CONTENTS

THE MAMMALIAN BONES

Mary Harman

The condition of the bone was variable; a few pieces were quite well preserved but most were badly eroded and broken, and less than half the pieces were identifiable. One cattle tooth root came from level 4 in the kerb cairn; almost all the remaining stratified bones came from level 6 under the kerb cairn, and were recovered from some forty-two separate plotted contexts.

Many pieces of human bone were found scattered in level 6 (illus. 6 shows the position of the larger pieces; these are interpreted as the remains of the body buried in the short cist, which were disturbed when the corbelled cist was cut through the earlier grave). The pieces included fragments of the skull, mandible, vertebral arches and possibly the ilium; shaft fragments from the humerus, ulna, radius, tibia and fibula; and two phalanxes. Another human phalanx was found in level 2. There is nothing to suggest that the pieces found belonged to more than one individual. All were the bones of an adult, and the size of some pieces suggests they were from a person who was not slightly built. Human teeth from the same context, and probably from the same individual, are discussed below by Dr Lunt.

A few cattle bones were identified among the other fragments from level 6: both deciduous and permanent teeth, a carpal and two metacarpal fragments, representing more than one animal. Some of the long bone shaft fragments found were not human.

KNEEP, LEWIS. Bones: all except 13 and 46 from level 6.

2. Cattle 1 upper molar, in wear.

3. Several fragments ? long bone shaft large animal.

4. ? Cattle part R calcareum, almost certainly.

5. Several fragments long bone shaft large animal.

7. Cattle tooth root fragment, probably molar.

8. Human phalanx, part, also few tiny ? skull fragments, ? animal.

10. Human humerus shaft fragments.?

11. Human fibula shaft fragment.

12. ? 3 small fragments.

13. Cattle 1 deciduous molar - upper. Level 5.

14. Long bone shaft fragment. Large animal.

16. Cattle part distal end of shaft of metapodial. DNF. fits piece in 40

17. Few small long bone shaft fragments. thin. ? sheep. ? human.

19. 2 bone fragments. ? similar to 21.

20. Few small long bone shaft fragments?

21. 2 flattish bone fragments. look like outer surface of ilium. from human pelvis, probably. Human part ulna shaft.

22. Several small long bone shaft fragments.

23. Probably human - part of proximal end of shaft of L tibia. Could possibly be cattle but human more likely.

24. Few long bone shaft fragments - large animal.

25. Human fragment metatarsal shaft.
? Cattle part distal end phalanx.
3 other fragments. one part of a vertebra.

26. Cattle carpal.

28. Human. Vertebra arch fragment. Probably thoracic.

29. Human proximal end of humerus shaft.

30. Several fragments. ? possibly fragments human collar bone (clavicle).

31. Several fragments, 1 long bone shaft.

33. Human tibia shaft fragment - distal end of shaft.

34. Several long bone shaft fragments, small.

35. ? few small fragments.

36. Few long bone shaft fragments.

37. Human, part cervical vertebra arch. 10 vertebral fragments - articular facets from arches.

Several long bone shaft fragments.

39. Human, skull, part R temporal, glenoid fossa and beginning of zygomatic arch.

Human, long bone shaft fragment. ? radius or possibly fibula.

Cattle tooth 2 upper molars in wear.

Several ? skull fragments and long bone shaft fragments not identifiable.

40. *Cattl[illegible] [illegible]carpal part proximal end and shaft.*

Part distal end of metapodial shaft. DNF. fits piece in 16

41. Human, mandible part L horizontal ramus.

Several long bone shaft fragments. ? largish could be human.

42. Long bone shaft fragment, large animal, almost certainly not human.

43. Human, 4 fragments vertebral arches.

L humerus part shaft - distal half of shaft.
Rib fragment.
Many long bone shaft fragments.

44. Human radius shaft fragment.
Several long bone shaft fragments, largish, probably human.

46. Human phalanx, level 2.

56. Cattle, tooth root.

57. Fragment.

58. *Human, skull - one petrous temporal.*
mandible - coronoid process.
vertebrae - 6 arch fragments.
metapodial shaft.
Many long bone shaft fragments, possibly human.

59. Many long bone shaft fragments, 1 near end. Nothing certain. ? could be human humerus distal end fragment. Largish long bone shaft fragments.

60. Long bone shaft fragments, part tooth - probably cattle molar.
(Fragments of a number of different bones - collection of anonymous splinters, really).

61. Several long bone shaft fragments, skull fragment, from ? pig. Uncertain.

65. Human phalanx.

HUMAN TEETH

Dorothy A Lunt

The seven teeth recovered at excavation have been identified as follows:-

one maxillary canine (3)

one maxillary premolar (4)

two mandibular premolars (45)

tree mandibu: ır molars (86/6)

None of the teeth is duplicated, and while it is impossible to prove that they derived from the same dentition, there is no evidence to suggest that more than one individual is involved.

The amount of attrition exhibited by the molars corresponds to that shown by individuals aged between 36 and 42 in the Anglo-Saxon population studied by Miles, and an age at death of c. 35-45 may be suggested for the person buried at Kneep.

The teeth show quite marked post-mortem changes in the form of pitting and flaking of the surface. There is no evidence of dental caries, but a moderately large mass of cementum ("cementoma") has developed on the root of one of the mandibular premolars. The cause of this condition is unknown. There are fairly large deposits of tartar on the mandibular third molar, indicating poor oral hygiene, and the pattern of wear on this tooth suggests that the opposing maxillary third molar was either unerupted, malpositioned or missing.

CREMATED HUMAN REMAINS FROM KNEEP, VALTOS, LEWIS

C B Denston
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Cremation from cinerary urn in corbelled cist

Colour of fragments: White, light-brown

Overall length: 0-83 mm

Total weight: 782.7 gm

Number of individuals: One

Sex, and age at death: ?Male, Adult

Bone	Weight
Skull	87.5 gm
Long bone	321.2 gm
Rib, Metacarpals, Metatarsals, Phalanges	7.0 gm
Cancellous	46.0 gm
Miscellaneous	321.0 gm
Total	782.7 gm

The evidence as presented by the fragments suggested more affinities with bones of a male individual than a female. The fragments were not of a robust nature, but the size of an intact mastoid process, and the development of the supramastoid crest of a temporal bone suggested male in preference to female. A fragment from the greater sciatic notch area of an innominate bone of the pelvis (a useful sex indicator) possibly confirmed the suggestion of male sex.

Under the heading of cancellous in the table of fragments and weight, these fragments could have come from any area of the skeleton where cancellous bone occurs, and included are at least half a dozen fragments of the body position of vertebrae, and a fragment of a patella.

Cremation from kerb cairn

Colour: white, light-brown, dark-brown, light grey, dark-grey, black.

Overall length of the fragments: 0-70mm

Total weight: 1,448 gm

Number of individuals: one

Sex: ? male

Age at death: young adult

Bone	Weight
long bone	379.5 gm
skull	182.0 gm
metacarpal bone, phalanges	25.0 gm
vertebra	2.5 gm
miscellaneous fragments	746.0 gm
Deposit Q 3 (3)	113.0 gm
Total	1,448.0 gm

Description of the recognisable fragments

Parietal bone displaying the squamous suture
Temporal bone displaying the mastoid process -external auditory meatus area
Temporal bone from squamous area
Foramen magnum
A wormian bone
Shafts and distal extremities of metacarpal bones

Phalanges, complete and fragmentary of the proximal, middle and distal rows. All of the hand.
A few posterior articular facets of vertebrae.

It was not possible to derive a definite conclusion if the remains from deposit Q3 (3), were from the same cremated material as of the main deposit. These fragments were mainly of the light-brown colour, in comparison to a range of colours from the main deposit, though the predominant colour was light-brown. No direct evidence could be found to associate, or unassociate, the fragments from Q3 (3) with the main deposit. Perhaps a feature in favour of the remains being associated was the fact that fragments from each deposit had clinker attached. The size of fragmentary petrous portions of right and left temporal bones suggested that the remains from deposit Q3 (3) were adult.

The remains from the main deposit, from the evidence of the range of colours, suggested various degrees of heat. Two fragments, one of light-grey, the other light-brown, and from the squamous area of a left parietal bone, fitted perfectly at a broken edge. The colour of both was uniform throughout the 2 fragments, suggesting that the breakage occurred during the process of cremation. One fragment was then subjected to a more intense heat than the other.

Features of the mastoid area of the left temporal bone, plus the general size of the metacarpal bones and phalanges, suggested preference for a male individual. Evidence for age at death, was in the form of a crown of a premolar tooth, displaying lack of attrition; non-fusion of cranial sutures; and fused epiphyses of the metacarpal bones and phalanges.

SHELLFISH

Shelagh Smith
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Level 7. A few fragments of Patella vulgata (common limpet), Chlamys varia (variegated scallop), Paphia rhombiodes and Lucinoma borealis (no common names).

Level 6. Fragments of Patella vulgata (common limpet), Mytilus edulis (common mussel), Tapes decussata (cross-cut carpet-shell). Ensis araratis (curved razor-shell) and five shells of Nacella Lapidus (dog-whelk). There are also five valves and fragments of other of Ostrea edulis (native oyster).

All the shells could have been used for food, in fact this is most likely, apart from Lucinoma borealis. This could have been brought in by accident or also eaten, though it is not a recognised food species, unlike the others. Tapes decussata does still live in Lewis on the east coast but I have not found it on the west around Loch Roag. However it could have been around in the past and an easily gathered delicacy. All the others are still common in the vicinity and I have eaten samples of many of them.

POLLEN ANALYSIS OF BURIED SOIL

G Whittington

Material obtained from the soil beneath the cairn was treated in hydrofluoric and hydrochloric acids before Erdtman's acetolysis. From the description provided with the material by the excavator, it was thought that pollen analysis might be unsuccessful for the soil was clearly developed from a machair deposit. Analyses of machair-derived material reveal only very corroded pollen grains or indeed no pollen at all. The sample from Kneep provided only two very broken grains, both of Corylus (hazel), but very large numbers of the spores of Osmunda regalis (royal fern). The presence of these spores in the soil is not surprising in terms of the location of the cairn which sealed it. Osmunda regalis grows over a wide range of sites, providing they are damp, and is to be found growing locally in the Hebrides today. Blackburn (1946) also reported its spores occurring in large numbers in basal samples taken from blanket peat on the Isle of Barra.

Thus from the analysis very little can be said about the environment in which the cairn burial took place. The presence of the Corylus grains might indicate the past existence of woodland here in which the ferns might have grown. However, given the ease of drainage on machair, it is more likely that the spores were deposited in the soil as a result of their natural dispersion from plants growing in wet places on the actual headland of Kneep. In general these results seem to confirm that sites on the machair are unlikely to provide archaeologists with palynological evidence.

References

Blackburn, K. B. 1946 'On a peat from the island of Barra, Outer Hebrides', *New Phytolo*[illegible], 45, 45.

THE FLAKED QUARTZ PIECES

Rosemary Bradley

There are four pieces from the buried soil under the Bronze Age cairn at Kneep. All are made of whitish-grey semi-translucent quartz which has no internal jointing cracks. The raw material has a few flaws but none have adversely influenced the fracturing properties of the quartz and the struck surfaces have a fine-grained rather greasy appearance, unlike the shinier, vitreous surfaces often associated with quartz. Microscopically the surfaces lack the smooth planar sheets of the glassier quartz and exhibit a regular mosaic of smaller fracture facets commonly 100-300μ in diameter. The jumbled associations of these features together with the presence of patches of granular quartz scatters the light and this accounts for the more matte texture visible macroscopically. The presence of such small separate features in the quartz enables the force of the blow used to detach the flakes to be transmitted in a more homogeneous fashion than is often the case with more massive and jointed quartz. As a result these pieces show more of the classic fracture characteristics which are generally best seen on microcrystalline rocks like flint: Both pieces 2 and 3 exhibit clear ventral fissures and the former also has a number of pressure rings. The regular shapes and thinness of pieces 2-4 also illustrate how superior this raw material is in the general quartz class and shows how one raw material type can have a wide range in its internal structure which correspondingly effects the knapping properties.

Piece 1 is made from a slightly larger grained quartz than the other flakes for not only are the fracture surfaces more glass-like but microscopically the individual quartz microfacets are larger. The piece has greater maximum dimensions (55x45x10mm) and it is bulkier than the others whose mean lengths, widths and thicknesses are 30,13 and 3.5 respectively, so for these reasons it will be described first. It is a large secondary flake which was detached without any platform preparation and the force and angle of the blow led to the formation of a medial ventral ridge. Examination of the cortical platform reveals a large well-developed radial crack on the right dorsal edge of the platform caused by an outward moving force. Such a blow probably detached the dorsal flake and the presence of an isolated ring crack behind this feature indicates a number of attempts were needed to detach either the dorsal flake or the whole flake itself. The bulb of force is quite insignificant but the crushing on the platform from failed hammerstone strikes points to the use of a hard hammerstone. No hammerstone scratches were seen microscopically anywhere on the platform.

Pieces 2 and 3 are treated next together since they can be conjoined. Examination of the two pieces independently led to the formulation of hypotheses concerning the knapping procedure used and when it was discovered that they could be refitted these were found to be largely correct so the sequence can be reconstructed with some certainty. Whilst the core was still intact and with a considerable extent of cortex on the area from which these two flakes were detached, a blow from the proximal end removed a flake whose scar is seen as a remnant of previous flaking on the dorsal surfaces of both pieces. A blow on the very outer edge of the current platform failed to detach a flake but produced a large and deep ring crack. This, and other mis-hit strikes (seen as ring-cracks on the platform of piece 3), must have considerably weakened the structure of the quartz at this point, so, when the core was hit at point A to detach piece 2, the platform of this flake sheared off. When the pieces are conjoined it is possible to see the portion and approximate size and shape of the platform fragment which was lost. Since this was not recovered in the same place as the other pieces it can be concluded that knapping occurred at another location and the pieces were brought to this spot already as flakes. The ring crack at 2 is almost certainly the remains of the cone crack which was formed by the blow that removed piece 2. Once piece 2 had been detached from the core a number of strikes were directed at the platform, some of which resulted in the cracks at 3. Then one powerful blow was delivered resulting in the crushed area at the extreme right of the platform of piece 3. This force detached flake 3 but either because of the angle and force of the blow or due to the flaws induced by previous failed strikes the flake split longitudinally bisecting the bulb of force and platform. A piece of quartz which was triangular in cross-section must have been lost resulting in the high edge angle (78°) on the right side. Although both pieces have a number of ring cracks from failed blows these were very small in diameter indicating a fairly pointed, or strongly curved hammer which, on the evidence of platform crushing, may have been quite hard but again no hard hammerstone scratches are seen microscopically. Both pieces are very regular with almost blade-like shapes and proportions and flat ventral surfaces indicating some considerable skill in knapping and more control shown than that seen on piece 1.

Piece 4, the only inner flake also exhibits care in flaking especially in the fine, sub-parallel dorsal removals. The force of the blow which detached this flake (or possibly halved the core if it is considered as a core fragment), was considerable for not only did it crush and shatter the platform area at the point of the blow to quite a depth below the surface but it also made the platform break off and gave the proximal end of the piece a twisted fracture face. At the distal end there are traces of a small bulb and this together with the two pronounced steps on the ventral surface suggests a bipolar method of knapping. In this one end of the core is rested on a resistant anvil whilst the other end is struck with a hammerstone. The force delivered is transmitted through the quartz and reflected back from the distal end forming a small secondary bulb of force. The ventral step scars were formed when the energy of the shock wave was insufficient to completely detach a flake and the fracture front was arrested by the mass of the quartz. The flake sheared off leaving a step and a scar marking the position of the crack and this can be detached by the trapped air which makes it appear white. Since these fractures face the distal tip it must have been the shock waves originating from this end which initiated them. The battered dorsal ridge which runs back from the distal tip has no microscopically visible features which could be interpreted as due to use so the bruising must be caused by technological or natural factors. Such damage could have been produced when this end rested on a hard surface while the proximal end was struck to detach flakes. Since the core from which this flake was split must have been small the use of this technique is not surprising as it is well suited to knapping such small pieces of raw material.

Overall these four pieces of quartz show a range of knapping techniques from the powerful hard hammer blow that detached flake 1, to the more precise and delicate strikes which removed pieces 2 and 3 and the use of the bipolar method with probably a hard hammerstone in the case of piece 4. Morphologically the quartz flakes do not form a homogeneous group. Pieces 2 and 3 are the most similar being even, thin and blade-like while piece 4 bears evidence of previous regular blade-type removals and is of similar dimensions to the other two flakes. Piece 1 is unlike this group of three being altogether more massive and also made from a slightly different type of quartz. No attempt has been made to alter any of their shapes by secondary working.

None of the pieces show any surface alterations macro- or microscopically. There are very rare thick (102μ) continuous white soil scratches on pieces 1 and 4 which are most probably due to slow soil movements while the flakes were buried (Keeley 1977,44).

All of the pieces were studied microscopically using an incident light Leitz Epivert binocular microscope with magnifications of 50-525x. Initial examination revealed the surfaces to be in good physical condition but covered with a discontinuous brown matte deposit. To dissolve this all the pieces were soaked in warm 5% hydrochloric acid for 5-10 minutee and then put into the ultra-sonic cleaner to remove any remaining traces of dirt. Every edge was examined on both the dorsal and ventral aspects using a range of magnifications but in each case the edges were found to be fresh and unaffected by any damage caused by use. The lack of definite use-wear does not preclude the use of any of the flakes on a substance which would not cause noticeable damage if only used for a very brief time eg. meat. The characteristics of the edges can be very important in determining whether a piece is used or not, for instance, some of the edges particularly on pieces 2 and 3 would be very suitable in their straightness and edge angle for use cutting a soft to medium resistant material in comparison to the perimeter of piece 1 which is mostly cortex dorsally and therefore less suitable for any work.

In conclusion three of the quartz pieces recovered from below the Bronze age cairn at Kneep form a coherent group technologically and in the material used with piece 1 set apart in both these respects. Since pieces 2 and 3 were conjoinable but the broken fragment of the platform was not recovered it can be concluded the flakes were produced elsewhere. They were possibly those pieces selected from the knapping process for further work and were being carried together when they were deposited before they could be used.

Catalogue (based on Wickham-Jones 1980).

1. Quartz; whitish-grey; secondary flake; cortical platform; hard hammer; unmodified; sides expand to medial apices from straight proximal to pointed distal; 55:45:20; right edge angle 54°-69°; left edge angle 70°; unused. Unused secondary flake.

2. Quartz; whitish-grey; secondary flake/blade; possibly hard hammer; unmodified; parallel sides from straight proximal to straight distal; broken - platform absent; 36:16:5; right edge angle 62°-90°; left edge angle 32°; conjoinable with piece 3; unused. Unused secondary flake - blade.

3. Quartz; whitish-grey; secondary flake/blade; simple artifical platform; possibly hard hammer; unmodified; almost parallel sides from irregular proximal to straight distal; broken distally; longitudinal split bisects flake and platform area; 28:15:5; right edge angle 78°; left edge angle 35°; conjoinable with piece 2; unused. Unused secondary flake.

4. Quartz; whitish-grey; inner flake; platform area crushed and broken; hard hammer; bipolar technique; small distal bulb; unmodified; 4 previous flake removals; straight sides converge from irregular proximal to distal tip; broken platform absent; 26:9·7; right edge angle 81°; left edge angle 88°; unused. Unused inner flake/core fragment.

References

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Wickham-Jones, C R 1980 *The application of typological analysis to flaked stone.* Artefact Research Unit sheet, National Museums of Scotland.

'CINDER' FROM KNEEP: THE BLACK DEPOSIT IN THE KERB CAIRN

R Hetherington

Partial analysis of the black material referred to as 'cinder' from the 1976 excavation on the Kneep headland, Isle of Lewis, produced the following results:

SiO_2	Al_2O_3	Fe_2O_3	CaO	Na_2O	K_2O	P_2O_5	S	Total
17.72	1.62	15.04	7.07	5.90	0.61	0.53	23	48.72%

Aluminium, iron, calcium, sodium and potassium were determined using atomic absorption techniques and from these results the values of the relevant oxides were calculated. Silica was determined by loss of weight on evaporation with hydroflouric acid, phosphate by a gravimetric technique involving the formation of ammonium nitro-phosphomolybdate and sulphur by combustion in oxygen and estimation of the sulphur dioxide formed. A qualitative test for the presence of chloride was also carried out using silver nitrate and none was found to be present. From appearance it is likely that the remaining 51.28% of the 'cinder' is mainly carbon. Thus this material is probably a semi-combusted, semi-vitrified fuel ash.

In order to try and identify the fuel involved by comparision with composition tables of known fuel ashes, it helps to recalculate these figures so that they total 100:

SiO_2	Al_2O_3	Fe_2O_3	CaO	Na_2O	K_2O	P_2O_5	S	Total
36.37	3.33	30.87	14.51	12.11	1.25	1.09	0.47	100.00

From the context of the find, the possible fuels would appear to be animal dung, seaweed, peat and wood. From the results published by Evans and Tylecote (1967) it would seem that the phosphate and silica contents of the Kneep material are rather low for the fuel to have been animal dung.

For comparitive tables of the other fuels, the work of Evans and Tylecote and more recently Beik (1970) is not comprehensive enough and so reference is made to the tables published by Percy (1875), which although they are rather antiquated, are probably just as reliable. From the table which Percy shows on p.190, it would seem that the lack of detectable chloride and the low potash level in the Kneep 'cinder' would exclude seaweed as a possible fuel.

This leaves wood or peat as the possible fuel From Percy's tables on pp.209 and 210, the relatively high silica, high iron and low phosphate contents of the Kneep material are what might be expected if peat had been the fuel. However, the low sulphur and high soda contents argue against this . Percy's tables on pp.189 and 190 though do show that some wood ashes have such high soda contents, especially those of pine and deciduous tree bark. If wood was the fuel used at Kneep, the high iron content of the `cinder' is an anomaly. This though may be the result of post deposition processes leaching iron from the overlying sands and redepositing it at the `cinder' level. The lime content of the Kneep `cinder' is also rather low but the soils in the vicinity were unlikely to contain much lime when the wood was growing for it to be absorbed.

Therefore, the most likely fuel to have produced the Kneep `cinder' was wood. Identification of the actual species is not easy. All Percy's tables are the results of analyses on the ashes of only one specimen of each species and then only a few species are represented. Also, as he himself points out (p.189), inorganic salts can only find their way into a plant in solution by absorption from the soil. Thus the relative contents of the salts in the wood will be highly dependant on the nature of the soil in which it is growing. However, the high soda content of the Kneep `cinder' parallels those which Percy gives for pine or deciduous tree bark (elm?). From the nature of the flora probably growing in the vicinity of the site at the time, of these two possibilities, the latter would seem the more likely.

<u>References</u>

Beik L 1970 *J Hist.Met.Soc.* 4, (1970), 81-2.

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