edge, were used in cutting the teeth of these combs, for the following reasons:—

If the grooves running from the bases of the teeth along the bevelled part of the comb be examined, it will be seen that the bottom of each groove is equal in width to its "lips," whereas, if a knife had been employed, the base of the groove would have been much narrower than the lips, and a cross section of the groove would have had the form of the letter V., the limbs being the sides of the groove, and the angle of junction the base. Besides, if we attempt to cut a new bone, and more especially a brittle old one, with a knife, the groove made is

neither so well defined, nor so clean as one made by a saw, the compact tissue splitting and cracking, owing to the great pressure of the knife's edge, and the lips of the groove being broken and jagged. The hardness and compactness of the bone or horn cut, the characters of the above grooves, also of those on the opposing surfaces of the teeth, the characters of the cuttings and marks on the broken bones, and other implements that have been found along with these combs, the comparative width of the interdental notches in most of the typical combs, the presence of flint saws among the finds in the lake dwellings, where some combs belonging to this class have been found, the use of saws in the present day, in cutting the teeth of combs and other things,—all tend to show that saws have been employed.

I am aware that as yet no saws have been found in the *brochs;* and as for flint implements, they are generally the exception, though some were found in the black mould over the stalagmitic layers in Kent's Cavern, in conjunction with combs of this class. I also know that saws of metal, of the bronze and iron periods, are very scarce, if any at all exist, and that the interdental notches of some combs are so narrow as to preclude the idea of stone saws in some cases having been used. Yet it must be borne in mind, that if metal saws were employed, and I believe they were, it is more than likely that they were iron ones, for there is no doubt but that some of the earlier dwellers of the brochs were co-temporary with the Roman invaders. Consequently, if such a period has elapsed since these saws were made or employed, or even if only a century had elapsed, knowing as we do the physical properties of iron, and the influence and conditions which any iron implement, especially one fine enough to make the grooves and interdental notches of a comb, or the cuttings we see on various bones found among the broch relics, must have been subjected to since its deposit, I need have little fear of being stigmatised as rash in assuming that such an implement did exist, and was used in their manufacture.

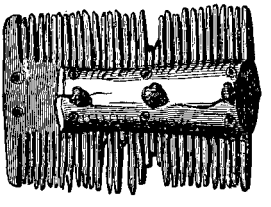


Fig. 1. Natural Size.

Nor is such an assumption unfounded, since to any one conversant with the subject, it will be seen that the very nature and disposition of

the materials found in these brochs would favour the rusting away of any iron implement deposited in them. For independent of the moisture which naturally must exist in and about buildings lying in a low situation, either built on the arms of the sea, or partly in some inland loch, or in the midst of some undrained mossbog or morass, we have the walls of such buildings partly broken down, the huge stones jumbled against one another, leaving underneath or between them little crevices, in which carbonic acid and moisture may collect; we have a soil infiltrated with, and indeed partly composed of, organic substances, such as broken and splintered bones, the remains of feasts and slaughterings, certainly the most favourable conditions for producing rust.

Indeed, Mr Farrer found, in the broch of Burray, Orkney, a small portion of a double-margined comb, with remains of an iron knob or rivet projecting from its centre (fig. 1). He also obtained from the same place some buttons of bone, with iron knobs projecting out of them; and from another broch he got another double-margined comb, also rivetted with iron. These were found along with long-handled combs, and in both cases the iron is only rusted at the ends. Here, although the imperfect conducting power of the bone may have interfered with the species of voltaic action which is produced in the rusting of iron, it would not wholly prevent it, yet, by protecting the shaft of the rivet, it did tend to preserve the iron.[1]

Again, Sir John Lubbock[2] mentions about several implements that were found at Thorsbjerg, in Slesvick, in which "the iron has been almost entirely removed," owing to chemical action, and the handle of bronze and wood are perfectly preserved." But if the negative evidence of the use of iron saws is not permissible, then it does not seem to me at all improbable that the margin of a shell might have been used; indeed, there are lots of natural articles which would subserve all the purposes of a saw, but which, until I have further investigated the subject, I forbear mentioning. That the cutting implement was made of metal is rendered more likely by the fact, that in almost every find bronze and iron articles have been found associated with these combs. As yet, the chief difficulty lies in the fact, that it is almost impossible to separate what implements

[1] "Miller's Elem. of Chemistry, 4th edition, part ii. pp. 579 and 580.

[2] "Prehistoric Times," 2d edition, pp. 8, 9.

belongs to one or what to another of the successive generations who occupied these brochs. Concerning the manner of cutting them, there may not be the same differences of opinion.

Mr Joseph Anderson[1] says, "the idea of the artist who fabricated the comb from a shank bone was evidently to make a rude imitation of the human hand, with its fingers outstretched," and it certainly does look as if this had been the case. Let us see how he set about it.

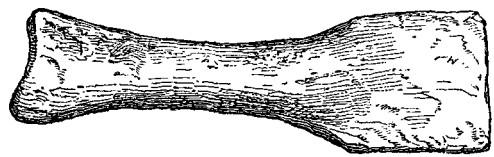


Fig. 2. One-half Natural Size.

Regarding the instrument figured by Mr Laing in the Proceedings of the Society[2] as one of those combs partly made, it would appear from it, and a careful study of the other combs, that the handle is formed, and the dental end bevelled to some extent, before the teeth are sawn or cut; and when these are cut, they are sawn from both surfaces of the comb,[3] just in the same way that a tyro-carpenter is often seen using a saw of a certain breadth, with a back to it, to cut through a log of wood, the diameter of which is much greater than the breadth of the saw. This sawing from both sides would account for the oblique grooves on opposing surfaces of the teeth (Pl. XVIII. fig. 2), commencing both at the internal and external surfaces, and also for the grooves on both surfaces of the bevelled portion of the comb, being deepest near the bases of the teeth. In some combs, after the above rough cutting is done, they are used without any further finishing; in others, the interdental notches are sawn *clean*, that is, the small portion of bone at the base of the teeth, which is left

[1] Anthropological Soc. Memoirs, vol. ii. 1865–66, p. 228.

[2] Vol. vii. p. 83. *Vide* also pp. 67 and 68, or fig. 2 above.

[3] This was suggested to me on reading about "a deerhorn handle rudely sawn at one end and rounded at the other, the sawing having been done from opposite sides," found in a Pict's house at Old Stirkoke—*Vide* Anderson, vol. ii. "Anthropological Memoirs," 1865–66, p. 231.

in the unfinished specimens, is removed, so that the plane of the base of the interdental notch is at right angles to the internal and external surface.[1] The grooves upon the bevelled portion are effaced by further bevelling, the margin of the teeth are rounded off, and the comb is ornamented or polished. The handle is hollowed out by means of shavings cut[2] away by a knife or some sharp-edged implement, and in some grinding seems to have been resorted to. In the Kettleburn Comb (fig. 3, p. 134) a straight line had evidently been cut before the teeth were made, on a level with the intended bases of the teeth, showing, probably, that these people mapped out the length of the teeth before they began to cut them.

Ornamentation of the Combs.—The ornamentation of these combs varies, and consists—1. Of single or parallel straight lines,[3] either running directly across the body of the comb, or crosssing one another, or both combined; found chiefly in broch combs. 2. Of concentric circles,[4] either grouped or distinct, sometimes confluent, as in those found in Roman camps. 3. Of parallel arranged zigzag lines, as in Kent's Cavern specimens. 3. Of carved figures, as in some which were got in Mexico, and are now in the British Museum.

The Rev. Mr Joass found in the Carn-liath Broch a comb,[5] in which the external surface possesses two arcs of a circle running crossways, the ends of each arc being at the margin of the surface, and their convexities facing one another, one arc being at the blunt end, the other at the dental end; between the extremity of one arc and the opposite end of the other arc, stretches a straight line, which is broken at its middle by a hole.

The ornamentation generally, but especially that of the *broch variety*, is on the convex surface of the handle, and more frequently grouped near the dental end. Exceptions do occur—for example, in the large Kettleburn Comb; and in No. II. of the Hillswick Combs (Pl. XIV. figs. 1 and 2) there is slight ornamental marking on the flat side also. I fancy, though I am not perfectly sure, that ornamentation on both sides is the rule rather than the exception, in the Roman camp variety, and those true

[1] For explanation, *vide* Pl. XVIII. figs. 1, 2, 3, and 4.
[2] Well seen by the markings on the handle, *vide* addenda.
[3] Pl. XIII. fig. 1, and Pl. XIV. figs. 1 and 2; also fig. 3, p. 134.
[4] Pl. XIV. fig. 3; Pl. XV. figs. 8, 9; also Pl. XVI. fig. 4.
[5] Pl. XVI. fig. 1.

long-handled combs of the Swiss lake dwellings. In the broch variety, in all the combs I have seen, the markings are more or less *rude* and *asymmetrical*, and they appear to have been made with a knife, for in some, but especially in the Hillswick Comb, No. II., the knife evidently has slipped whilst in the act of making a straight line, and another line has been made at an angle with the previous line. Again, in the above comb, where we have a series of three closely situated parallel lines, crossing one another diagonally, and these again between two series of three lines, which run transversely from margin to margin of the comb, in some of the series only two lines are present, and a faintly marked portion of a third. In another series it commences with four lines, but soon the fourth line is given up, as if it had been an abortive attempt.

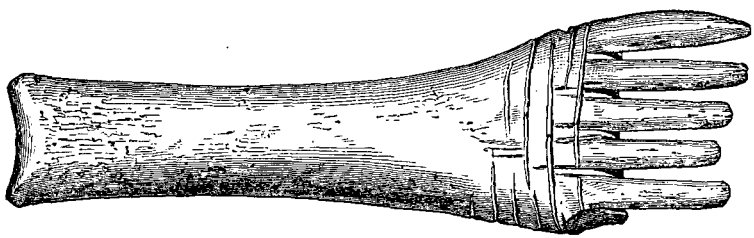


Fig. 3. One-half Natural Size.

In the Kettleburn Comb (fig. 3) it consists either of parallel lines running across the comb at right angles to its long axis, or of portions of such lines placed at irregular intervals. Where lines are present on both surfaces, they are not continuous one with the other, but appear to have been made distinct from the rest. The marks bear characters of a knife having been propelled backwards and forwards like a saw in making them.

Some of the broch combs possess here and there a coarse rude mark; one comb has on its smooth surface two shallow lines crossing one another, partly effaced. The variety whose surfaces are ornamented with dots and concentric circles occur chiefly in England, and universally in connection with the so-called *Roman camps*.

Addenda, comb 9.

Where Found.—As generally indicated in my preceding remarks, these combs have been found in brochs or similar buildings, in kitchen middens or shell mounds, in bone caves (as Kent's Cavern), and in chalk pits; and their characters differ with the character of the place where they were found.

Comparison with Analogous Implements.—The true typical long-handled combs do bear some resemblance to those at present in use among barbarous and semi-civilised tribes, such, for example, as the North American Indians, Hottentots, and the Eskimo. And laying aside the differences in finish and ornamentation, as being too difficult to determine what is peculiar to these tribes and what has been contracted by contact and intercourse with civilised races, we will consider their agreements and disagreements.

There are two forms of Eskimo combs, one in which the whole series of teeth converge from base to apex, the other in which they diverge, that is, the apicilar end of the dental portion is much wider than its basilar end. In the convergent teethed comb, which is by far the most common of the two, the teeth are larger and more tenuous, and the interdental notches are no wider between the apices of the teeth than they are betwixt the bases. The comb itself is thin, wide, and short, and its two surfaces are quite flat (*vide* Pl. XVII. figs. 13 and 14).

In the second variety of the Eskimo comb the body, the handle, and the tenuity of the teeth is the same, but they diverge so that the interdental notches are much wider between the apices than at the bases of the teeth. The interdental notches of the true or typical long-handled comb also diverge; but the teeth are not, as in the above cases, long, thin, and of equal thickness throughout, but possess the characters which I have before enumerated; then between the broch combs and these combs there is a great difference in the general form and in the characters of the body.

The combs in use among the North American Indians approach more in form those found in the Danish shell mounds. They are smaller in size, and comparatively narrower than the Eskimo combs. Mr Edward S. Stevens[1] refers to the likeness existing between these long-handled combs and some implements "in recent use by the Eskimo for scraping fat,

[1] Flint Chips, p. 64.

&c., from the backs of skins; the Eskimo tools are made of wood, with the sharp claws of birds lashed to them." He says,—"In the Christy Museum there are examples of these; in the same collection there is a Basuto tool, used for a similar purpose, the short thick teeth of which are of iron, bound to a wooden handle with twisted fibres." Here the likeness exists only in the general form; for, as before stated, the broch combs are made from a single piece of bone; whilst these are made, not only of different materials, but also of several pieces. The Society possesses one of the most typical Eskimo combs,[1] and the British Museum possess all the forms of the above combs.

Differences of a like nature to those subsisting between the Indian and Eskimo combs separate the Danish combs from the typical long-handled combs. Such as those found in the Danish shell mounds, and figured by Worsaaé.[2] Some of these are wide, and approach in character the ordinary Roman or Saxon single-margined combs; others are more allied to the Eskimo and Indian combs. The latter are chiefly bronze combs.

Professor George Stephens, in his grand work,[3] mentions and describes a bone comb which was found in a moss, along with some dozens of the same form. Then two bone combs were found at Ickleton and Chesterford, along with some Roman coins[4] (Plate XVII. fig. 12). Mr F. W. Wakeman,[5] in speaking of the Irish antiquities of the Saxon period, also mentions and figures several of the Irish combs; these are much ornamented. All the above combs are in general form and character of the teeth halfway between the Eskimo combs and the ordinary Saxon single-margined comb. In the museum attached to John Knox's house, in this city, are two wooden combs identical in general character with those figured by Stephens *ut supra*.[6]

[1] Proceedings, vol. v. p. 126; also Pl. XVII. fig. 13 of this paper.

[2] Afbildninger fra Det Kongelige Museum for Nordiske Oldsager, p. 15, fig. 63; p. 45, figs. 179–181.

[3] Old Northern Runic Monuments, Scandinavia and England, part i. p. 305.

[4] Archæological Journal, vol. vi. p. 17.

[5] Collectanea Antiqua, by Charles Roach Smith, Archæological Jour. vol. iii. p. 43.

[6] I am indebted to Dr John Alexander Smith for the knowledge of the above two combs. Where they came from is unknown, but it is supposed that they came from some of the tribes around Old Calabar.

Among the combs found in Swiss lake dwellings, those two figured by Keller,[1] in Pl. lxiii., may be looked upon as being more connected with the Eskimo combs than the typical long-handled comb, the only marked difference between them and the Eskimo consisting in the fact that they are made up of several pieces of bone, and the interdental notches are much narrower. The Moosedorf yew-wood comb,[2] the three bone combs found at Nussdorf,[3] and the bronze comb of Terramara,[4] also the cast[5] of a bronze comb figured and described by Keller, I regard as being intimately connected, both by general form, characters of teeth, and size, with the long-handled combs. Similarly, though much smaller in size, those combs mentioned by Madsen,[6] some possessing three, others four, others seven teeth, and of which he gives a figure of one,—these, too, must be looked upon as a variety of the long-handled form. Most of the above combs have evidence of use in the presence of small transverse grooves on the surfaces of the teeth, similar to what I pointed out as existing among many of the broch combs.

It may not be out of place to mention, that certain of the so-called back-scratchers have a certain resemblance to the broch combs; indeed, some bronze articles,[7] called by the above name, which I saw in the antiquarian department of Sir William Brown's Museum, Liverpool, are identical in general form and in their teeth to that comb which was presented to the Society by Mr Innes in 1783.

The typical long-handled combs have peculiarities in form and ornamentation, which are coincident, not only with the kind of place in which they were found, but also in their distribution. The English combs are as distinct from the Scotch combs as the latter are from the Eskimo.

[1] *Loc. cit.*, p. 229, pl. lxiii. figs. 6 and 15. (Worsaaé has also figured these.)
[2] *Loc. cit.*, p. 34, pl. v. fig. 21.
[3] *Loc. cit.*, p. 114, pl. xxviii. fig. 8.
[4] *Loc. cit.*, p. 299, pl. lxiii. fig. 7.
[5] *Loc. cit.*, p. 299, pl. lix. fig 9.
Vide also addenda of this paper, and Pl. XVII.

[6] Afbildninger, &c., *loc. cit.* part xiv. pp. 6 and 7; *vide* also Pl. XVII. fig. 4 of this paper.

[7] I am of opinion that these will turn out to be combs, if properly investigated, especially so, when one sees the marked difference between them and the back scratchers of the Japanese, the South Sea savages, and other barbarous tribes; indeed, the back scratchers of the South Sea savages are very like the Eskimo skin-scraping tool, or the Basuto implement.

I shall not enter upon the question of the relation of these combs to the single and double margined combs; let it suffice that I think they belonged in many cases to the same people, were used for different purposes. All the broch combs are similar in form to that I have detailed in the typical description. Those found in so-called Roman camps are more or less knobbed, and differ from the broch forms besides by having flat surfaces and sharp square margins; and *similar* differences exist as regards their ornamentation. It is rather a curious coincidence, that the same kind of ornamentation which is found universally on the Roman combs, viz., the dot and concentric circles, has been discovered to exist on many of the stones or slabs found in the Pictish brochs and houses, and yet, so far as I know, no combs with this ornament have ever been

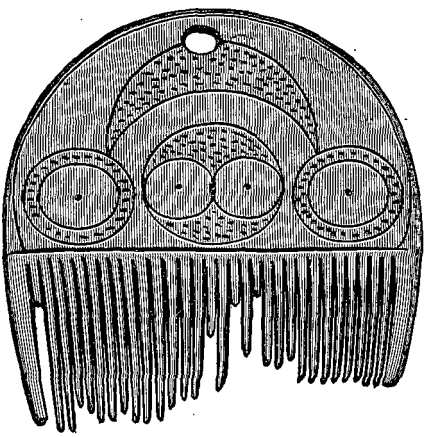


Fig. 4. Natural Size.

found in these brochs. Again, on not a few of the sculptured slabs of Scotland representations are present of double-margined combs, the domestic animals, birds, fishes, &c.; and the brochs, when excavated, yield the bones of the very same kind of creatures that are figured on the stones. But the coincidence goes still further, for Dr John Stuart points out, that on the sculptured slabs of Scotland "the geographical distribution of the symbols—the comb (fig. 4) and of the comb and mirror (fig. 5)—is as follows:—

	Comb.	Mirror and Comb together.
"Between Rivers Forth and Dee, . .	8	6
Between Rivers Dee and Spey, . .	7	7
North of Spey, ...	5	4
South of Forth, ...	0	0"

So likewise, to the best of my knowledge, all the typical long-handled combs of the broch form occur north of the Forth.

A great variety of uses have been assigned to these combs by various authors. Montfaucon thought they might have been used as instruments of torture. A glance at the general form and characters of the markings on the teeth of the combs will soon dispel so ferocious an idea. Nor has that very commonly thought opinion, that they were employed in dressing and ornamenting pottery, much more support than the weak legs of supposition to rest upon.

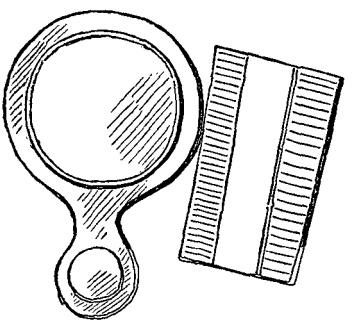


Fig. 5.

Again, by confounding them with those implements in use among the Eskimo, North American Indians, and certain of the South Sea savages, for taking off the fat from the inside of skins and furs, and which consist of an oblong piece of wood, having lashed to one end of it, in such a manner that they may project, three or more birds' claws, many have been led to believe that the long-handled combs were used for the same purpose.[1] That such is not the case, a careful consideration of what I have already said when comparing them with the above imple-

[1] Some of the implements used by the Fijians for this purpose are made of the teeth of animals lashed to a piece of wood from the cocoa-nut palm. Their back-scratchers are also like the above. Mr Williams, the missionary among the Fijians, mentions that "their priests possess as among the sacred insignia of their office, a long-toothed comb." I have shown some of these to the Society; they are made of several slender pieces of cocoa-nut wood, lashed together by fibres of grasses. Some are made from reeds. *Vide* Pl. XVIII. fig. 11.

ments; and to speak more dogmatically, I may mention that the two kinds of implements are so distinct in form and use from each other, that I only compared them so that I might not be accused of having overlooked them.

The Maories carry wooden combs about as mere ornaments, and some have even considered the long-handled combs were put to the same use. Such I doubt; but there is more probability in the opinion, that they were used for combing the shaggy locks of their owners, since combs allied to them and the common Eskimo combs were in use a few years back in reducing to order not only the hair of the living, but also the scalp locks of the slain warriors, while the scalps are undergoing the preparatory processes to fit them for decorating the person of the slayer. And I exhibit a photograph, *vide* Pl. XVIII. fig. 8, of a girl of the Seshaaht tribe, representing the manner in which such a comb is worn on the head. The females of that nation are evidently behind the age, while the females of our nation have become more than imitators of the practice in vogue by the simple Eskimo girl. That such an use is not improbable I do not deny, yet the other two uses which have been assigned to these combs seem to my mind more feasible, viz., either that they were employed in keeping disentangled the threads of rein-deer sinew whilst plaiting it, or for the combing of wool flax.

Dr Robert Brown, a well-known traveller among the Eskimo and the Indian tribes of North America, kindly gave me several facts about these combs in a letter, part of which I now copy:—"I am strongly inclined to believe that the use of this Shetland comb was to separate the strands while making sinew thread; the tendon, in order to make it, is steeped in water, then flattened out by beating, and the whole mass separated into threads by tearing out with a comb like this. This is the method in use among the Eskimo, the North American Indians, and indeed all tribes which now use sinew thread." "*The combs found in the Danish kjökkenmoddings*" [the italics are mine] "are to all intents and purposes the same as the Eskimo comb for separating the sinew threads; and to make the likeness more remarkable, at the base of the teeth could be distinctly seen the transverse markings caused by tugging the thread mass from side to side, in order to separate the fibres." But from a careful examination of the marks of wear on the teeth of the

long-handled combs, I think they were employed rather in combing fleece, flax, or hair, than rein-deer skein. The transverse marks on the surfaces of the teeth are not so wide nor so well marked as one would expect if they had been used to disentangle coarse sinew threads. Then, as Dr Brown remarks, not only the Eskimo combs, but all the Danish shell-mound combs, have these transverse marks of wear near the base, whilst in almost all the typical long-handled combs I have had the opportunity of examining, these marks are nearer to the apices than otherwise; and, according to sketches, such seems to be the case in that one figured by Madsen, and in several of the Swiss combs. In the former case, the threads being in the water, there was nothing to oppose the thrusting of the comb well down among the thread mass, since there would be little fear either of damaging the teeth or of scraping them against any hard substance; but in the latter, whether the comb was used for combing wool, flax, or hair, it is quite evident either that care was taken not to bury the teeth too deeply in the material, or that such material was not in sufficient thickness to allow the teeth to become immersed up to their bases, and the points of the teeth, if opposed to anything, it must have been some soft substance.

The marks on the long-handled combs, however, make it apparent that, whatever was the material used, it was of sufficient length to allow it to wind round each tooth, so that in some cases, if the comb had been employed much more, the ends of some of the teeth would have been cut off from wear. From the results of experiments I have made with combs on wool, from the fineness of the transverse grooves of wear on the teeth, from the position of such grooves, and from the microscopic anatomy of wool, I am inclined to favour the idea that these combs were used chiefly for combing or carding wool or fleece.

Nor is hand-wool combing new, for Mr Joseph Anderson pointed out a passage to me in the Senchus Mor, the ancient laws of Ireland, in which the following words occur:—"For the wool bag, *i.e.* the bag which she has at her pes, *i.e.* foot, out of which she combs the material, that is, the combing bag." But in connection with this it should be remembered that no combs of the long-handled form have yet been found in Ireland, and the only combs approaching this form are some which resemble those got by Stevens from a moss in Denmark. Again,

Archbishop Potter, in his "Archæologia Græca," says, that Julius Pollux enumerates at great length the furniture and utensils of the Grecian women's lodgings, among which are instruments for spinning and weaving, baskets for the wool measures (ἀγνυθὲς, or the λεῖα), *a comb* (ξάνιον), a card for combing wool, &c.

Among the many interpretations of the comb symbol on the sculptured slab stones is that in which it is said to indicate that a wool-comber sleeps below. The older Latin dictionaries of about the sixteenth century afford additional evidence that combs were used in weaving. Thus we have "*Carmĭnare, to comb, or card wool; to heckle flax or hemp.*" *Pecten lanaris, a weaver's slay; a wool-comb; a wool card; a hatchel.*" "*Carpĕre lanam, to comb wool,* &c." Macaulay, in his "Lays of Ancient Rome," tells how Virginia warbled the lines of the good old song—

> "How for sport the princes came spurring from the camp,
> And found Lucrece combing the fleece under the midnight lamp."

In concluding, allow me to state, that the study of these combs points plainly to the facts—

1. That the Romans, the broch dwellers, and the inhabitants of the Swiss lake habitations, used tools possessing a remarkable similarity in form and make, and probably for the same purpose, whether or not this similarity was produced by other things, than that all were subjected to similar conditions of life, and consequently compelled to resort to similar methods and to similar tools, it is difficult to say.

2. That at least in the make of these combs, the Roman can scarcely be said to be better than the broch dweller; for although the Roman combs, both by their general finish and their special ornamentation, indicate generally the use of more complex instruments, and probably of a higher grade of intelligence to produce them; yet there are some of the broch specimens, which, if ornamental forms and marks be left out of the question, are equally as well formed and quite as well finished as the Roman combs; not that I wish to say the broch dwellers were wanting in æsthetic culture, but that their idea of symmetry and beauty was marred evidently by want of proper instruments to exhibit it objectively.

3. That the varieties of these broch combs, both as to form, finish, and

rudeness, may be due either to successive generations occupying the brochs at different times, as is shown by many of the finds to have often been the case, or to different classes occupying the broch at the same time.

4. There can, however, be no doubt of the fact that, to produce these long-handled combs, and also double-margined combs with rivets of iron, or single-margined combs with handles like that found at Kettleburn, there must have been some of the generations who possessed greater manipulative skill and more delicate instruments than what the explorers of brochs have yet discovered, or we are in the habit of giving them credit for.

And just in the same way that our past ideas of the progress these people had made in the arts of life required modification, it may be subsequently found that the intellectual acquirements and accomplishments of the broch dwellers were neither so few nor so simple as has hitherto been supposed.

I am sorry that excess of my ordinary duties and ill health together prevented me using up all the material I have by me, and completing the paper as I wished, but I hope to do that by a future day.

For very kind and copious replies in return to my queries, my gratitude is due to the following gentlemen:—Robert Brown, Esq., Ph.D., F.R.G.S., Edinburgh; A. W. Franks, Esq., A.M., &c., of the British Museum; the Rev. George Gordon, LL.D., Cor. Mem. S.A. Scot., Birnie; Rev. Mr Sutherland of Northmavine, Shetland. For the loan of sketches—Rev. Mr. Joass, Cor. Mem. S.A. Scot., of Sutherlandshire; George Petrie, Esq., Cor. Mem. S.A. Scot., Kirkwall. And for assistance in obtaining the materials from the kitchen-midden—Mr John Anderson, merchant, Hillswick.

ADDENDA.

Notes of the Combs in the Society's Museum.

Comb 1.

Long-handled Comb found in ruins of a *Pictish* broch in Caithness, by G. Innes, Esq. in 1783. Form of handle usual, except body much constricted, and ends in a knob. Made from a long bone. Ornamentation none. Scratches, as if from gnawing, on convex side. Length of comb, $4\frac{1}{4}$ in.; girth at dental end, $3\frac{3}{4}$ in. Diameter of knob, $1\frac{5}{8}$ in; girth at constricted part, $1\frac{3}{4}$ in. Teeth, 8 in number—5 present, 3 partially broken; set obliquely to axis of comb. Length of teeth, $\frac{7}{8}$ to 1 in., middle ones longest. External teeth usual form. Interdental notches, $\frac{1}{3}$th in. wide. Cutting grooves at bases. Indication of a narrow instrument having been used. Borders of teeth near bases have marks of wear (Pl. XIII. fig. 3).

Comb 2.

Comb of Burgh of Burgar, Evie, Orkney, 1825.—*Vide* Archæologia Scotica, vol. iii. 1831, p. 44, pl. v. fig. 3. Found along with human skeleton and part of a deer's horn. Made of horn, typical in form. Length, $4\frac{1}{8}$ in.; girth at most constricted part, $2\frac{1}{4}$ in.; at dental end, $3\frac{1}{4}$ in.; at blunt end, $2\frac{3}{4}$ in. (barely). Ornamentation (*vide* fig.). Teeth, 9 in number; typical in form. Length of each, $\frac{5}{8}$ in.; have marks of wear on exterior (Pl. XIII. fig. 1).

Comb 3.

A. H. Rhind's Kettleburn Comb. One side convex, with ornamental marks; other concave at dental end and cancellated; made from a long bone. Length, $6\frac{1}{4}$ in.; girth at dental end, $4\frac{1}{2}$ in.; at blunt end, $2\frac{1}{4}$ in. (*good*). Teeth, 6 in number; an external one is broken away; they are large, clumsy, and wide apart; remaining external one is longest. Cutting grooves at bases. One of cutting grooves passes through one of the transverse ornamental lines. Ornamentation on convex side has near dental end two complete transverse lines and six incomplete ones. Internal concave surface has two; one complete near the teeth, and another at a little distance incomplete. Stone vessels, implements, bronze tweezers, iron weapons, &c., found along with it; also next comb. Proceedings, vol. i. pp. 264 and 269; and vol. ii. p. 134. *Mems. Anthropolog.* Soc. vol. ii. p. 227. Archæolog. Jour. vol. x. p. 223, contains Quekett's examination of bones found at Kettleburn. He says, "This comb, and some spheriodal bone balls which were found along with it, were formed from the lower jawbone of a whale; several small portions of whose osseous structure were likewise found in an unmanufactured state. (*Vide* woodcut, fig. 3, page 134).

Comb 4.

Same references as last comb. Found at Kettleburn, by Benj. Neeve Peach in 1854, in a Pictish broch. Body has a constricted middle, and a fish-tailed distal end. Made of long bone of some animal. Compact wall of bone = convex surface. Cancellated texture = concave surface. Very little cancellated texture left. Length, 4⅛ in. Distance between lobes at distal end, 2 in. Girth at dental end, 3½ in. All the teeth except one broken away. From characters of stumps interdental notches are wide (Pl. XIII. fig. 2).

Combs 5, 6, 7, and 8.

Found by James Farrer, Esq., M.P., in the broch of Burray, Orkney, along with a portion of a double-margined comb. Among other articles found were stone implements, body of vertebra of a whale hollowed, bone scoops, bones with holes drilled through them, bone pin, part of a bone wheel, and part of lower jawbone of a whale.—Proceedings, vol. *ii.* p. 6; also p. 157.

Comb 5 (these numbers are affixed to combs in Museum). This is a very rough and rude comb, made from shaft of a deer's horn, which is naturally grooved longitudinally, is rounded and rough bevelled at the dental end from one side; is a tyne obliquely cut. Extreme length, 4⅞ in. Girth of body, 4⅛ in.; at distal end, ditto; at dental end, 3¾ in. Teeth, 9 in number, short and wedge-shaped; broad at base or attached part, with a free round apex; hardly ¼ of an in. in length grooves of cutting well seen. Teeth present near apex; transverse shallow grooves as if worn; but in an indifferent state of preservation (Plate XV. fig. 1).

Comb 6. Better finished than Comb 5. Made of horn, also grooved longitudinally; from roundness and size most probably red deer. Extreme length, 6 in.; girth of body and end, 3¾ in.; girth at bevelled dental end, 3¾ in. Body is round, not constricted; dental end an oblique section made from one side to the other; cancellated structure coarse; and the compact, thin. Teeth irregularly cut, do not possess any transverse marks, but cutting grooves, seen on the surfaces of the handle for an inch or more, are 11 in number (Pl. XV. fig. 2).

Comb 7 is round, and made from horn. Length, 4⅞ in.; girth at body and end, 3⅛ in.; girth at dental end, 3¼ in.; it expands near dental end slightly. Bevelled in a similar way to 6 and 7. Teeth, 10 in number; 6 present, rest broken; teeth are sharp, from cancellated texture having been worn away. Surfaces of body bear marks of cutting (sluices have been shaved off). Dental surface has a transverse ornamental mark (Pl. XV. fig. 3).

Comb 8. Made of horn, longitudinally grooved. Length, 4½ in.; girth between the ends, 2⅜ in.; at tail end, 2¼ in.; at dental end, 2¾ in. External surface of comb smooth; internal surface rough (cancellated). Comb tapers from teeth to distal end. Teeth, 7 in number—4 present, 3 broken—are narrow and tenuous. Cutting grooves present to the extent of 1 in. Transverse marks of wear near the apex of teeth (Pl. XV. fig. 4).

COMB 9.

Made of bone, probably whale. External length, 6 in.; girth at constricted part, 2¾ in.; girth round dental end, 4 in.; tail end, 3¾ in., expanded. Comb has both surfaces flat, margins rounded, one smoother than the other; tail end notched obliquely. Teeth, 7 in number; vary 1¼ in. to 1⅜ of an inch in length; average 1 in. in girth; are flat, strong, and parallel; central teeth longest; interdental notches wide. Smooth surface of comb has near dental end two lines crossing one another; these are pretty broad and shallow. Not known where found (Pl. XIV. fig. 5).

COMB No 10. Proceedings, vol. iii. pp. 122, 124.

Gordon's Comb, found in a circular building at Uist, made of horn, grooved in longitudinal direction; length, 4 in.; girth at one end, 2¼ in., diverges to 4¾ in.; hole, ¼ in. in diameter, near distal end. 8 teeth, which diverge very much; teeth, ¾ in. long; girth of teeth at base, ⅝ in.; all taper to a point. All teeth rounded; interdental notches wide ⅛ to ¼; teeth present transverse markings near apex; one of teeth evidently constricted as if a twine had often wound round it. The comb possesses the same curve as the tyne it has been made from. Among things found were—a copper needle, formed of wire, and an eye through it near one end; a quantity of deer's horns; a human thigh bone; thirty or forty vertebræ of whales flattened and marked, eight cut; a bone article, flat at each end and round in the middle, 8 or 9 in. long (lost); bone lid of a small box; six large black stone dishes, all about 2½ in. thick, and varying from 1 ft. 8 in. to 10 in. in diameter (Pl. XIII. fig. 4).

COMB No. 11. HILLSWICK (No. 1).

Typical in form; 5 in. long; girth at dental end, 3½ in.; at tail end, 3⅝ in. Teeth, 10 in number; middle ones longest, have marks of wear near apex (Pl. XV. fig. 11).

COMB No. 12. HILLSWICK (No. 2).

Typical in form, but ornamented; 5½ in. long; girth at tail end, 3 in.; at dental end, 3⅝ in. Teeth have been 14 in number, only 4 remain; length, ⅝ in., set close together with very narrow interdental notches. Evidences of the handle having been cut by an instrument like a knife are seen. On convex surface of handle are the ornamental lines depicted in Pl. XIV. fig. 2. Some of these series of lines commence with four, but two invariably run into one another, and only three lines are seen on coarse inspection. The rough flat side of handle has, within three lines of the bases of the teeth, a complete broad transverse mark, evidently made with a coarser instrument than the other lines. Between this and bases of teeth is found another coarse groove, only running about ½ in. through from the margin of the comb (Pl. XIV. fig. 2).

COMB No. 13. HILLSWICK (No. 3).

Is made of bone. More flat, and possesses coarser teeth than rest of Hillswick combs, of which it is the third. Handle oblique as regards teeth; its distal end,

concave, is uneven, and not cut at right angles to axis of handle. Length, 5¼ in.; girth at distal, 4 in.; at dental, 4½ in. Teeth, probably 13 in number; marks of 10 left, 2 only unbroken, these ½ in. long. Remnants of teeth show that they must have been set obliquely, and irregularly as regards handle, not parallel like the iron bars in a palisade railing, but some pointing in one direction, others in a slightly different, and not of uniform thickness. Cutting grooves well seen. This comb is remarkable from its appearance and a comparison with other combs; also bearing in mind it was found with three typical and well-finished combs, I am almost tempted to theorise concerning its production. In the first place, whether from necessity or voluntarily, an oblique splinter of bone seems to have been selected. The fabricator of the comb failed first in the parallelism of the teeth; second, in the parallelism observed between apices of teeth on the one hand, and margin of distal end on other. Then the margins of the handle are not equally hollowed out. Can it indicate the work of a beginner? or was it intended for one of the lower classes of that age? (Pl. XV. fig. 10).

Comb No. 14.

Fourth of Hillswick lot, also the largest. Typical in form, except distal end slightly thickened, 6¼ in. long; girth at distal, 4. in.; at dental, 4¼ in. Teeth, 16 in number (largest number yet found in any broch comb). They are ⅝ in. in length; only 4 are complete, and these exhibit easily seen transverse marks of wear near apex. Handle of comb has marks both of old and recent shavings. Near dental end on flat surface is a deeply cut groove. Sections of this comb were made and examined microscopically, and showed well the histological characters of bone, especially resembling that of whale (Pl. XIV. fig. 4. Dotted line at side of plate marked *a—b* indicates length of this comb).

Stuart's Comb, No. 15. Proceedings, vol. vi. pt. ii. p. 402.

Made of bone. Body, typical in form; both sides are slightly convex, one side especially smooth and polished; this surface also presents the appearance of having had very thin slices cut off it here and there, and then these cut surfaces polished. There are one or two other abrasions of this surface that are evidently of more recent production. Length of comb, ¾ in. Teeth, 14 in number, short, thin, flattened from side to side, and well finished at their bases. Average length, ½ in., though some are much shorter; 5 entire ones only remain, 3 of which stand in series, and are of different sizes, so that the 8th tooth from one side (or 7th from the other) is shorter than 7th tooth on same side (6th on the other), so likewise the 7th is longer than 6th (or, if we count them from the other side, the 6th than the 5th). No cutting grooves are present, nor are there indications of them ever having been present and then effaced; but there are lots of transverse grooves of wear present in the teeth that remain, and the stumps of the broken ones; these are especially found on the outside of the only external tooth that remains, no traces of such grooves being seen on the opposite or internal lateral surface of such tooth, and as regards the remaining teeth and the stumps, they are not only worn more on one

side, but have these grooves of wear only on the same lateral surface as the outside tooth, very few grooves of wear being seen on the opposite lateral surface. These grooves are present in greatest number nearer the bases of the teeth than the apices, and are best marked on the margins, which are between the polished surface of the comb and the lateral surface; in other words, on the part of the teeth in which the compact harder bone tissue is found. This points to a view that I have regarding these combs when used, viz., that the compact or hardest part of the comb is that which has been opposed to the wool or flax (Plate XVIII. fig. 5).

PETRIE'S COMB, No. 16.

Body typical in form; distal end approaching fish tail form; one lobe broken away; surfaces flat. Margins of handle have appearances of having been sliced or shaved in manufacture of comb, especially so near dental end. Teeth broken away from stumps; it is evident they have been 8 in number, irregularly cut, of various thicknesses, and were cut chiefly from one surface of comb, from cutting grooves being found only on one side, and the characters of these grooves themselves. Two stumps, one belonging to an external tooth, and the other belonging to one of the central set, have transverse grooves not produced by wear; this is the only comb on which I have seen such cuts on the lateral surfaces of the teeth; they are much deeper, and possess all the characters of a cut, as distinctive from a groove of wear (Pl. XV. fig. 6).

COMB No. 17. D. BALFOUR, Esq.

Is made of bone. Is remnant of a very strong comb, 6 in. long. Handle has one of its margins, and some of the teeth, broken away. Seven long, clean, and very strong teeth remain. Interdental notches comparatively narrow, but clean. Teeth 2 in. long. Dental surface has a sharp, transverse line at very bases of teeth. Handle hacked and shaved, especially its remaining margin. Any one examining this comb would never for a moment doubt that its teeth had been cut by a saw (Pl. XV. fig. 5).

COMB No. 18. ROMAN CAMP COMB.

Found, along with an iron dart-head, in a "Roman Camp" at Hamhill, Somersetshire, by J. F. Irvine, Esq., F.S.A. Scot. (Proc., vol. vii. part ii. p. 424). Made of horn; $6\frac{1}{2}$ in. long; girth at dental end, $2\frac{5}{8}$ in.; round the body, $2\frac{1}{4}$ in. Handle long and narrow; margins very round; ends by a knob at blunt end. Teeth, 10 in number, 4 perfect only, $\frac{3}{8}$ inch in length, with sawing marks present. At base of teeth is a transverse line, which appears to have been the guiding line in cutting the lengths of the teeth (*vide* Pl. XIV. fig. 3).

COMB No. 19. ESKIMO COMB. Proc., vol. v., page 126.

From Repulse Bay, Hudson's Bay, lat. 66° 22′. Handle and teeth almost equal to one another in length; handle is almost square, margins or sides of square being concave. Both surfaces are smooth. Has 12 teeth. Each tooth, except the exter-

nal ones, is long, and slightly narrower at apex than at the base. Point is bevelled from surface to surface. Margins of teeth have been shaved off. Marginal teeth much thicker and stronger. Bases of teeth mostly without groove of cutting. Middle teeth longest, not because they project beyond the others at end, but because the line of the bases is concave. Teeth converge, hence more difficult to cut the comb. At end of handle bone is cut in form of a small ring, by means of which it may be hung. Diameter of hole, ¼ in. Handle ornamented like panel of a door. Comb evidently a new one, and possessing no traces or marks of wear (*vide* Pl. XVI. fig 3).

EXPLANATION OF PLATES.

Plate XIII.

Fig. 1. Evie Comb, No. 2 addenda. Typical.
Fig. 2. Peach's Fish-tail Comb, No. 4 addenda.
Fig. 3. Innes's Comb, No. 1 addenda.
Fig. 4. Gordon's Comb, No. 10 addenda. This comb is like the Kent's Cavern specimens, according to description in Brit. Association Reports.

Plate XIV.

Fig. 1. Part of Hillswick Comb, No. 12 addenda. Smooth surface.
Fig. 2. Part of Hillswick Comb, No. 12. Rough surface.
Fig. 3. One form of so-called Roman Camp Combs, No. 18 addenda.
Fig. 4. Part of Hillswick Comb, No. 14 addenda.
Fig. 5. Part of Comb, No 9 addenda.

Plate XV.

Figs. 1, 2, 3, and 4 refer to Farrer's Combs, No. 5, 6, 7, and 8 in addenda. Fig. 1 exhibits very well the cylindrical form of their handles.
Fig. 5. Balfour's Comb, No. 17 addenda.
Figs. 6 and 7. Petrie's Combs. Fig. 6, No. 16 addenda. Fig. 7 is from a sketch by Mr Petrie.
Fig. 8 is the Speltisbury (Dorset) Roman Comb in British Museum.
Fig. 9 is the Danebury (near Stockbridge, Hants) Comb in British Museum. Figs. 8 and 9 from rough sketches by Aug. W. Franks, Esq., British Museum.
Figs. 10 and 11. Hillswick Combs. Fig. 10, No. 13 addenda; fig. 11. No. 11 addenda.

Plate XVI.

Figs. 1 and 2. Carnliath Combs. From sketches by Rev. Mr Joass.
Fig. 3. Eskimo Comb, one variety. *Vide* addenda, Comb. 19.
Fig. 4. Is a Roman Camp form, in British Museum; where got unknown. From a sketch by Mr Franks.

Plate XVII.

Fig. 1. Bone Comb.
Figs. 2 and 3. Bronze, Worsaae. *Vide* p. 136 of my paper.
Fig. 4. One of Madsen's Combs. *Vide* pp. 125 and 137 of my paper.
Fig. 5. Yew Wood, Moosedorf.
Fig. 6. Bone, Nussdorf.
Fig. 9. Bronze Comb.
Fig. 10. Cast of Bronze Comb.
} Keller's. *Vide* p. 136 of my paper.
Figs. 7 and 8. Bone, Keller's. *Vide* paper, p. 136.
Fig. 11. Schoolcraft's Indian Comb, made of wood. Schoolcraft, part iii. p. 468, pl. xxxv. fig. 2, from Oregon tribes of Columbia Valley. *Vide* also fig. 1. Hume ("Antiquities of Sea Coast of Cheshire") gives much interesting information concerning these combs, and figures several.
Fig. 12. Ickleton Comb., Archæolog. Jour., vol. vi.
Fig. 13. Eskimo Comb, in possession of Society. *Vide* p. 135 of this paper.
Fig. 14. The other form of Eskimo Comb, p. 135.
Fig. 15. Stephens's Moss Comb. *Vide* p. 136.
Fig. 16. Profile view of one of its teeth.

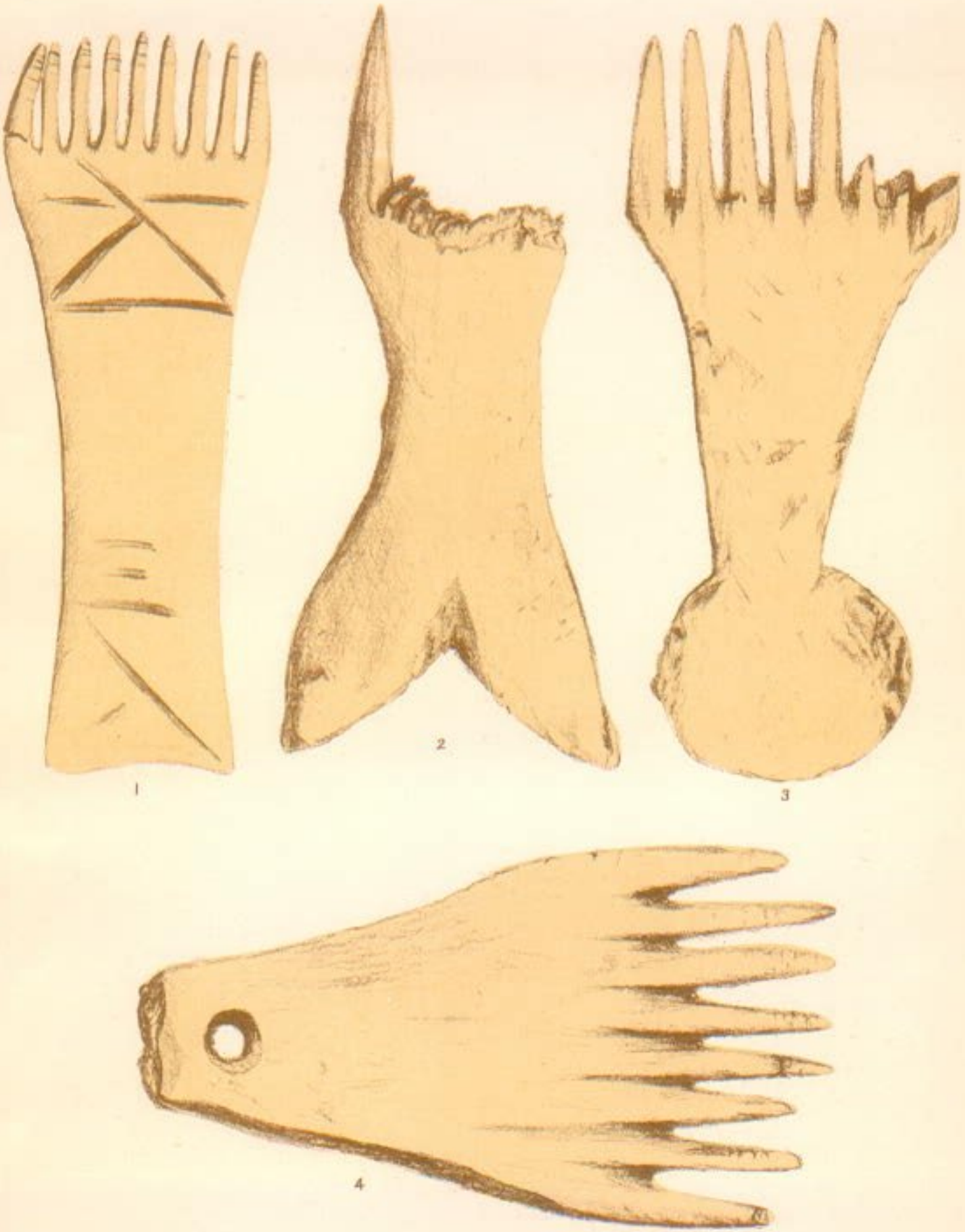
Plate XVIII.

Fig. 1. Diagram to show profile view of a section of well-finished comb.
a, Transverse grooves of wear.
Fig. 2. Diagram exhibiting a profile view of badly finished combs.
a, External surface of comb or tooth.
b, Internal surface of comb or tooth.
c, Lateral or opposing surface, exhibiting—
d, A small conical piece of bone at base of tooth, which is absent in well-cleaned and finished specimens.
e, Oblique saw marks on side of tooth.
f, Sawing grooves of bevelled part.
Fig. 3. Diagram of teeth of an unfinished comb, exhibiting, with clogged teeth—
a, Sawing grooves on bevelled part.
b, Marks of wear.
Fig. 4. Typical and well-finished teeth and interdental notches.
a, Marks of wear.
Fig. 5. Stuart's Comb, No. 15 addenda.
Fig. 6. Pompeian Bronze Comb. *Vide* fig. 12.
Fig. 7. Bowermadden Bow-handled Comb. *Vide* Mr Joseph Anderson's paper in "Archæologia Scot.," vol. v.
Fig. 8. From a photograph of "Fontana" (The Lightning), a Seshaaht squaw, a tribe on the western shores of Vancouver's Island. Exhibits the flattened forehead, and an Indian comb, as worn *in situ*.
Fig. 9. From photograph of Tabitha Propert, a North Greenland girl. Exhibits Eskimo mode of dressing the hair.

Fig. 10. A portion of a comb found on the shores of Cheshire. *Vide* Hume's work.

Fig. 11. A Fijian Priest's Comb.

Fig. 12. A Bronze Pompeian Comb. Ceci Piccoli Bronzi del Museo Borbonico. Tavola viii. figs. 49 and 50. I would class them with single-margined Saxon combs.

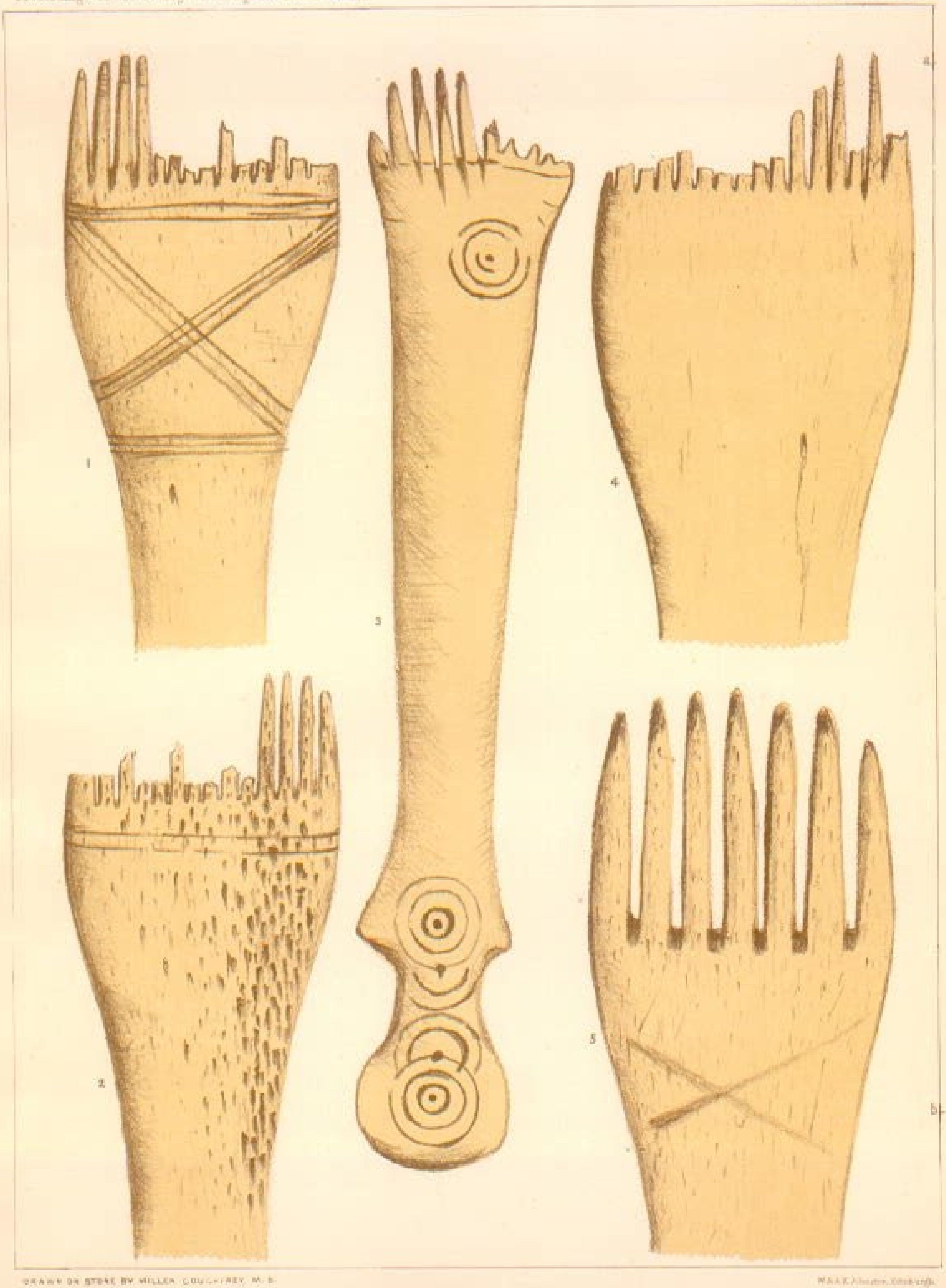


DRAWN ON STONE BY WILLIAM GIBBONEY, M. S.

W. & A. K. Johnston, Edinburgh.

LONG-HANDLED COMBS

(Actual size) p. 149.

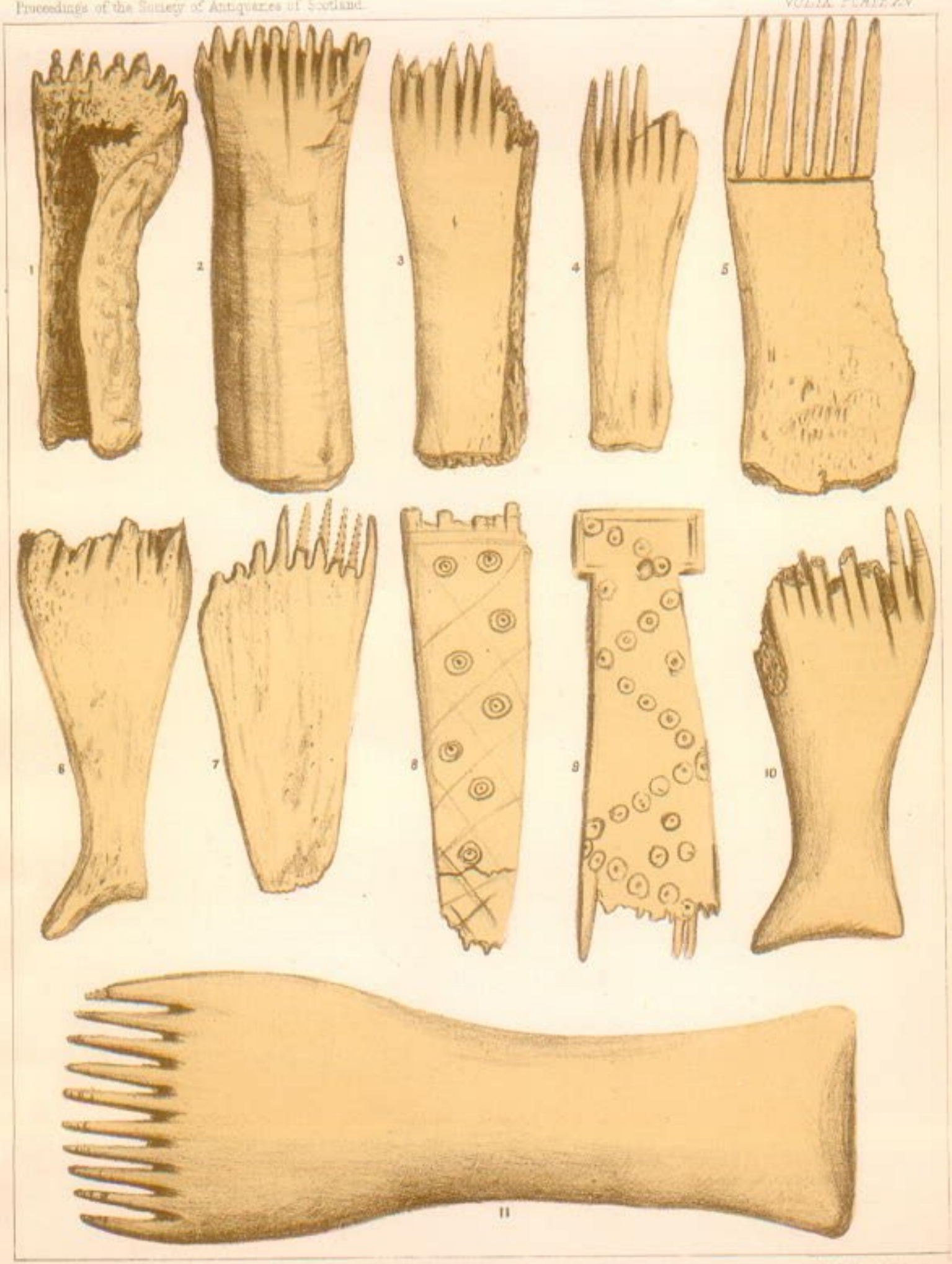


DRAWN ON STONE BY MILLER CHRISTY, M.D.

W & A K Johnston, Edinburgh.

LONG-HANDLED COMBS.

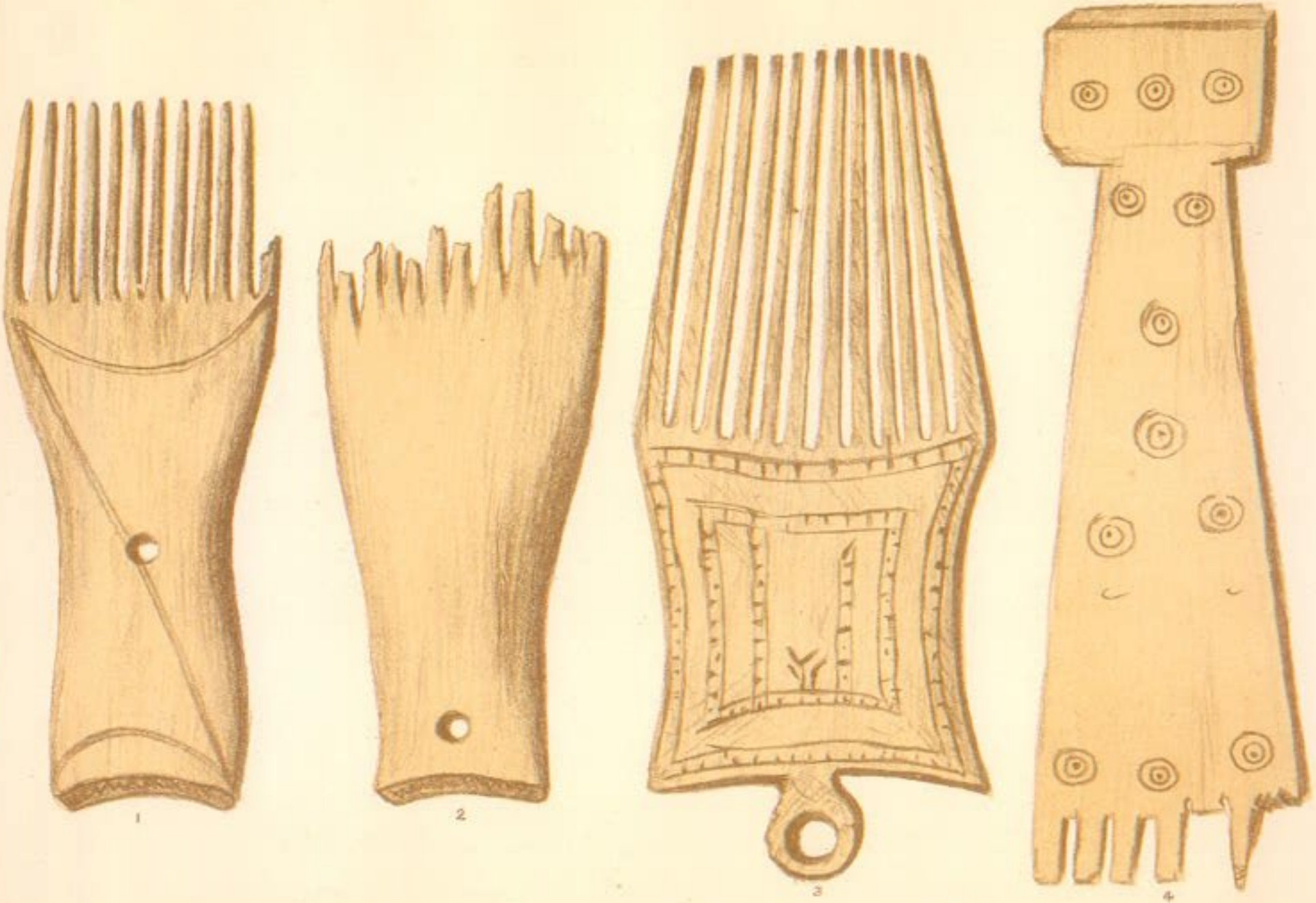
(Actual size.) p.149.



DRAWN ON STONE BY WILLIAM COUGHTRIE, M.S.A.

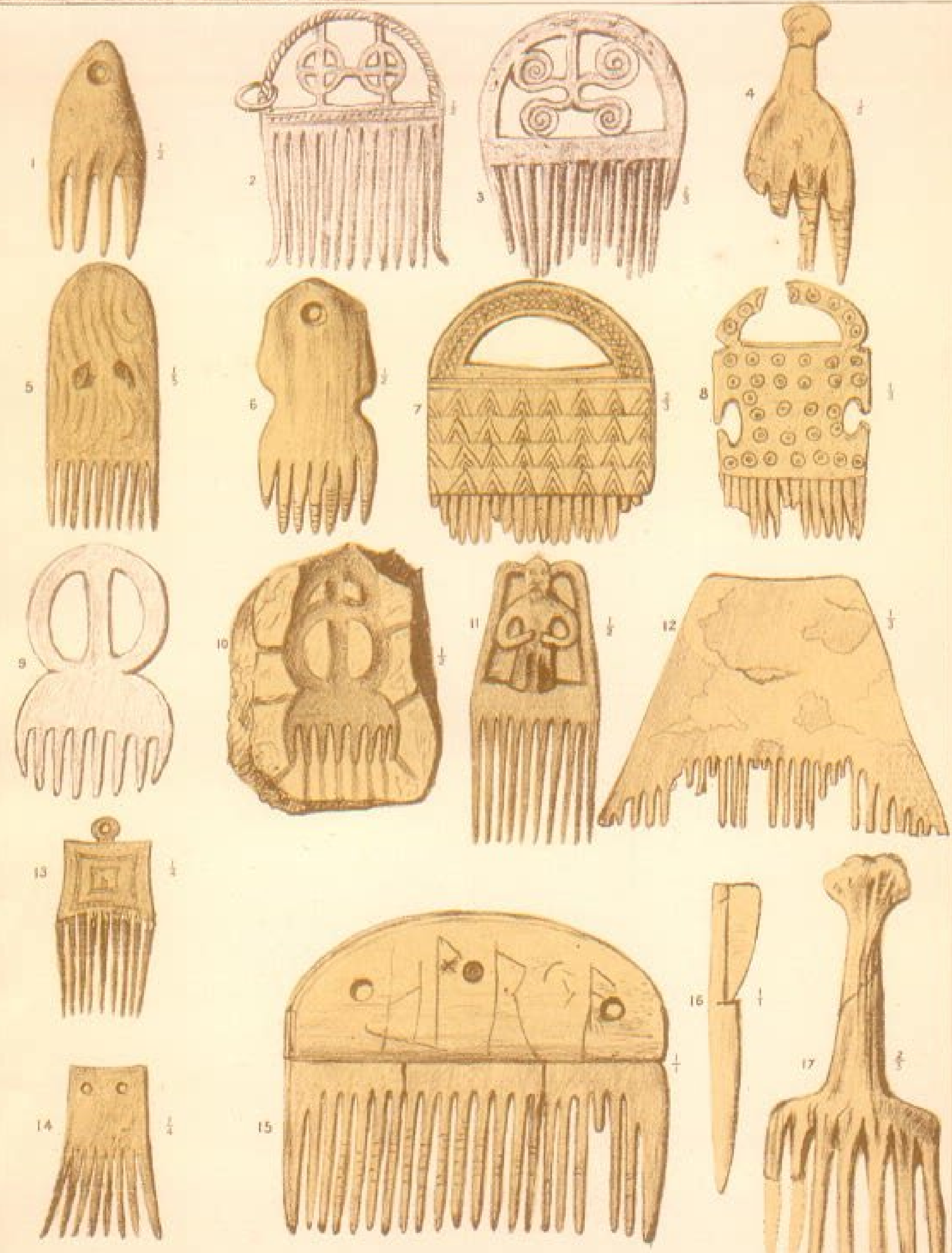
LONG-HANDLED COMBS.

(1 to 10 about ½ — 11 Actual size) *p 149*



DRAWN ON STONE BY MILLEN COUGHTREE, M. S.

BROCH, ESKIMO AND ROMAN COMBS.



DRAWN ON STONE BY MILLEN COUGHTREY, M.B.

W. & A. K. Johnston, Edinburgh.

SWISS, DANISH AND ESKIMO COMBS (p. 150)
(Fig. 17 from Madsen)

DRAWN ON STONE BY MILLEN COUGHTREY, M.B.

COMBS, ETC.

p. 150