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EXCAVATIONS AT PIEROWALL QUARRY, WESTRAY, ORKNEY

NIALL M SHARPLES

1: D1

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PIEROWALL QUARRY, WESTRAY

THE STRATIGRAPHIC UNITS

Niall M. Sharples

1. Yellow brown sand directly underlying present-day turf. The edge of machair system known as Links of Noltland.
2. Brown sand between 1 and archaeological remains. Signs of ard/plough cultivation at its deepest points.
3. Rubble spread. Probably derived from collapse and destruction of the round-house wall. Severely truncated and disturbed on top of the spit by quarry activities.
4. Arrangements of stones directly on top of occupation 5. Thought at first to be structural but as such make no coherent sense.
5. Thin black organic rich soil containing many small stones. Rich in occupation material. Lies adjacent to the outer face of round-house wall.
6. Thick black organic rich soil surrounding arrangement of slabs (see illus 15). Considerable variations in consistency. Rich in occupation material. Lies adjacent to 5 downslope from the round-house.
7. Round-house wall 3m thick. Inner face not present in spit. Outer face badly robbed, reached no more than 4 courses.
8. Thin black organic rich soil containing many small stones. Rich in occupation material. Fills-in shallow hollow under the round-house wall. Impossible to distinguish it from 5, though latter clearly later than construction of the wall.
9. Layer of frost-shattered stone fragments with a soil matrix of variable significance. Stratigraphic position suggests that it represents the decay and stabilization of earlier structural and occupational features before re-occupation.
10. Lines of pitched slabs filling in area between walls 18 and 21. Embedded into and partially surrounded by red/

red brown soil containing large quantities of occupation material. Interpreted as collapse of upper courses of walls 18 and 21 into occupation in structure.

11. Black organic rich occupation soil of variable thickness. Rich in occupation material. Lies between walls 18 and 21 and surrounds single line of paving against wall 18. Primary occupation of structure.
12. Rubble layer. Lies to east of structure.
13. Small pitched slabs lying directly in front of S and E faces of wall 21. Collapse from this wall.
14. Brown clayey soil. Fills gap in paving layer 15, against quarry section, and may represent robbing of this.
15. Single layer of slabs on a level with the uppermost stones of revetment 23. Paving over destroyed cairn.
16. Layer of frost-shattered stone fragments with very little soil matrix. Lies between revetment 23 and cairn 24.
17. Layer of frost-shattered stone fragments with brown clay matrix. Occurs where cairn 24 runs into quarry section and may represent fill of robbed area.
18. A short isolated stretch of walling 5 courses high, 1m long. Faced to the S, backs on to collapsed revetment 23 to N. Defines N edge of structure containing occupation 11.
19. A short stretch of walling 4.5 courses high:- added to protrude from the E edge of the N face of wall 21. Faced to W and N. Partially defines E edge of structure containing occupation 11.
20. Layer of frost-shattered stone fragments with soil matrix. Contains large quantities of finds, particularly animal bones. Lies within hollow defined by revetment 23 to N, wall 21 to S and rise of underlying stones 22 to E. Deliberately deposited to create platform adjacent to revetment 23.
21. Wall c 0.50m high of old ground surface (OGS) 5m long, c 1.30m wide. Faced to S, E and N, latter face rested on/

on OGS, 25, former on stones, 22. Built as part of platform created adjacent to revetment 23.

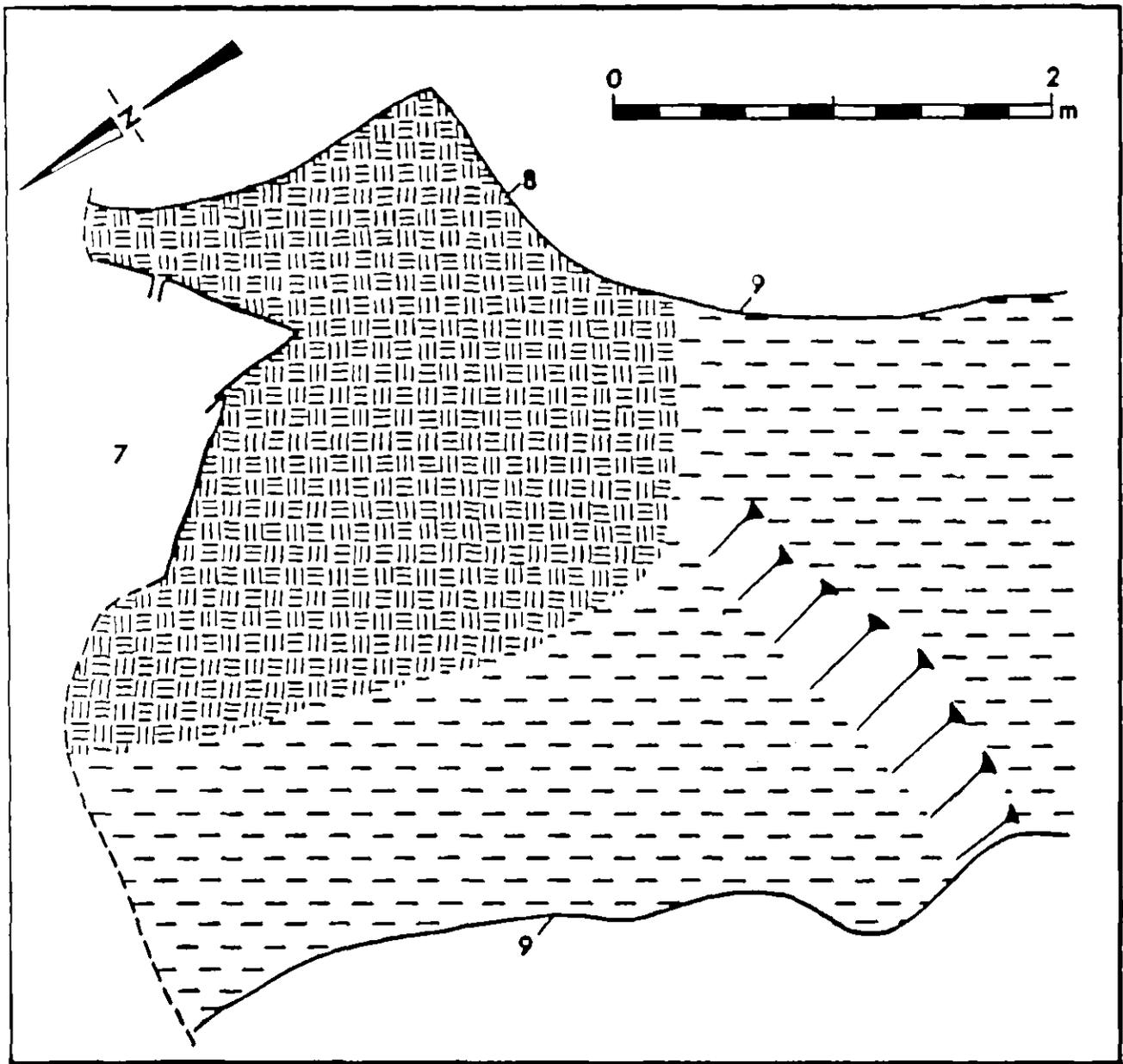
22. Layer of pitched slabs. Generally large but thin rectangles, lying on OGS, 25, in front of revetment 23. Interpreted as collapse from revetment 23.
23. Arc of walling 17.30m in diameter, 1.10 high and thick. Concentric with cairn 24 and abutting against it on the OGS. Secondary revetment to cairn.
24. Segment of circular stone cairn c 14m in diameter. The face stands to a height of 0.70m and has built into it two protruding stones.
25. Old ground surface of yellowy/brown clay. Only examined in any detail outside 23. Impressed into it here were quantities of bone which do not appear between the cairn 24 and the revetment, 23.
26. A discontinuous clay of varying colours between the OGS and the bedrock. A thin deposit of glacial till.

The following layers were visible in the quarry sections but are not present in the spit excavated.

101. Brown silty soil lying beyond edge of slab layer 22 in S-facing section. Soil building up during and after Neolithic.
102. Rubble layer of small slabs with matrix of small stones and earth. Pitched down away from revetment 23, so possibly secondary collapse of this structure.
103. Remains of two parallel walls facing towards each other and packing on to cairn rubble 24. Set 0.60 to 0.70m apart and stand up to 2 courses high. Passage.
104. Layer of small stone fragments with soil matrix. Fills area of passage 103 and hollow in cairn above it.
105. Yellow sand layer. Occurs in S-facing section between initial site mound and later occupation soil 6. Represents first sand-deposition on E coast of Westray in Pierowall area.

106. A/

106. A single layer of large slabs extending from the base of the inner face of wall 7 for 1.80m. Paving in interior of round-house.
107. Thick black organic rich soil lying within the wall 7. Rich in occupation material. Occupation on floor of round-house.
108. Wall 6 courses high facing W; aligned perpendicular to it is a thin orthostat well-chocked at its base. These lie over the passage 103 and presumably represent alterations or furnishings within the round-house.
109. Rubble layer lying between wall 7 of round-house. To the E of wall 108; it consists of small horizontally laid stones to W; much looser stone pitched in various directions and with some large thin slabs.



Illus 34 Plan of layers 7, 8 and 9

THE FINDS

POTTERY

Clare H Yarrington

After a discussion of the fabric, the pottery is dealt with phase by phase, including a discussion of comparative assemblages. It should be noted here that the unevenness of the rim-and base sherds makes their orientation and diameter readings unreliable. Where the orientation is unsure this is shown on the text illustration by a dashed line. Only positive features are recorded in the catalogue, eg the thickness of fragments has not been measured.

Fabric

Examination of the pottery under a binocular microscope (magnification range x 12 to x 100) revealed that only a limited range of grits was used for filler. Micaceous sandstone is present in all the sherds with only P49 and P54 having in addition ?limestone grits. Odd fragments of other sandstone and quartz also occur. Identification of the rock types was by visual comparison with hand specimens taken from near the site and by their similarity in reaction to 5% dilute hydrochloric acid. The source of the micaceous sandstone is probably the flagstone of old red sandstone which is ubiquitous in the Orkneys. Pieces of limestone can be found on local beaches but there is also a quarry of calcareous fish-bearing shales in the Rousay flagstone at Skelwick, Westray (Mykura 1976, 123).

PHASE	CATEGORY	WEIGHT (g)	% WEIGHT	
			OF PHASE	OF TOTAL
Neolithic	C1	21.6	16.1	0.5
	C2	37.8	28.2	0.9
			<hr/>	<hr/>
			44.3	1.4
			<hr/>	<hr/>
late Neolithic	C3	262.1	70.4	6.4
EIA*	C4	744.4	23.2	18.2
	C4 + C4?	1095.1	34.2	26.8

*This does not take into consideration unstratified sherds of C4.

Table 5 Summary of pottery categories by phase

Although the sherds are indivisible on filler alone, looking at the attributes of hardness, colour, surface treatment and form it is possible to discern four groups (table 5). However, these groups proved to be small, making up only 38% of the assemblage and the divisions between them are not very clear cut. As they come from a rather small scale rescue excavation it is not possible to ascertain fully their significance, especially as probably only one or two vessels are represented in each case. Nevertheless, they are described here as categories C1 to C4 for the record and to prevent repetition of similar fabric entries in the catalogue.

Before passing on to the brief descriptions of the categories it should be stressed that the majority of the sherds are relatively undistinguished. They are of generally hard, 6-13mm thick fabric which is well to heavily gritted with ill-sorted, angular and sub-rounded inclusions (>10mm in size). Mottled colours of black, brown and orange show unevenness in firing. There is no surface finish apparent but most sherds are now abraded and many are encrusted with carbon or soot.

C1 - Thin, 5-8.5mm, soft brown and partly orange-brown fabric/

fabric which is well gritted with ill-sorted, ≤ 7 mm, irregularly shaped inclusions of micaceous sandstone. The interior is untreated and rough, the exterior black and sooty from reduction or smudging during firing. Munsell readings are ext 7.5 YR N2/0 black, int 7.5 YR 5/4 brown. Evidence of probable construction rings.

C2 - Sherds of variable thickness, 7-15.7mm. The fabric is black and coarse, heavily gritted with ill-sorted, ≤ 8 mm, angular inclusions of micaceous sandstone. The surfaces are uneven and unfinished, several sherds are encrusted with carbon, possibly the result of charring in a fire. Evidence of construction rings.

C3 - Thin, 6-9mm, sherds of soft grey-brown-orange fabric which is fairly well gritted with ill sorted, ≤ 8 mm, micaceous sandstone inclusions. The black exterior is crazed and slightly irregular but is also partly burnished. The interior is mostly untreated and slightly rough. Munsell readings are ext 7.5 YR N2/0 black, int 10 YR 5/3 brown and 10 YR 4/1 dark grey. Some sherds are thinly encrusted with carbon.

C4 - 6-11mm, sherds of soft - hard fabric heavily gritted with ≤ 10 mm sized angular and subrounded grits of micaceous sandstone and, in some cases, limestone. These grits protrude through both surfaces giving a very rough texture. The exterior is oxidized to orange-yellow-buff. Munsell readings are ext 7.5 YR 6/6, 7/6 reddish yellow and 5 YR 6/6 reddish yellow, int 10 YR 5/2 greyish brown.

Neolithic 1-9

All the sherds from the cairn and platform construction are very small and abraded and constitute only 3.3% of the assemblage. 1 is the only sherd from the cairn, the others were found in the platform wall and associated layers. The one possible rim, 4, is rounded but very uneven. Fabric categories C1 and C2 are represented.

Late Neolithic 10-14

Both layers from the interior of the platform structure contained pottery, a total of 8.6% of the whole assemblage. Most of the sherds, 11 and 12, are possibly from the same well-made, medium sized and flat based vessel. No portion of the rim survives. These sherds are of C3 fabric and their fineness contrasts with the other sherds from these layers and also with those of the later early Iron Age levels.

Two sherds, 13, are decorated with applied pellets of clay which point to the 'Grooved ware', ceramic tradition (illus 19). Plastic ornament is characteristic of the Orcadian substyle (Wainwright & Longworth 1971) and examples are readily found at Rinyo, Rousay (Childe & Grant 1939, pl XX no 5), Skara Brae and Quanterness, Mainland Orkney (Childe 1931, pl XLVII no 2, pl XLVIII and Henshall *in* Renfrew 1979, 76-8, figs 33 & 34). The radiocarbon dates from Pierowall support this comparison. Undecorated tub-shaped pots are often found with 'Grooved ware' though seldom illustrated.

Pre-Early Iron Age 15-18

Amongst the little pottery which came from this rather uncertainly stratified layer is a thinned, rounded and everted rim or strongly concave 'false rim', 15.

Early Iron Age 19-49

The round-house and its associated occupation deposits have yielded the greatest proportion of the pottery finds, 76.5% of the assemblage. Approximately half of the estimated 25 vessels that these sherds represent appear to have the same basic vessel form (20, 21, 22, 28, 31, 34, 36, 42, 45, 49; illus 19). A flat-based pot with a high and pronounced shoulder and upright rim. However, none can be reconstructed to more than 80mm below the rim. The rims are simply rounded-off, except for 20, 21 and 37 where the rim is thickened and carefully flattened, the neck being very thin just above the shoulder. 20 still has part of the shoulder attached, a pronounced ledge carination set 30mm below the rim. Sharp and rounded/

rounded forms of carination are also present. Where the rim diameters can be estimated they indicate medium sized vessels ie c 180mm and c 230mm. The lack of curvature in the wall sherds suggest that 36 and 49 were large vessels. Eight of these vessels are of C4 or C4? fabric, the latter being where the sherds possess some but not all of the attributes listed.

There is little indication of other vessel shapes but the rimsherds, though small, vary. Most are roughly made and simply finished but those of 32, 37 and 38 are carefully made and the latter two are from small vessels, ie with 110mm and c 130mm rim diameters respectively.

Examples of flat-based vessels with high and pronounced shoulders and upright rims can be found at a number of early Iron Age sites in both Shetland and Orkney. Phase I and II at the late Bronze Age village II at Jarlishof, Shetland, later assigned to the early Iron Age by the excavator (Hamilton 1968, 41), has the same range of rim and carination forms as at Pierowall Quarry (Hamilton 1956, 37-8, figs 18 & 19). They are gritted with the locally abundant steatite and are described as of 'black polished ware', whereas the lack of surface finish at Pierowall is most marked. The other common form at Jarlishof for this period is a fairly upright vessel with an internally flanged rim. The only rim that nears this description at Pierowall is 32 which also has well smoothed surfaces. The comparative pottery classes I and II from the early Iron Age farmstead at Clickhimin, Shetland (Hamilton 1968, 41-3, fig 19) include sharp but no developed carinations and these occur lower down the vessel profile than at either Jarlishof or Pierowall. Although the bases are also flared, these vessels are of similar size and class II are not gritted with steatite but are 'brown and biscuit' in colour. A number of small vessels with simple rims are also recorded. From Shetland again the settlement site of Sumburgh has yielded pots with ledge carinations and everted rims, some of which are thickened (Lamb, forthcoming) and it is possible that some of the rims at Pierowall were originally everted. A few pottery assemblages in Orkney have been compared with the pottery from Jarlishof/

Jarlshof and Clickhimin. At Calf of Eday one vessel has a developed pinched out and everted rim (Stevenson 1938, 182, fig 4:20 & 21). The round-house at Quanterness, Mainland Orkney has parts of vessels with both rounded and pronounced carinations and the fabric is described as hard and harsh in texture, tempered with medium sized, grey angular grits which project through the buff-grey surfaces (Renfrew 1979, 189, fig 53:60 & 61). Similar rims and high, though not pronounced, carinations occur on roughly made vessels of local fabric from the round-house at Bu, Stromness, Mainland Orkney (Hedges, forthcoming). All of the pottery shows evidence of ring/coil construction, as does that from Pierowall.

The remaining sherds in the catalogue are largely unstratified collections from the quarry sections and spoil heaps. Most would fit readily into the early Iron Age assemblage, in particular 54 and 55 which are of C4 fabric, and 56 which appears to be an abraded rim similar to 43. There is one sherd, 51, however, which is very different in form and fabric from any so far discussed. It is a footed or pedestal base in a hard black fabric with an organic temper. No good parallels for this vessel are known in Orkney or Shetland but it seems likely that a later, post-Iron Age, date is likely. It came from the sand layer which showed signs of ploughing, above the round-house infilling.

Conclusion

Throughout the life of this site the pottery used was probably made locally and the forms can be found within the ceramic traditions of Orcadian 'Grooved ware' and the early Iron Age traditions of both Orkney and Shetland respectively. This is exemplified by the comparisons with the similar multi-period site of Quanterness and the major early Iron Age settlement site of Jarlshof. However, the limitations of the assemblage make any comparisons tentative and it is likely that significant variations in ceramic forms in fabric have gone unnoticed. The poor evidence does suggest that a crude, thick walled and poorly fired pottery is common to all periods.

POTTERY CATALOGUE

abbreviations used: frag = fragment, int = interior, ext = exterior, fract = fracture, d = diameter, t = thickness (all measurements are in millimetres; frag = <20mm²).

Neolithic

1. Small body sherd, abraded. Soft black fabric, partly vesicular - possible reburnt. Orange-brown ext. t = 9 24
- 2 'False' rim, rounded & v uneven, plus 2 frags. C2. t = 14. 20
- 3 Body sherd & 2 frags, v abraded. Soft black fabric with orange-brown surfaces 20
- 4 1 rim, roughly rounded & uneven, possibly 'false', & 3 small body sherds C1. t = 5-6.5 21
- 5 5 body sherds & 1 frag. Ring/coil built. C2. t = 7-8.5 21
- 6 2 body sherds of soft-hard grey-black fabric with uneven orange-buff ext. t = 10.5. 21
- 7 3 frags, abraded. Black fabric. 21
- 8 Body sherd & 3 frags. V abraded. Friable black & orange-brown fabric. 14
- 9 Body sherd & 3 frags. Friable black fabric with orange-brown ext. Fairly coarsely gritted. t = 12.5 22

Late Neolithic

- 10 3 body sherds & 5 frags. Mixed. Soft-hard, slightly crumbly black-grey-brown fabric. Fairly coarsely gritted. Orange-brown, brown & grey surfaces. t = 13. 11
- 11 15 body sherds, 1 possibly from near the base angle, and 18 frags. C3. All probably from the same vessel, possibly the same one as P12. 11
- 12 2 base angle sherds, 28 body sherds, 1 of which is from near the base, and 8 frags. All from a thin walled, flat based and medium sized vessel with apparently straight walls. C3. d = c 130; t = (base) 12, wall 5.5-9. 10

13 2 decorated body sherds and 6 frags. The decoration is of 3 applied pellets, 2 of which are intact & placed close & end to end. Soft-hard orange-brown fabric. Carbon encrusted ext, no int survives. The pellets measure 11 x 7.5, are rounded in profile and set 7mm apart. 10

14 2 thick body sherds. Soft-hard orange-brown (ext) and grey (int) fabric. Fairly coarsely gritted. t = 13. 10

Pre-early Iron Age

15 1 thinned, rounded rim or 'false' rim either everted or with a concave neck, plus 6 body sherds. Abraded. Hard black fabric with numerous small grits. Abraded buff-brown ext, charred black int. t = 7-10.6. 9

16 1 body sherd and 4 frags. Soft-hard orange-brown (ext) and black to grey-brown (int) fabric. t = 9. 9

17 5 body sherds and 11 frags, abraded. Soft-hard orange-buff (ext) and grey-black (int) fabric. 1 sherd shows ring/coil building. t = 9. 9

18 Small body sherd in poor condition. Friable black fabric. t = 11.7. 9

Early Iron Age

19 Body sherd, thin and abraded. Soft orange (ext) and black (int) fabric. Carbon encrustation on int. t = 6.6. 7

20 Rim and shoulder sherd from a medium sized vessel. The upright rim is thickened and flat, the neck curves out to a ledge carination 30mm below the rim. C4. Partly smoothed and patchily carbon encrusted ext, rough grey-brown int. d = c180; t = (rim) 8, (neck) 6, (carination) 9.3. 6

21 Rim, similar to 20 but from a larger vessel. Broken just above the carination. C4. Small patch of carbon near rim. d = c230; t = (rim) 10, (neck) 7. 6

22 1 rim and 1 body sherd. Flattened upright rim with a slightly outcurving neck, from a shouldered vessel? C4./

- C4, Patchy carbon encrustation. t = 8-10. 6
- 20-22 37 body sherds and 16 frags, from the same or similar vessels as 20-22. 2 sherds are concave and are probably from the neck. t = (neck) 9.5 (body) 8-11. 6
- 23 1 base and 4 body sherds. The base is fairly small, flat and with a flared wall. Friable black fabric coarsely gritted with angular inclusions. d = c80-90; t = (base) 12.5 (wall) 9.5. 6
- 24 4 rimsherds, all possibly from the same fairly thick and coarsely built vessel. The rim is simply rounded. Fairly hard grey fabric, orange-buff patch on ext. Wall gritted. Rough surfaces. t = (rim) 10 (wall) 12.5-13.5. 6
- 25 Rim, flat and roughly made. Soft-hard grey-brown fabric with some small grits. Ext charred black, int and rim grey-and orange-brown. t = 10.6. 6
- 26 Rim, roughly made with slight internal bevel? Soft-hard grey fabric fairly coarsely gritted and with rough surface. t = 7. 6
- 27 Rim, uneven with an internal bevel and external lip. The neck is strongly concave. From a small vessel. Soft orange-buff fabric. Well gritted. The surfaces are fairly smooth with faint horizontal 'wiping' marks in the neck. Patches of soot? d = c110; t = (rim) 6.3 (neck) 7.5. 6
- 28 5 rimsherds, probably at least 2 vessels represented. The rim is flattened and upright with the neck curving outwards probably to a carination. C4? Smooth surfaces. t = (rim) 7-7.5 (neck) 6.5-9. 6
- 29 Rim, fairly roughly made, upright, thinned and flat with the neck curving strongly outwards and also greatly thickening to a carination? Soft-hard orange-grey fabric heavily gritted. The grits protrude through the int but the orange ext is encrusted with carbon near the rim. t = (rim) 7 (neck) 7.5-13. 6

- 30 7 base sherds, all flat with fairly upright walls. From at least 3 different vessels. Only 1 sherd has a sufficient circumference to measure. None can be related to any of the rims P24-29. Soft-hard grey-brown and black fabric 2 sherds friable. Well to heavily gritted, 1 base is coarsely gritted (inclusions 15mm). No clear surface finishes, ext orange-buff-grey, int orange-grey. 1 sherd int encrusted with carbon. d = c130; t = (base) 9 (wall) 8.5; t = (wall) 9.5 and 11.5. 6
- 24-30 32 body sherds $>30\text{mm}^2$, including 3 sherds with rounded carinations and 82 body sherds $\leq 30\text{mm}^2$. Evidence of ring, coil building. From the same or similar vessels as P24-30. 6
- 20-30 91 frags.
- 31 2/3? base and 12 body sherds. The base sherds are flat with a slight foot and flaring wall. 1 body sherd is from a deeply concave neck and ledge carinated shoulder similar to 20. The walls are generally thin. At least 2 vessels represented. C4? hard grey-brown fabric well gritted with medium sized grits which are visible on the int and a few protrude through the ext. The surfaces are patchy orange-brown, rough and untreated. Carbon encrustation. d = c90; t = (base) 8.5 & 15? (wall) 5-10. 4
- 32 Rim, 2 joining pieces. V uneven. It is flat, thickened and slightly splayed with a round ext edge and a sharp but irregular int edge. Probably from a medium to large sized vessel. Soft grey-brown fabric with smoothed orange-brown surfaces. Patchy thin carbon encrustation on ext. t = (rim) 9-10 (wall) 7. 4
- 33 1 rim and 1 body sherd. The rim is roughly flat and unevenly thickened. They appear to be from a closed-mouthed vessel. Soft-hard grey-black fabric well gritted with medium sized grits including sandstone. Uneven surfaces with patchy carbon encrustation. t = (rim) 9-10.5 (wall) 8-9, 7. 4

- 34 Rim, int abraded, slightly flattened and uneven with a hollow neck. C4? soft-hard grey fabric well gritted with smoothed orange-buff surfaces. t = (rim) 6.5-7.7. 4
- 35 Body sherd, possibly decorated with a pellet. It is on a break and may just be a clay covered grit especially as the surfaces are v uneven. Hard grey fabric with grey and black surfaces. t = 10. 4
- 32-35 23 body sherds $\approx 30\text{mm}^2$ and 33 frags. 4
- 36 1 rim and 23 body sherds, 1 of which is carinated. Possibly the remains of a single roughly made vessel. The rim is flat and upright with the neck curving out. The shoulder sherd has a pronounced ledge carination and the lower wall curves gently in. The walls are thin but the lack of curvature suggests a large vessel. C4? soft-hard orange and grey-brown fabric. Well gritted. The surfaces are uneven and patchily smooth, ext orange-brown, int grey-brown with patches of carbon encrustation. t = (rim) 8 (wall) 8-9 (carination) 10 (body)8-13. 4
- 37 Rim, thickened, flat and upright, the neck curves out probably to a carination. From a medium sized vessel. Hard black fabric, well gritted. Rough surfaces encrusted with carbon but with possible wiping marks near the rim on the ext. t = (rim) 9 (neck) 6-8. 4
- 38 Rim, flattened. From a small open mouthed vessel. Similar in fabric and finish to 37. d = c130; t = 8. 4
- 37-38 12 body sherds 1 of which is concave and is possibly from the neck of 37. Some sherds are patchily orange-brown. t = 7.5-12.5. 4
- 39 Small, thin body sherd and frag. Soft orange and black fabric. t = 8. 4
- 40 Rim, probably unevenly flat and from a medium to large vessel with slightly bulging walls. Faint nicks, possibly decoration, on the upper surface. Hard but friable black fabric heavily and coarsely gritted ($\approx 14\text{mm}$). Rough int, carbon encrusted ext. t = 11.5. 8

41/

- 41 Rim, squared-off and flat. Hard black fabric, well gritted. Rough surfaces with patchy carbon encrustation. t = 11. 8
- 42 2 rimsherds, slightly thinned and rounded. Upright with an outcurving neck. Soft-hard black fabric with numerous small to medium grits. Rough carbon encrusted surfaces. t = 7-8. 8
- 40-42 16 body sherds and 20 frags. 1 sherd has a rounded carination and a concave neck. Several are patchily orange-brown. t = (carination) 10. 8

Section Cleaning

- 43 Rim v thick and rounded with a concave neck. Soft-hard grey fabric with buff ext possibly poorly hand-slipped, int v rough. t = 15. 6
- 44 1 rim and 4 body sherds, unlikely from the same vessel. The rim is roughly made and unevenly flattened, and is similar in fabric to 40-42. The body sherds are of a soft-hard orange-brown fabric and abraded. 6
- 45 1 rim and 2 body sherds. The rounded rim is either upright or slightly everted, the neck curves out. Hard black fabric, well gritted and with rough carbon encrusted surfaces. t = (rim) 6 (neck) 8 (wall) 8-9. 6
- 46 Body sherd. Soft orange-buff fabric, well gritted. Ring/coil built. t = 11.6. 6
- 47 2 thin body sherds, 1 concave. C4. Ring/coil built. t = 6-9. 6
- 48 2 frags of black and orange fabric, well gritted. 6
- 49 Possibly a single roughly made vessel represented by 2 rims, 1 carinated sherd, 12 body sherds 30mm^2 , 31 body sherds 30mm^2 and 20 frags. The lack of curvature suggests a large vessel though the walls are thin. The rim is rounded and upright with an outcurving neck. The carination is pronounced and the lower walls curve in. C4 with limestone? and micaceous sandstone grits. t = (rim) 7 (wall) 8-10. 6

Ploughsoil

- 50 3 body sherds and 4 frags. Soft-hard orange and black fabric, well gritted. The grits include sandstone. Untreated orange-brown ext and grey-black int. t = 9.5. 2
- 51 Base sherd, footed or of pedestal form with wide flaring walls. Hard dense black fabric. Fairly numerous elongate vesicles which suggest chaff or some sort of organic filler and a few small, possibly incidental rock grits. Ext smoothed. d = c40, t = (base) 15.5, (wall) 8.7-13. 2

Unstratified

- 52 3 body sherds and 1 frag. C4? hard brown-black fabric well gritted, some grits protrude through the untreated patchy orange, brown and black (carbon) surfaces. t = 8-10.5.
- 53 1 rim? 9 body sherds, 1 of which is convex, and 32 frags. The rim? is roughly made and rounded. Various fabrics but most are too small and in too poor condition to allow sorting. t = (rim) 7, (body) 8-13.
- 54 4 body sherds, 1 is either from the base or more likely from a ledge carination. From a medium to large vessel. Abraded. C4 with limestone? and micaceous sandstone grits. t = 7-9.
- 55 1 base? and 5 body sherds, 1 of which is from a concave neck. Flat base. Unlikely all from the same vessel. C4. t = (base) 11-12, (neck) 7, (body) 6-8.
- 56 Rim? abraded but v similar to P43. Hard grey fabric, well gritted. Rough grey-black int, slightly smoother, hand-slipped? orange and black ext. t = 12-15.

FLAKED STONE

C R Wickham-Jones

April 1982

Introduction

The flaked stone assemblage from Pierowall Quarry comprises 588 pieces. 90% of these were recovered from within the late Neolithic structure. The rubble below this structure contained 7% and the other stratigraphical units less than 1% each. Typological analysis of the complete assemblage revealed few differences between units, so that unless otherwise noted the discussion below is drawn from those pieces from within the late-Neolithic structure but refers to the assemblage as a whole.

Raw Materials

All the pieces are of flint. The abraded state of the surviving cortex, together with the flawed nature of many pieces and the range of colours present, indicate the use of a pebble source. In situ flint nodules are rare in Scotland, but deposits of rounded pebbles within boulder clay have been recorded upon three of the Orkadian Islands: North Ronaldsay, Swona and Stroms (Wickham-Jones & Collins 1978: 10-12). In addition flint pebbles may be collected from many Orkadian beaches to which they are transported from coastal or undersea exposures possibly in the roots of drifting seaweed (Piggott & Powell 1949, 160).

Although the range of colours visible today is likely to reflect that present when the assemblage was knapped, much of the assemblage (97%) is also corticated. This has muted many of the colours and is a post-depositional condition, as is that of the lustrous patination which affects 37% of the assemblage. On some of the pieces, eg 66, remnant patination exists on cortical surfaces, indicating that some, at least, of the original pebble nodules were affected by this surface condition.

A very few pieces, 14 altogether, are burnt. These are all/

all from within the late-Neolithic structure and probably represent chance contact with fire rather than any purposeful alteration or activity. They are all small débitage pieces and were all recovered from wet sieving.

Technology I: Primary Knapping Processes

There is only one core within the assemblage, but much evidence of the knapping techniques used may be drawn from the detachment characteristics surviving amongst the large body of flakes. The core itself, 64, is a scalar core and does not come from those layers containing the bulk of the knapping evidence, but within these layers, 11, are many flakes that show the common use of both scalar cores, which do not require the formation of conventional platforms, and platform cores.

The use of scalar cores is particularly adapted to the knapping of pebble nodules which are often very irregular. In such circumstances platform cores require careful trimming and control and although no core rejuvenation or trimming flakes were recovered many of the flakes themselves had remnant platform edge trimming at the proximal end, 47% of all flakes. The formation of artificial platforms upon these cores was demonstrated by 27% of the flakes, although evidence of their refinement by facetting was very rare, on less than 1% of the artificial platforms. The use of natural areas as platforms was demonstrated by only 1.4% of the flakes.

With regard to the actual force of flake removal, on both scalar and platform cores all the evidence points to the use of direct percussion. Only two flakes, both from the rubble below the middle Bronze Age structure, are bipolar, nos 234 & 235, and there is no indication anywhere of the use of indirect percussion. The use of soft hammers, such as antler or wood, seems to have been general. 71% of the flakes preserve the bulb of force and of these 95% have a diffuse bulb and only 5% a pronounced bulb. The existence of generally wide platforms, often with a slight lip at the ventral edge, also/

also supports the use of soft hammers.

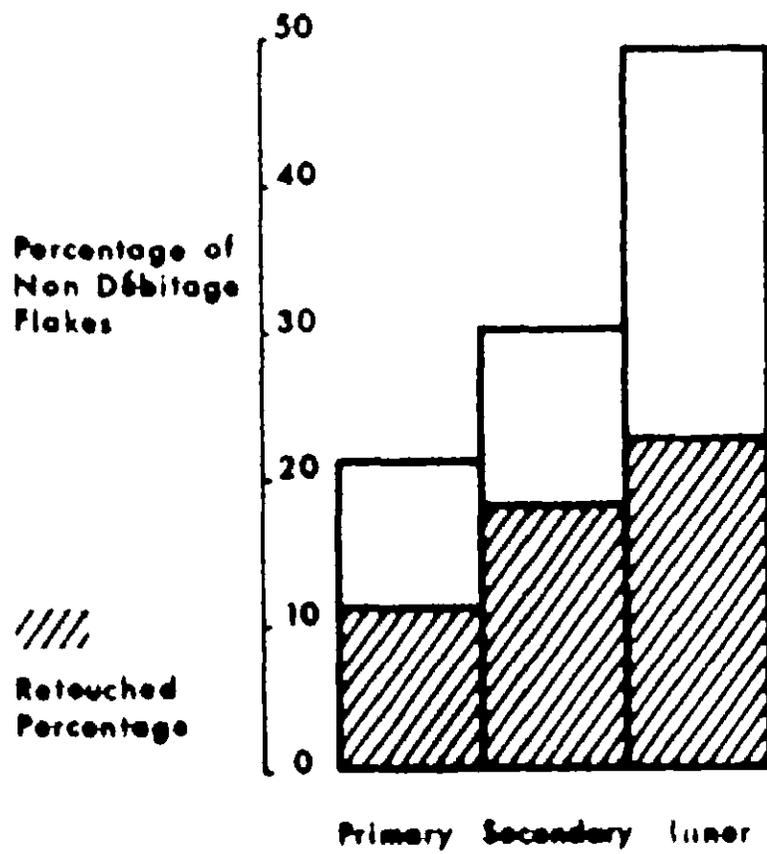
Very few of the flakes are of any great size. This will have been conditioned, however, by the original sizes of the pebble nodules which are likely to have been small themselves; note the sizes of those unknapped pieces in the assemblage nos 57-83. In addition, the majority of the assemblage, 95%, consists of débitage from knapping, thus biasing the sample. Generally, there are enough larger and retouched flakes to indicate that, using the techniques outlined above, the knappers at Pierowall Quarry were successful in producing the flint tools that they required.

Technology II: Secondary Knapping Processes

Once a series of suitable flakes have been produced secondary alteration may be desired, but is by no means a prerequisite for use. Such work may have two main aims that can be used either singly or together. In some cases the alteration of a particular edge to meet certain working specifications is all that is required, while in other cases complete alteration of shape is necessary.

At Pierowall Quarry secondary alteration has been carried out by retouching work, the removal of smaller flakes along the edges or across the surfaces of blanks. Blanks were selected largely on the basis of size and suitability for the task in hand. Although there are some smaller retouched pieces they are generally larger than the non-débitage flakes of the rest of the assemblage and in many cases little alteration of the original flake shape was necessary. The percentages of primary, secondary and inner flakes selected for alteration reflect those of the unretouched, non-débitage flakes, indicating a random selection amongst these flake categories (table 24). The inclusion of three cortical flakes and one primary chunk amongst the retouched pieces supports this picture of initial selection on a basis of size. There is no evidence for any blank selection on the basis of colour.

One/



Illus 35 Typological composition of the non débitage flakes

One of the pieces, 627, is made upon a flake removed from a previously partially polished tool but this is the only evidence of polishing from the site and does not offer conclusive proof of the use of this technique on site.

Both the shapes and sizes of the retouch scars vary greatly. They are adapted to suit the particular alteration necessary for any one piece. Generally, however, all the scars are relatively small and smooth and it is most likely that pressure work, using an antler tine for example, was employed.

As the characteristics of the secondary knapping vary greatly within each morphological category of tool they will be discussed separately below in the relevant categories.

1. Scrapers

Scrapers form the majority of the retouched pieces (70%). Few of them show much alteration of the basic flake shape but the retouch used to create the faces varies not only in length and regularity but also in steepness (see illus 21-23). The scraper face was most commonly worked upon the distal end of flakes but other edges were also used, either alone or in combination with the distal end. Some of the blanks were formed from broken flakes, eg 621, but in other cases pieces have broken after retouch, eg 626.

Nine of the end scrapers, nos 613, 616-618, 621-622, 624-625 & 630, and three of the side scrapers, 629-631, have indications of thinning or damage upon the end opposite the scraper face, demonstrating slight alteration of the flake shape which may be related to hafting. Many of the other pieces, eg 615 & 619-620, have naturally shaped butt ends and, although it is not a pre-requisite of use, hafting would certainly increase the efficiency of these pieces.

Piece 627, the double-ended scraper has been made upon the previously polished flake. Here the retouch extends around/

around the right hand margin of the flake and as the distal end has been worked from the dorsal face the bifacial, gently angled, retouch on the right side has produced a skewed profile. The distal end is narrower than the proximal and may indicate hafting alteration but as a steep, undercut, scraper face exists at this end it is also possible that a true double-ended tool is involved. This piece is slightly larger than many of the other scrapers.

The reworking or resharpening of scrapers may be indicated by 635, a flake struck across a scraper face and therefore bearing upon its dorsal face the crested scraping edge with retouch scars running down to the left.

2 Edge retouched flakes

Of the four edge retouched flakes, 636-639, only one, 637, is complete. No 638 has been truncated by the removal of the distal end and most of the left side while small sections only survive of 636 and 639. Indeed, there is no conclusive evidence that either of these latter pieces ever formed part of a tool as large as the former two, although they have been worked in a similar fashion.

637 has been worked upon one of the longest flakes from within the assemblage with abrupt edge retouch used to regularize the shape and create two relatively straight long sides and a broad convex distal end. Although it is badly damaged, 638 is still long and appears to have formed part of a similar tool. 639 has lost the distal end, and the surviving retouch, which is truncated by the snap, is quite irregular and particularly large on the left side. Such coarse retouch is not common amongst the rest of the assemblage and suggests that the piece was unfinished when it was broken. The distal end is also missing from 636 which has a truncated length of retouch along the left side only. Unlike the others, which were all worked upon inner flakes, this piece is a primary flake and cortex therefore extends along the right side. This side has a regular, long profile, however, and it is possible that a naturally backed tool was desired.

3 Other retouched pieces

The five remaining retouched pieces, 640-644, are all irregular flakes with short lengths of often coarse retouch. In some cases unfinished tools may be represented but in others, eg 641 & 644, the piece is broken so that interpretation is impossible.

The Morphology and Function of the Assemblage

The bulk of the assemblage consists of débitage produced by both the primary and secondary processes of knapping. Although there is only one core present it seems likely that the assemblage was primarily formed by knapping activities rather than by the use of the tools produced. The presence of a number of larger pieces, both retouched and unretouched, does, however, suggest that other activities were taking place.

Macroscopically, much of the retouch is undercut by varying degrees of edge damage and there are a few pieces, eg 64, 79, 215 & 232, with edge damage upon unretouched edges. Such damage may be caused by a variety of factors, such as edge abrasion during knapping or post-depositional wear and tear, but the general characteristics of that present does suggest use.

If it is assumed that the tools present form a representative selection of those knapped then it is apparent that the aim was to produce two main types of retouched piece, scrapers and edge retouched flakes. The edge retouched flakes are few in number and mostly broken so that little variation may be determined among them. The scrapers, however, are more numerous and a variety of depths and shapes of scraper edges exists. It is possible that these were intended to fulfill different tasks but in order to ascertain details of the individual functions and activities a microwear analysis is necessary and was not feasible within the present study.

The Distribution of the Assemblage

The assemblage was recovered from a number of discrete stratigraphical units within the site. The majority of these produced only a few pieces which archaeological evidence (see 'Excavations: late Neolithic reconstruction', in printed section) suggests were probably derived from the two main areas of flint deposition, the area within the late Neolithic structure and the rubble platform below. Certainly there is no technological or morphological evidence to distinguish between the groups of flints.

Within the late Neolithic structure there was a large amount of knapping debris together with a number of larger flakes and retouched pieces. Further stratigraphical breakdown within the deposit reveals an increased depositional differentiation. Of the two main layers within the structure the lower one, 11, contained all the knapping debris with only a few retouched pieces while the layer above, 10, contained a few pieces only, the core, larger unretouched flakes and a high proportion of retouched pieces. Unlike layer 11, layer 10 was not sieved but although this process produced most of the smaller débitage within 11, some was still recovered by hand and the complete absence of any within layer 10 does support the validity of the differentiation.

The activities within the area excavated inside the late Neolithic structure, as outlined by the flint assemblage, would therefore seem to have changed with time. Although the time gap may well be only very slight the initial activity seems to have involved a period of flint knapping. The presence of a large proportion of very tiny debris does suggest that this débitage is in situ although it is possible that a dump of waste material is represented. After this the actual use of flint tools seems to have taken place. The presence of the single core within this material is not necessarily out of place as such scalar cores readily lend themselves to re-use after exhaustion. Unfortunately, the deposition of these tools was disturbed by the collapse of part of the structure itself so that their horizontal distribution produced/

produced no patterning at all. It is indeed possible that the presence of some of the larger pieces amongst the knapping debris below may be accounted for by movement possibly associated with this disturbance.

The rubble platform below the late Neolithic structure contained only 40 pieces of flaked stone. Although a sample of the material was wet sieved this produced only one piece of flint and the majority of the assemblage comprises larger flakes and retouched pieces. There is very little knapping debris, such as there is may well have percolated down from the area within the structure above. Technologically and morphologically the assemblage is very similar to that recovered from the layers above. Although it contains a higher percentage of edge retouched flakes the same knapping tradition is involved. Once again, the occurrence of activities involving the use of stone tools would seem to be represented.

Notes to the Catalogue

- i All pieces are of flint.
- ii When examining the pieces they are always held with the dorsal face uppermost and the proximal end towards the observer.
- iii Dimensions are given in millimetres in the order: length; width; thickness.
- iv Length is measured in millimetres along a line at 90° to the platform of the piece, width is in the same plane and at 90° to the length along a line across the widest part of the flake, thickness is measured from the ventral surface to the highest point of the dorsal surface along a line perpendicular to both length and width. Each measurement gives a maximum reading.
- v In the case of pebbles, chips and chunks the axes of measurement have been arbitrarily chosen.
- vi Chips and chunks have neither a platform nor a ventral surface. The largest dimension of a chunk is over 15mm, that of a chip is under 15mm.

iii Primary/

vii Primary flakes are those that have a dorsal face composed entirely of cortex. Secondary flakes have some cortex on the dorsal surface in addition to some fresh surfaces formed by the negative scars of previous flakes removed from the nodule. Inner flakes are composed entirely of fresh flint with no cortex surfaces at all. Cortex is the original, abraded outer surface of the nodule.

viii The retouched pieces have been allocated names in the absence of functional analysis. Where relevant, traditional, functional names have been retained in parenthesis although no functional information is intended.

ix Macroscopic edge damage has been noted where apparent. It generally consists of the removal of small flakes and may be due to use, although this cannot be verified without the use of a high-powered microscope. Unless otherwise noted the damage occurs upon the dorsal surface of an edge. Spontaneous retouch has not been recorded.

x Cortication refers to the matt discoloration which may cover the surface of a piece with time. Patination is the lustrous sheen that may subsequently develop (Shepherd 1972, 114-18).

xi The following abbreviations have been used:
l: left edge angle, r: right edge angle,
d: distal edge angle, p: proximal edge angle.

xii The key to the tabulated entries is as follows:-

- x Present
- l Lightly
- 1 One surface only
- r Surfaces rounded
- o Outer surface only
- o Partially present

The entry in the 'Broken' column denotes the surviving part. Any additional information is provided in the final column.

xiii The following abbreviations have been used in the tabulation headings:-

Cat no	Catalogue number
Cort	Corticated
Pat	Patinated
Nat P	Natural Platform
Art P	Artificial Platform
Fac	Faceted platform
Dif B	Diffuse bulb
Pro B	Pronounced bulb
P Lip	Platform lip
P Trim	Platform edge trimmed
Hinge E	Hinge ended
Macro E D	Macroscopic Edge Damage
Deb	Debitage
Ret	Retouching Flake
W S	Recovered from the wet sieves

FLAKED STONE CATALOGUE

Cat no	Site no		Layer
Modules			
57	18	White; cortical; 55:40:15	unstrat
58	103	Grey/brown; mainly cortical; 30:27:11	11
59	198	Orange; corticated; 30:22:19	20
60	228	Pale grey; corticated; some natural chipping; 32:31:19	20
61	230	Pink; partially corticated; lightly patinated; some natural chipping; 32:28:15	20
62	106	White; cortical; 23:19:10	22
63	232	Grey; corticated; badly flawed; 33:15:13	16
Scalar Core			
64	68	White; corticated; three strikes; remnant cortex on left side; heavy damage at both ends; possibly re-used after exhaustion; 22:26:07; d 31 ⁰ , p 40 ⁰	10

Cat No	Site No	Colour	Cort	Pat	Macro E D	Size	deb	w/s	layer
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Chunks

Primary Chunks

65	26	Grey/ brown	x	x 1 1 sur		23:15:11	x		10
66	11	Honey		x 1		34:23:18	x		2

Secondary Chunks

67	65	Grey	x	x 1 roun		35:14:07	x		11
68		P grey	x			17:10:03	x	x	11
69		Honey	x			17:10:10	x	x	11
70		Grey	x			16:07:05	x	x	11
71	102	Grey	x	x o r		15:10:05	x		11
72	17	Honey		x 1		16:09:08	x		unstrat
73	147	P grey	x			23:13:07	x		22
74	94	P grey	x			21:12:09	x		22
75	233	P orange	x			15:13:08	x		21
76	185	P orange	x			18:11:06	x		20
77	178	Honey	x	x 1		26:19:10	x		13

Inner Chunks

78		Grey	x			15:10:07	x	x	11
79		Cream	x	x r abraded	x	17:11:05	x	x	11
80	226	Cream	x			16:15:08	x		20
81	72	Cream	x			20:12:02	x		12

Chips

Primary Chips

82		Orange	x	x		07:10:03	x	x	11
83		Grey	x			08:06:02	x	x	11
84		Orange	x	x		07:06:02	x	x	11
85		Orange	x			07:05:02	x	x	11
86		White	x			09:06:03	x	x	11
87		P grey	x	x		07:05:02	x	x	11
88		Honey	x			06:03:01	x	x	11

Cat No	Site No	Colour	Cort	Pat	Macro E D	Size	deb w/s	layer
Secondary Chips								
89		Grey	x	x 1		12:08:04	x x	11
90		Grey	x	x 1		07:06:02	x x	11
91	66	Grey	x			07:05:03	x	11
92		Pink/white	x			06:05:02	x x	11
93		Orange	x			06:03:01	x x	11
94		Pink/cream	x	x 1		06:03:02	x x	11
95		Cream	x			05:04:01	x x	11
96	89	Cream	x			10:06:03	x	22
97	219	P grey	x	x		10:10:10	x	25
98		Cream	x			05:05:01	x x	11
99		Cream	x			04:03:01	x x	11
100	66	Cream	x			03:03:01	x	11
101	53	Cream	x			03:03:01	x	11
102		Grey/white	x p	x p		08:04:03	x x	11
103		Cream	x			06:04:02	x x	11
104		Cream	x			05:03:01	x x	11
105		Cream	x	x 1		04:03:01	x x	11
Inner Chips								
106		Pink	x			11:05:01	x x	11
107		P grey	x	x 1		07:04:01	x x	11
108		Orange	x			06:02:02	x x	11
109		Pink	x			04:03:01	x x	11
110		Cream	x			12:11:03	x x	11burnt
111		Cream	x			08:06:03	x x	11
112		P grey	x			10:05:03	x x	11
113		Cream	x	x 1		13:03:02	x x	11
114		P orange	x			11:04:01	x x	11
115	78	Cream	x			09:04:02	x	11
116		P grey	x			08:06:01	x x	11
117		P orange	x			09:04:03	x x	11
118		Cream	x	x 1		08:04:03	x x	11

Cat No	Site No	Colour	Cort	Pat Macro	Size	deb	w/s	layer
Inner Chips (cont)								
119	93	P grey	x		14:10:08	x		22
120	109	Pink	x	x	09:07:05	x		22
121		P grey	x	x 1	07:04:01	x	x	11
122		Orange	x	x 1	07:03:03	x	x	11
123		Cream	x	x 1	05:03:02	x	x	11
124		Orange	x		04:04:02	x	x	11
125		P grey	x		05:03:02	x	x	11
126		Cream	x		05:04:01	x	x	11
127		White	x		05:04:01	x	x	11
128		Orange	x	x 1	04:03:01	x	x	11
129		Cream	x		03:02:01	x	x	11
130		White	x		03:02:01	x	x	11
131		Orange	x		08:05:03	x	x	11
132		Pink	x		05:06:02	x	x	11
133		Orange	x		06:04:02	x	x	11
134		P grey	x		07:03:02	x	x	11
135		P grey	x		06:02:03	x	x	11
136		P grey	x		07:03:02	x	x	11
137		White	x		05:05:01	x	x	11
138		White	x		05:05:02	x	x	11
139		Pink	x		05:02:02	x	x	11
140		Pink	x	x 1	04:03:02	x	x	11
141		White	x		07:03:01	x	x	11
142		Honey	x		04:02:02	x	x	11
143		Orange	x 1		03:04:01	x	x	11

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W	S	Layer
Primary Flakes																					
144	36	P grey	x	x	1		x			x						25:20:08					10
145	31	Cream	x			distal										22:25:06					10
146		Cream	x													16:14:04			x		11
147	79	Cream	x													12:04:02	x				11
148	46	Cream	x				x									07:06:02	x				11
149		Cream	x			segment										04:04:01	x		x		11
150		P orange	x								x					04:05:02	x		x		11
151		P grey	x				x									11:09:04	x		x		11
152		Orange	x							x						10:08:01	x		x		11
153		White	x							x		x				05:03:01	x		x		11
154		White	x							x						04:03:01	x		x		11
155		White	x							x						04:03:01	x		x		11
156	209	Pink	x			right	x			x		x				38:21:10					21
157	221	Red	x				x			x						12:21:05					22
158	225	P grey	x			segment										14:10:03					22
Secondary Flakes																					
159	37	P orange	x	p		distal										16:24:11					10
160	78	White	x							x						19:16:06					11
161	79	P grey	x	x	1		x			x		x				13:09:04	x				11
162	57	P grey	x	1	x	1	x			x		x				07:13:02	x				11
163	43	Cream	x	x	1			x		x		x				14:07:02	x	x			11
164		P grey	x	x	1			x		x		x	x			11:06:02	x	x	x		11
165		P grey	x					x		x		x	x			10:07:02	x	x	x		11
166		Cream	x	x	1			x		x		x	x			09:04:01	x	x	x		11

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W S	Layer
Secondary Flakes (cont)																				
167		P grey	x	x	1											07:08:02	x		x	11
168	104	P orange	x	x		middle										08:05:02	x	x		11
169		P grey	x					x		x		x	x			08:06:02	x		x	11
170		Orange	x	x	1		x			x						09:06:01	x		x	11
171		P grey	x	x	1					x			x			09:04:02	x	x	x	11
172		Cream	x							x			x			08:05:01	x	x	x	11
173	184	P grey	x				x			x		x				27:28:08				20
174	187	Pink	x	x	1					x			x			32:26:13				20
175	227	Pink	x	x	1					x				x		14:15:06				21
176	110	P grey	x					x		x			x			19:13:05				20
177	234	Honey	x	x	1		x			x						29:17:08				35
178		Cream	x							x			x			09:05:02	x		x	11
179	66	Cream	x			middle										06:06:01	x			11
180		Cream	x					x		x		x	x			05:06:01	x	x	x	11
181		Cream	x				x			x						06:06:01	x		x	11
182		Cream	x							x						07:05:02	x		x	11
183		P grey	x							x						07:04:01	x		x	11
184		P grey	x							x			x			07:04:01	x		x	11
185		P orange	x	x	1	segment										05:07:02	x		x	11
186		White	x	x	1					x						04:04:01	x	x	x	11
187		P grey	x			segment										04:04:01	x		x	11
188		P grey	x	p	x	1										06:03:01	x		x	11
189		Cream	x			segment										02:04:01	x		x	11
190	52	Honey	x	p	x	1										04:05:01	x			11
191	60	Orange	x			prox				x			x			04:05:01	x			11

Ca' No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E O	Size	Deb	Ret	W	S	Layer
Secondary Flakes (cont)																					
192	63	Pink	x	x	1											04:04:01	x				11
193		P grey	x			distal										06:06:01	x	x	x		11
194		Cream	x					x		x		x				06:05:01	x		x		11
195		P grey	x													05:04:01	x		x		11
196		P grey	x	x	1					x		x				07:05:01	x	x	x		11
197		P grey	x					x		x		x	x			10:05:02	x	x	x		11
198		Orange	x	p	x	1				x			x			08:05:01	x	x	x		11
199		White	x	x	1			x		x		x				09:05:01	x	x	x		11
200		White	x							x		x				07:06:01	x	x	x		11
201		Grey	x	p	x	1				x			x			09:05:01	x	x	x		11
202		Orange	x	p	x	1				x						09:04:02	x	x	x		11
203		Honey	x			prox				x						07:05:02	x		x		11
204		P Grey	x	x	1					x						08:05:01	x	x	x		11
205		P Grey	x								x		x			07:04:01	x	x	x		11
206		White	x			segment										07:03:01	x		x		11
207		White	x							x			x			06:04:01	x	x	x		11
208		Pink	x	p	x	1					x					06:06:01	x	x	x		11
209		White	x					x		x						05:05:01	x		x		11
210		Honey	x	x	1	prox				x			x			05:05:01	x	x	x		11
211		Grey	x	p	x	1	prox		x			x	x			05:06:01	x	x	x		11
212		White	x			dist										04:03:01	x		x		11
213		P grey	x	x	1					x						06:02:01	x	x	x		11

Inner Flakes/

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W	S	Layer
Inner Flakes (cont)																					
214	47	P grey	x							x						22:12:04					11
										negat											
215	78	P grey	x							x						22:17:05					11 135 ^o r41 ^o
216	45	Cream	x	x	1			x		x		x	x			10:08:02	x	x			11
217	77	Cream	x								x		x			12:08:02	x	x			11
218	77	Cream	x					x		x		x				10:08:02	x	x			11
219	55	Cream	x							x		x	x			10:06:01	x	x			11
220	58	Cream	x	x	1	prox				x						09:07:02	x				11
221	56	Cream	x					x		x		x	x			07:08:01	x	x			11
222		Pink	x	x	1			x		x		x	x			13:08:02	x	x	x		11
223		P grey	x	x	1					x			x			13:07:01	x	x	x		11
224		Pink	x	x	1			x		x		x	x			13:06:01	x	x	x		11
225		Pink	x	x	1			x			x	x	x			11:07:02	x	x	x		11
226		Pink	x	x	1			x		x		x	x			11:05:01	x	x	x		11
227		Pink	x	x	1								x			13:05:02	x	x	x		11
228	79	Pink	x	x	1					x			x			13:05:01	x	x			11
229		Grey	x	p	x	1										13:05:02	x		x		11
230		Pink	x	x	1					x		x	x			10:06:01	x	x	x		11
231		Pink	x	x	1	prox		x		x		x	x			11:06:01	x	x	x		11
232	220	P grey	x	1				x		x						29:23:08					9 181 ^o r75 ^o
233	188	Pink	x			segment										22:12:06					20
234	107	Cream	x							x						27:14:07					22 bipolar

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W	S	Layer
Inner Flakes (cont)																					
259	79	Honey	x			segment										05:07:01	x			11	
260		P grey	x					x		x		x	x			09:04:01	x	x		11	
261	62	Pink	x							x						09:06:01	x			11	
262		Cream	x					x		x		x	x			09:05:01	x	x	x	11	
263		P grey	x	x	1					x						06:07:01	x		x	11	
264		Red		x	1	x										09:06:01	x		x	11	
265		Grey	x					x		x		x	x			10:05:01	x	x	x	11	
266		Cream	x							x			x			10:04:01	x	x	x	11	
267		Cream	x					x		x		x	x			07:06:01	x	x	x	11	
268		Cream	x							x		x	x			08:04:01	x	x	x	11	
269		P grey	x					x		x		x				08:05:01	x	x	x	11	
270		Cream	x	x	1			x		x		x	x			09:04:01	x	x	x	11	
271		Cream	x	x	1			x		x		x	x			10:04:01	x	x	x	11	
272		Cream	x	x	1			x		x		x	x			07:05:01	x	x	x	11	
273		P grey	x	x	1	x		x		x		x				06:07:02	x		x	11	
274		P grey	x	x	1						x		x			09:04:01	x	x	x	11	
275		Cream	x	x	1					x		x	x			09:06:01	x	x	x	11	
276		Honey	x							x			x			09:04:01	x	x	x	11	
277		Orange	x	x	1					x						10:04:01	x	x	x	11	
278		Orange	x	x	1											07:05:01	x	x	x	11	
279		Cream	x	x	1					x		x	x			08:05:01	x	x	x	11	
280		Cream	x	x	1						x	x	x			08:06:01	x		x	11	
281		Cream	x	x	1			x		x		x				09:04:01	x	x	x	11	
282		Honey	x	p	x	1										07:07:02	x		x	11	
283		White	x					x		x		x	x			06:07:02	x	x	x	11	

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W S	Layer
Inner Flakes (cont)																				
284		Orange	x	x	1	prox										07:05:01	x		x	11
285		Cream	x							x						08:04:01	x	x	x	11
286		P grey	x			middle										07:05:01	x		x	11
287		Cream	x				x		x			x	x			07:05:02	x		x	11
288		Cream	x	x	1	middle										07:06:01	x		x	11
289		P grey	x	x			x		x			x	x			07:05:01	x	x	x	11
290		Honey	x	p	x	1	x						x			07:05:01	x	x	x	11
291		Orange	x			middle										04:08:01	x		x	11
292		Cream	x				x		x				x			06:06:02	x	x	x	11
293		Cream	x				x			x						07:05:01	x	x	x	11
294		Pink	x			prox	x	x		x	x					04:08:02	x		x	11
295		Cream	x						x				x			06:06:01	x	x	x	11
296		Cream	x						x							08:04:01	x	x	x	11
297		Cream	x						x							08:05:01	x	x	x	11
298		Cream	x						x				x			06:07:02	x	x	x	11
299		Cream	x						x				x			07:05:01	x	x	x	11
300		Cream	x	x	1				x							06:07:01	x		x	11
301		Red		x	x		x		x							07:05:01	x	x	x	11
302		White	x						x				x			05:05:01	x	x	x	11
303		P grey	x			x										07:04:01	x	x	x	11
304		Cream	x			middle										07:03:01	x		x	11
305		Pink	x	x	1	prox			x				x			06:04:01	x	x	x	11
306		Honey	x	x	1				x							07:04:01	x	x	x	11
307		P grey	x	x	1	middle										05:04:01	x	x	x	11
308		Pink	x	x	1	middle										04:06:01	x		x	11
309		Cream	x						x				x			06:05:01	x		x	11

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W	S	Layer
Inner Flakes (cont)																					
310		P grey	x	x	1	prox		x		x		x	x			06:04:01	x	x	x		11
311		Honey	x	x	1			x		x		x	x			05:05:01	x	x	x		11
312		Cream	x							x						07:03:01	x	x	x		11
313		P grey	x			prox				x			x			06:05:01	x	x	x		11
314		Pink	x			prox		x		x		x				07:04:01	x	x	x		11
315		P grey	x								x					05:05:01	x	x	x		11
316		White	x					x		x		x	x			05:04:01	x	x	x		11
317		Orange	x	x	1											07:03:01	x		x		11
318		White	x					x		x		x	x			05:05:01	x	x	x		11
319		Orange	x	x	1	middle										06:05:01	x	x	x		11
320		White	x			prox				x						04:05:01	x	x	x		11
321		Cream	x			middle										06:06:01	x		x		11
322		Red				x prox				x		x				05:04:01	x		x		11
323		Honey	x	p	x	1 dist										06:05:01	x		x		11
324		Cream	x	x	1					x						06:04:01	x	x	x		11
325		Cream	x													04:07:01	x		x		11
326		Orange	x	p	x	1				x			x			06:05:01	x	x	x		11
327		Red	x	p	x	1				x						04:04:01	x	x	x		11
328		Orange	x			middle										06:05:01	x		x		11
329		Pink	x	x	1			x		x						06:03:01	x	x	x		11
330		Cream	x					x		x		x	x			05:04:01	x	x	x		11
331		Cream	x			middle										05:04:01	x	x	x		11
332		Honey	x			prox		x		x		x	x			05:05:01	x		x		11
333		Cream	x							x			x			06:03:01	x	x	x		11

Cat Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif B	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W S	Layer
Inner Flakes (cont)																			
334	White	x							x						04:04:01	x	x	x	11
335	Honey	x	x 1												06:04:01	x		x	11
336	Honey	x	x 1		middle										04:06:01	x		x	11
337	White	x			prox				x		x				04:05:01	x	x	x	11
338	P grey	x	x 1		prox				x		x				06:04:01	x	x	x	11
339	Orange	x	x 1		dist										04:05:01	x	x	x	11
340	Orange	x	x 1						x		x				04:03:01	x	x	x	11
341	Grey	x		x											03:03:01	x		x	11
342	Orange	x							x						05:03:01	x		x	11
343	Orange	x	x 1						x		x				03:06:01	x		x	11
344	Red			x					x						04:03:01	x		x	11
345	Orange	x p	x 1												05:04:01	x		x	11
346	White	x							x						04:03:01	x		x	11
347	White	x			prox				x						05:04:01	x	x	x	11
348	P grey	x													05:04:01	x		x	11
349	Honey	x p	x 1		prox				x						08:04:01	x		x	11
350	Cream	x			prox				x						03:05:01	x		x	11
351	Cream	x	x 1		middle										05:03:01	x		x	11
352	Honey	x			prox				x						05:03:01	x	x	x	11
353	Cream	x	x 1		distal										04:03:01	x	x	x	11
354	White	x			prox				x		x				03:02:01	x		x	11
355	White	x							x		x				05:03:01	x		x	11
356	Cream	x			prox				x						04:03:01	x		x	11
357	Cream	x			prox				x						04:02:01	x		x	11
358	Cream	x			middle										05:02:01	x		x	11

Cat No	Site No	Colour	Cort	Pat	Burnt	Broken	Nat P	Art P	Fac	Dif R	Pro B	P Lip	P Trim	Hinge E	Macro E D	Size	Deb	Ret	W	S	Layer
Inner Flakes (cont)																					
359		Pink	x			prox		x				x				02:05:01	x		x	11	
360		P grey	x					x		x		x	x			07:05:01	x	x	x	11	
361		White	x							x			x			08:04:01	x	x	x	11	
362		Cream	x							x		x	x			06:04:01	x	x	x	11	
363		Cream	x							x						06:04:01	x	x	x	11	
364		P grey	x							x						06:06:01	x	x	x	11	
365		P grey	x			prox					x		x			05:06:01	x	x	x	11	
366		P grey	x			prox					x					04:07:01	x		x	11	
367		Cream	x	x 1						x						06:05:01	x	x	x	11	
368		P grey	x			middle										05:05:01	x		x	11	
369		White	x							x			x			05:04:01	x	x	x	11	
370		Orange	x			prox				x						04:06:01	x		x	11	
371		P grey	x					x		x		x	x			05:04:02	x	x	x	11	
372		Honey	x	x 1						x			x			07:05:01	x	x	x	11	
373		Pink	x							x						07:03:01	x	x		11	
374		P grey	x					x		x			x			08:04:01	x	x	x	11	
375		Honey	x							x			x			05:06:01	x	x	x	11	
376		P grey	x							x						06:04:01	x	x	x	11	
377		Orange	x							x		x				06:04:01	x	x	x	11	
378		Pink	x					x		x		x	x			06:05:01	x	x	x	11	
379		Cream	x			prox				x			x			06:04:01	x	x	x	11	
380		White	x			middle										05:02:01	x	x	x	11	
381		P grey	x			prox				x						05:05:01	x		x	11	
382		Honey	x	x 1												04:03:01	x	x	x	11	
383		Orange	x			middle										04:04:01	x		x	11	