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Mesolithic and Later Sites at Kinloch, Excavations 1984–86

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8 THE LITHIC ASSEMBLAGE: USE AND DEPOSITION

INTRODUCTION

The lithic artifacts recovered from Kinloch are the products of a series of human activities (Bonnichsen 1977; Knutsson 1988a, 11–18). The first of these have already been considered: the selection and procurement of raw materials and their reduction into specific tool types. After manufacture, however, artifacts still have some way to go before they enter the archaeological record. The next stage would usually be use, followed perhaps by maintenance or curation, and finally deposition. The stages of manufacture, use, and deposition have been termed the 'Formative Processes' (Madsen 1986, 5; Knutsson 1988a, 22–3), and they are to be differentiated from the subsequent post-depositional 'Formation Processes' (Schiffer 1976). Formation processes are discussed in Chapter 12; the present section is concerned with the period of time between the manufacture of the assemblage and its incorporation into the archaeological deposits. It includes analysis of both the function and the deposition of the assemblage, but first it is necessary to question the relationship between the recovered assemblage and the assemblage that was originally deposited.

Lithics were collected by both manual collection and by wet sieving, to ensure that the archaeological assemblage might be representative of the original composition of the prehistoric assemblage (Chapter 2). The most obvious impact of the wet sieving was that it greatly increased the size of the recovered assemblage (Tab 9), but in addition certain types of artifact were apparently more likely to be recovered through visual inspection than were others. Table 10 was constructed in order to illustrate the biases operating in the material recovered by hand. In this figure the composition of a hypothetical sample of 1000 artifacts recovered by wet sieving in combination with manual collection is predicted, then compared with the composition of the assemblage that would be expected from hand collection only. From this a bias factor for each artifact type may be calculated. Some types are seen to be over-represented in the manual collection, while other types are under-represented, but it must be stressed that these particular bias factors apply only to Kinloch. The excavators at Kinloch were clearly more likely to recover larger artifacts of known type on site (eg cores or scrapers), but their interest in hunter-gatherer

Recovery Technique	Pebbles	Cores	Blades	Regular Flakes	Irregular Size Flakes	Irregular Chip Flakes	Chunks	Microliths	Non-Microlithic Ret. Pieces	Total
Manual	10	76	232	1253	1568	1145	350	46	26	4706
%	50%	63%	39%	39%	34%	8%	14%	17%	59%	18%
Wet Sieve	10	44	357	1994	3034	12916	2215	224	18	20812
%	50%	37%	61%	61%	66%	92%	86%	83%	41%	82%
Total	20	120	589	3247	4602	14061	2565	270	44	25518

Table 9: Recovery techniques: a comparison of the different recovery rates by lithic artifact type.

sites may be reflected in the high manual recovery rate for microliths, despite their small size. Even with a 3mm mesh sieve, much lithic material will still be lost (Bang-Andersen 1985, 21; Payne 1972, 52–3; Fladmark 1982), but with sieving the biases inherent in manual collection are reduced, so that the archaeological sample may be considered with more confidence to represent that buried in prehistory.

Sample of 1000 pieces Expected composition	Pebbles	Cores	Blades	Regular Flakes	Irregular [illegible] Flakes	Irregular [illegible] Flakes	Quartz	Microliths	Non-microlithic ret. pieces
by hand + sieve	1	4	23	127	180	551	101	11	2
by hand alone	2	16	49	266	333	243	75	10	6
Bias of hand collection at Kinloch	× 2	× 4	× 2	× 2	× 2	÷2	÷1.5	-	× 3

Table 10: The bias factors for hand collection at Kinloch.

THE FORMATIVE PROCESS

Manufacture has already been considered, and here evidence relating to use and deposition is examined; this encompasses five fields:

- the existence of a range of modified artifacts;
- the existence of macroscopic edge damage on many artifacts;
- the existence of specific breakage patterns amongst the modified artifacts;
- the existence of resharpening flakes and other indications of tool maintenance;
- the spatial patterning and associations of the lithic artifact types across the site.

THE RANGE OF MODIFIED ARTIFACTS

Amongst the assemblage there are a number of types of modified tools, all of which would be suitable for a variety of functions (Knutsson 1988a, 142–6; 1988b, 9–20). These pieces may have been used on site, but they may be freshly made tools awaiting removal for use elsewhere (particularly if the site were used for specialised production, cf Torrence 1986), or they could be failed tools, ie artifacts that did not conform to the prescribed type and so were discarded before use. As they generally conform to clear patterns of modification, the artifacts at Kinloch are unlikely to be failed tools, and a close examination of the pieces reveals that many bear macroscopic edge damage, and still more are broken.

MACROSCOPIC EDGE DAMAGE

Macroscopic edge damage occurs on many of the modified tools from Kinloch and it is seen on both retouched edges and unmodified edges. Although not systematically recorded, it was also observed on the regular flakes and on the blades, as well as on much of the debitage. Macroscopic edge damage may be caused by manufacture, use, or post-depositional pressures, eg plough damage or trampling (Betts 1978; Knudson 1979). Without microscopic examination, however, it is usually impossible to distinguish between damage that has resulted from use and post-depositional damage. The most obvious example of edge damage caused by use occurs amongst the borers, where many of the tips are noticeably rounded and blunted.

BREAKAGE

Breakage may result from use and from post-depositional pressures. When due to post-depositional pressure it generally occurs in a random fashion exploiting the structural weaknesses of the pieces. Breakage due to use generally occurs in more consistent patterns, as certain tool shapes are repeatedly subject to particular pressures. For this reason, the examination of any patterns of breakage amongst different tool types may shed light on tool use. At Kinloch certain tool types showed particular breakage patterns: many of the borers had lost their tips, and both the borers and the simple scrapers were frequently laterally broken. There were many broken scraper edges that had snapped just behind the scraper face; in these cases the face was usually made on the distal end of the blank, and they appeared to have broken from simple scrapers (Ill 56. 16–18). In contrast with the scrapers, the fragments of broken edge retouched pieces were varied. The particular patterns of breakage on scrapers have been noted on other sites, and it has been suggested that breakage was a deliberate part of tool manufacture (Broadbent 1979, 56–8). Finally, almost all the microlith fragments were a result of lateral breakage, but it is impossible to say whether this was a result of pressures imposed during use, or whether it was a feature of the natural weak point of the narrow blade blanks. The two causes may be linked, as breakage due to use will normally exploit the natural weak point of a tool.

INDICATIONS OF RESHARPENING

The existence of a number of scraper resharpening flakes (Ill 56. 14–15) is clearly indicative of use: some of the scrapers, at least, became blunt enough to require the manufacture of a new edge. These pieces are easily recognised, while flakes resulting from the resharpening of other tools are not, though a careful sort of the tiny irregular flakes would certainly reveal others with the characteristic truncated scars of previous edges. It is also notable that the tool types with the most complex retouch tend to be smaller than their simpler counterparts (Ills 52, 53); this is not just a result of a more complex manufacturing process bcause larger blanks were available and were used where necessary. An alternative explanation may be that the more complex modification is a result of resharpening and using new edges: as simple tools were repeatedly resharpened they became smaller and more complex.

SPATIAL PATTERNING AND ARTIFACT ASSOCIATIONS

The relationship between activity, activity area, and material deposits on hunter-gatherer sites has been much discussed (Binford 1983, 144–92; Forsberg 1985, 189–261; Schiffer 1976; Yellen 1977). At Kinloch the deposits containing stone tools might result from a variety of activities that may be divided into: tool manufacture and maintenance; tool use; tool discard. The analysis had to take account of the fact that the site was in use over a long period of time, and it was based on three areas of assumption:

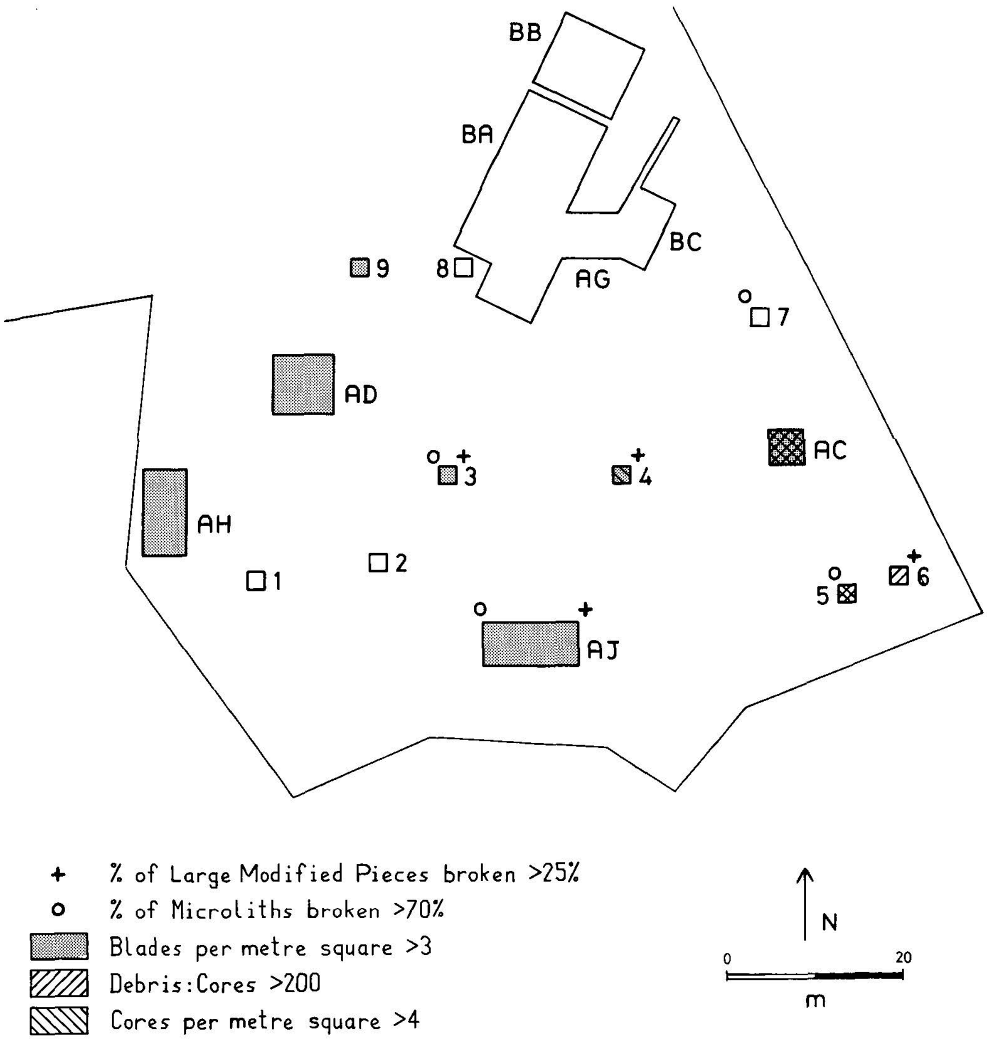
Deposits resulting from tool manufacture.
These should contain high quantities of debitage, as well as many cores and large numbers of regular flakes (it is likely that regular flakes were a by-product of the manufacture of blades at Kinloch, Chapter 6). If the knapping was *in situ*, or if the waste was specifically dumped, then a large proportion of the debitage should consist of tiny pieces (Behm 1983; Newcomer & Karlin 1987). Blades and modified pieces should be relatively rare.

Deposits resulting from tool maintenance.
These should contain both resharpening flakes and broken tools (the latter recognisable as broken blades and modified pieces). There may be some unused tools (probably unrecognisable to the present study), as well as flake and blade blanks. If the activity took place close by, or if the material was deposited soon after re-tooling finished, then very small resharpening and modification flakes may be present in large numbers.

Deposits resulting from tool use.
These should contain little knapping debris, and higher proportions of blades and modified pieces. If the morphological tools are broken, then they may have been deliberately discarded, and the location of the deposit may not be the place of use. If the morphological tools

Sample Sq.	Debris/Cores	Microliths/m2	Cores/m2	Blades/m2
1	148	<1	<1	1
2	122	2	1	1
3	145	12	3	5
4	180	12	7	8
5	241	6	4	<1
6	214	3	2	<1
7	170	3	1	4
8	130	10	4	11
9	44	2	2	3
Trench				
AC	214	5	4	4
AD	177	2	<1	3
AG	73	1	<1	2
AH	139	2	<1	5
AJ	194	3	2	5
BA	21	<1	2	2
BB	33	<1	<1	<1
BC	50	<1	1	2

Table 11: The distribution of lithic artifacts across the site.



ILL 65: The distribution of lithic artifacts across the site. Sample quadrats are numbered 1-9.

are complete, then the deposit may result from an interrupted activity. Although this use might have taken place close by, the tools may have been cached after use elsewhere. If the morphological types are all of a specific type or association of types, it may be possible to suggest that different areas were used for different tasks.

METHODS OF SPATIAL ANALYSIS

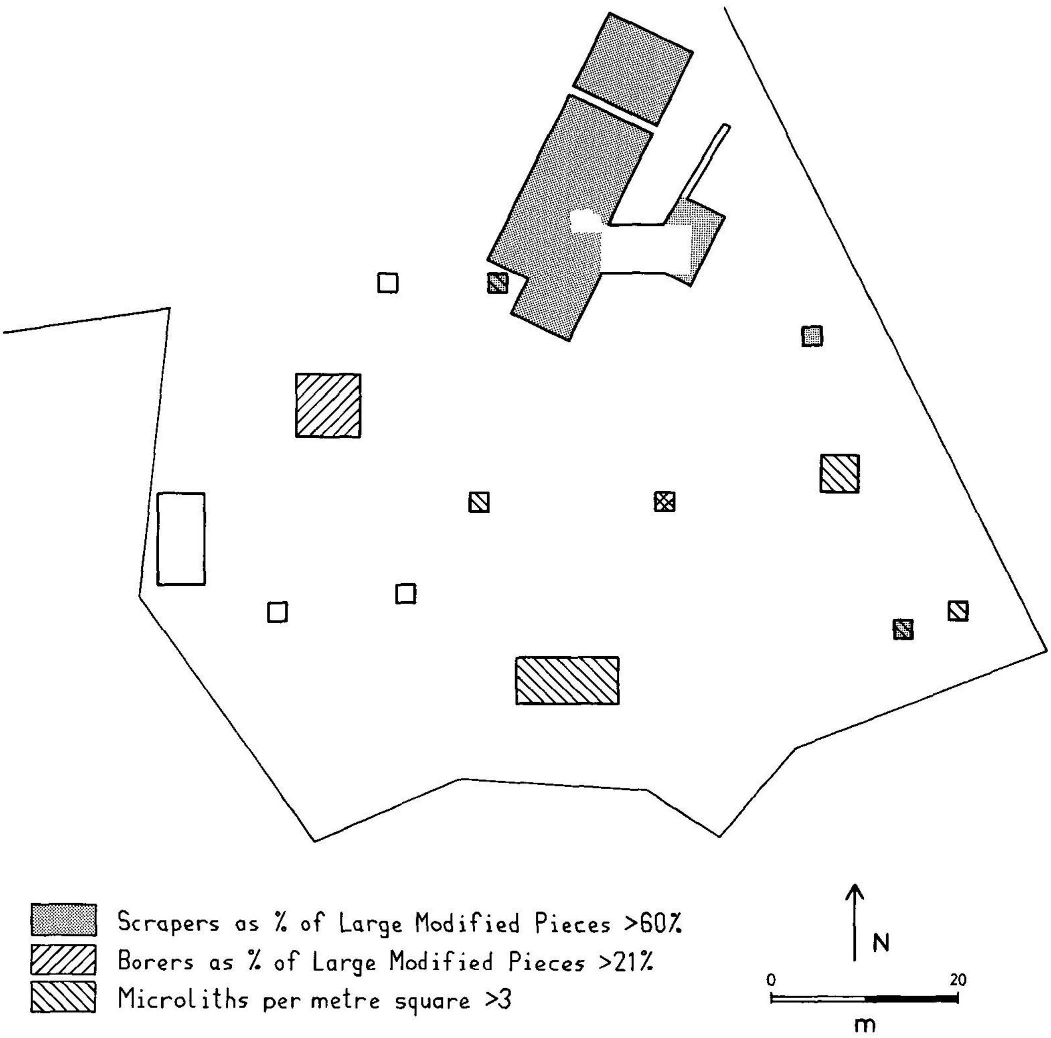
The spatial analysis was based on visual observation, the nature of the site and excavation was such that statistical analysis could not be applied (Whallon Jr 1978). Initially, the absolute quantities of the different artifact types in separate trenches were examined. This revealed some differentiation, but, as both the area and the assemblage size varied greatly, it was necessary to evaluate whether or not the differences revealed were true reflections of the variation of the prehistoric assemblages. Next, the importance of each lithic type was assessed for each context (as a percentage of the total assemblage from that context). Then, the absolute numbers of artifacts per metre square for the different contexts were calculated. Finally, it was predicted that specific associations of certain artifact types might be of interest (bearing in mind the assumptions outlined above), and indices were constructed to illustrate the ways in which these associations vary across the site:

debitage: cores,
debitage: regular flakes,
blades: cores,
regular flakes: cores.

THE RESULTS OF SPATIAL ANALYSIS

The contexts from which material was recovered are considered under two general headings, ie Ploughsoil and Stratified Features.

Initially, all the pits, hollows and other stratified features were examined, but in only two of the trenches (BA & AD) were features preserved to the extent that detailed analysis was worthwhile. There were, however, concentrations of material within the ploughsoil, and these were related to the features where they survived, while in areas of greater truncation they suggested the locations of 'ghost'



ILL 66: The distribution of modified artifacts across the site.

features. The general composition of the ploughsoil assemblage was therefore examined across the whole site, and the distributions of the different artifact types were plotted in detail across Trench BA. This trench was large enough both to identify spatial patterning in the size of the assemblage and its contents within the ploughsoil, and to relate the patterning to the complexes of stratified features.

The Ploughsoil Assemblage

The lithic assemblage was concentrated towards the S end of the site (Chapter 3; Ill 5), but it must be remembered that the 'original' S edge of the site had been disturbed in recent times. The absolute distributions of the individual artifact types reflect this concentration, but when the relationships between the types are examined some differentiation across the site may be discerned.

In general, the deposits of all areas were dominated by debitage; however, the indicators of manufacture were concentrated towards the SE corner of the site, whereas higher concentrations of blades were found to the S and W (Ill 65; Tab 11). Modified artifacts were evenly spread across the site and, although all types do appear in all areas, there is differentiation between the distribution of the various types (Ill 66; Tab 12). The N area of the site is dominated by scrapers, while microliths dominate in the S. Scrapers were particularly abundant in Trench BA (most of the concave scrapers were in Trench BA, though the morphological variation between the different concave scrapers means that several different prehistoric tool types may be represented, Chapter 7), and it is notable that only two of the scraper resharpening flakes occurred within scraper dominated areas. Borers were concentrated across the central and N parts of the site; they dominated the modified artifacts in Trench AD and in one sample quadrat (no 4), both of which are areas with low percentages of scrapers. Broken modified artifacts were concentrated across the central area of the site. Microliths were relatively rare towards the N edge, but where they occurred in the N they were dominated by backed bladelets, usually in association with scalene triangles. Towards the S and W scalene triangles predominated, while more of the crescentic types came from Trench BA (Ill 67; Tab 13), here there were also many backed bladelets but scalene triangles were rare.

Looking at trench BA in detail there is a general trend for material to be found towards the S, with the edge of another possible concentration to the W (Ills 68, 69). The distribution of individual types follows the same pattern

Sample Sq.	Scrapers %	Borers %	Retouched Edge %	Miscellaneous %	Invasive %	Retouched Segments & Blade %	Resharpening Scraper %	Retouched Blades %	Total no. of artifacts
1			100						1
2	20		20	40			20		5
3	41	11	29	11		6		35	17
4	32	21	18	7			18	28	28
5	70	10	10	10					10
6	25		25	12	12		25	25	8
7	60	20	20					20	5
8	70		10	10			10	10	10
9									
Trench									
AC	32		22	23	9	4	9	23	22
AD	21	25	39	11		3		18	28
AG	48	8	30	4		4	4	17	23
AH	50	10	20	10		10		10	10
AJ	38	8	15	28	6	2	2	30	47
BA	62	11	18	6	1			22	104
BB	100								2
BC	75		25					25	4

Table 12: The modified lithic assemblage: composition of non-microlithic artifact types by area.

(Ills 71–74), and the composition of the assemblage within each grid square is similar. Each square across the trench is dominated by knapping debris (Ill 70), but there is some patterning, eg blades were relatively more abundant towards the W (Ills 73, 76). Four of the grid squares with particularly high concentrations of debitage had surprisingly few cores (Ill 75); these areas included a high proportion of regular flakes, as well as a great percentage of tiny pieces (less than 10mm). There were more cores in some of the other debitage-rich areas, but none of the deposits characterised by debitage had large numbers of blades (Ills 75, 76).

Mesolithic Deposits

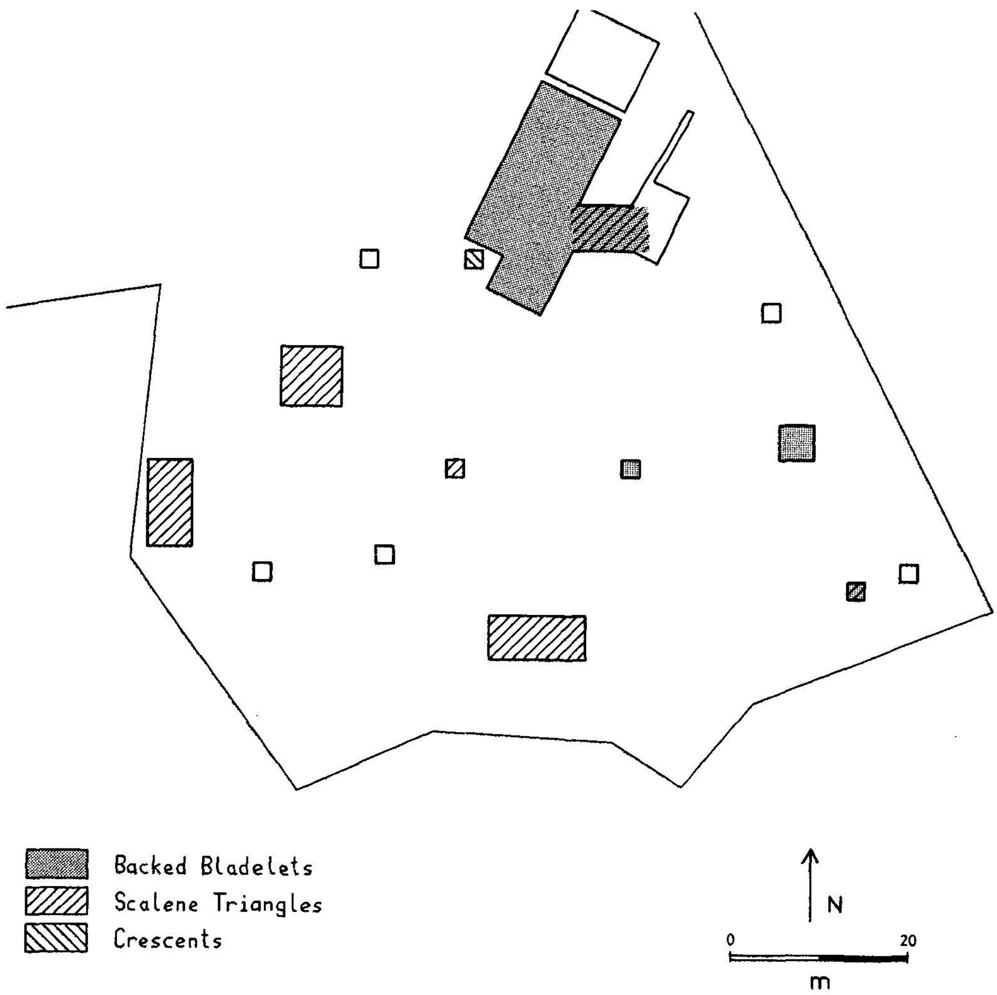
Trench AD (Tab 14) The mesolithic pits within the AD complex cut into each other, and they had probably filled relatively rapidly, consequently it was difficult to separate the contents of the individual pits. As might be expected, the larger and most recent pits had larger assemblages, whilst Pits AD 3 and 4 (of both of which little had survived) had the smallest assemblages. Examination of the artifact types within each pit revealed no discernable differences. The bulk of each fill consisted of knapping debris and similar types of modified artifacts, the bigger the fill the greater the range of types. With the exception of the ubiquitous fragments, the microliths were dominated by backed blades and scalene triangles, together with a few microburins and one or two of the other types. Larger modified artifacts comprised eight scrapers, two borers, a burin, one edge retouched piece, and a small leaf point.

Trench BA (Tab 14) As in Trench AD many of the pits in Trench BA were part of an intercutting complex (Pits BA 4–9), and there were no major differences between their artifactual contents. Knapping debris dominated all the fills. Modified artifacts included a limited range of microliths: fragments; backed bladelets; crescents and double edged crescents. The larger modified artifacts included mainly scrapers and borers which, interestingly, did not occur together within the same pits. There were also two edge retouched artifacts.

Mesolithic/Neolithic Deposits

Trench AD Only one small neolithic pit (AD 7) was identified and it contained few lithics (predominantly knapping debris, with three microliths: two fragments and a backed bladelet).

Trenches BA/BB/BC No pits of neolithic origin were identified in these trenches, but there were mixed deposits in, and around, the peat-filled watercourse (Chapter 3). There was little difference between the artifactual content



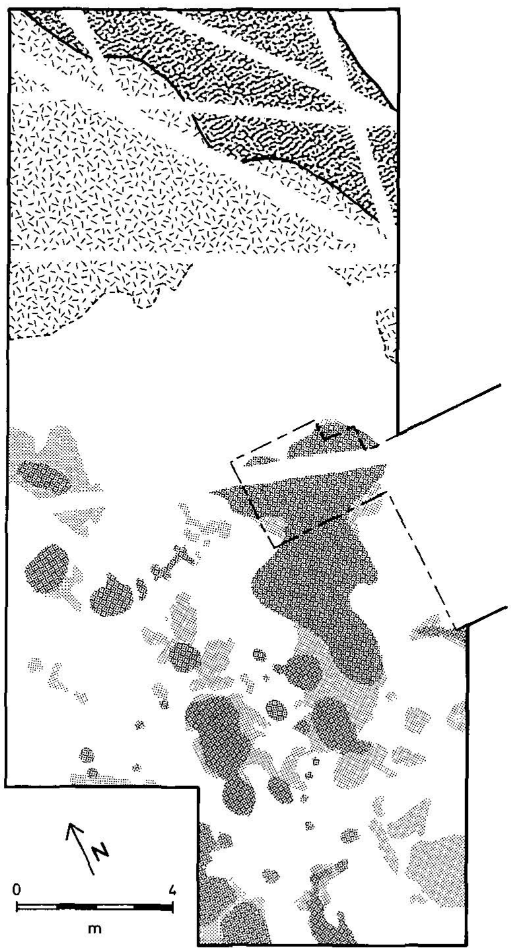
ILL 67: Artifact distribution across the site: dominant microliths.

of these individual deposits (the peat itself, the dumped bank materials, and the rocks and debris within the peat). All contained knapping debris, including a high percentage of cores and pebbles, and there were few modified artifacts. The latter comprised a few microliths and some other types (mainly broken or miscellaneous pieces, but there were two borers, a scraper resharpening flake, and two leaf points).

DISCUSSION

The archaeological evidence suggests that the spatial patterning of artifacts across the site resulted from differing activities in the various areas. Although evidence for the manufacture of tools existed everywhere, a closer examination of the range of artifact types indicates that manufacture predominated towards the S corner, and that the different areas of the site were dominated by specific modified types.

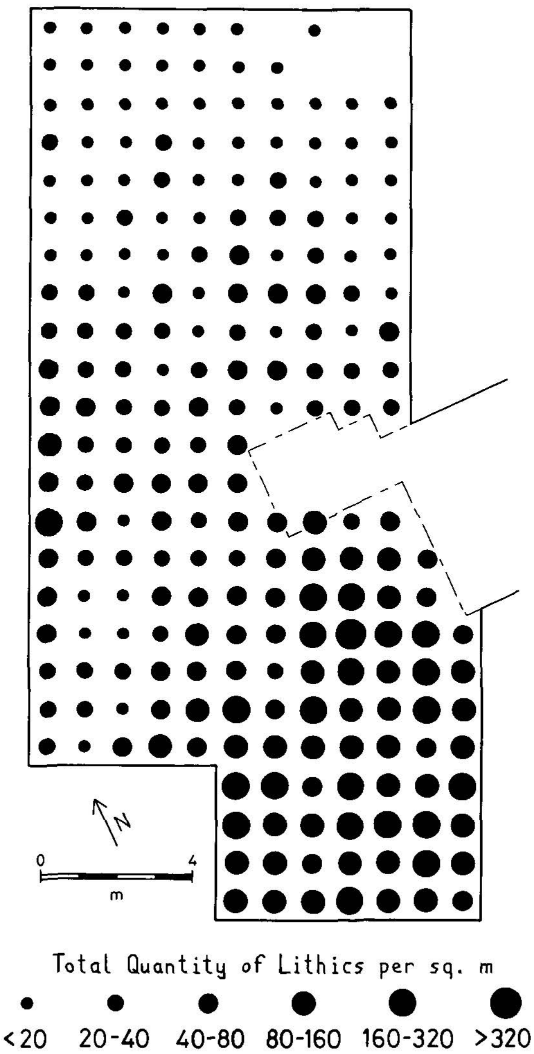
The knapping debris was concentrated in the S, but it still dominated the assemblage from Trench BA, and in this trench discrete concentrations could be highlighted. In some cases, the absence of cores associated with concentrations of knapping debris is cause for surprise, but work done elsewhere has suggested that the use of cores as an indicator of knapping debris may be misplaced (Welinder 1971, 181), and these particular deposits are probably the result of tool manufacture. Indeed, the presence of much tiny debitage would suggest that knapping occurred close by, if not on the spot. These deposits stand out from others where less tiny debris was



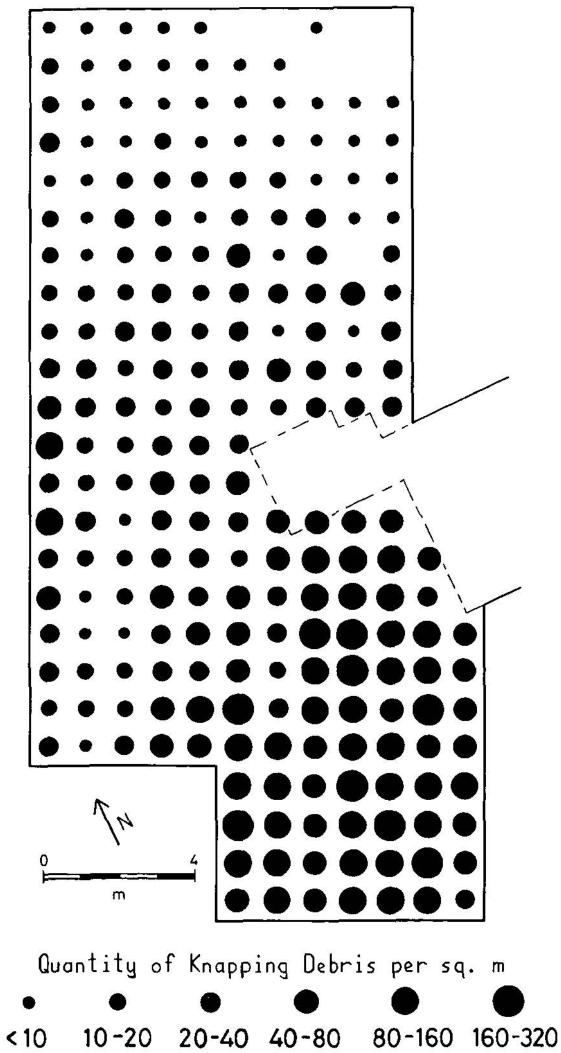
ILL 68: Trench BA: features.

recovered. The deposits in Trench BA seem fresher, or less re-worked, than material from elsewhere.

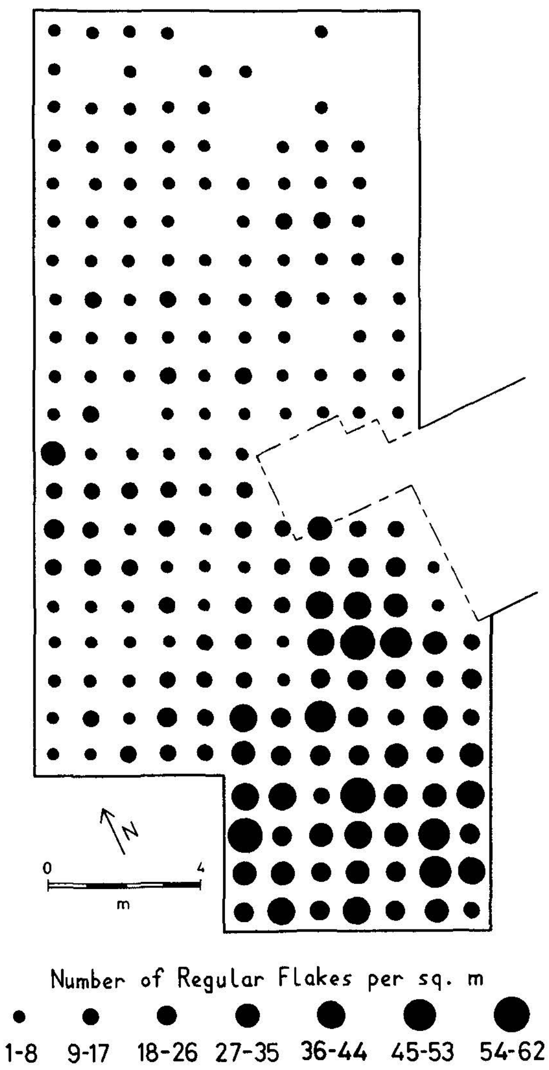
Trench BA yielded few modified artifacts, and there was little spatial variation across the trench. Microliths were not common at all, in either the features or the ploughsoil (though it is notable that the majority of the crescents from the site came from this trench); they were most abundant in the mesolithic pits. The mesolithic/neolithic deposits contained predominantly knapping debris with a few broken artifacts. In Trench AD the pits contained a different assemblage of modified tools to those in Trench BA and this difference was also reflected in the material from the ploughsoil. Although scrapers dominated the assemblage of larger modified tools, there were a few borers, but the two types did not occur together. Across the site the modified tools were always found in association with knapping debris, so that it seems likely that whilst the deposits were dominated by waste from tool manufacture, they also contained material from other activities. The different areas were dominated by particular tool types, some of which appear to be associated: eg microburins and scalene triangles occur in similar locations to the borers (S and centre); whilst elsewhere scrapers (particularly concave scrapers) were associated with crescentic microliths (to the N).



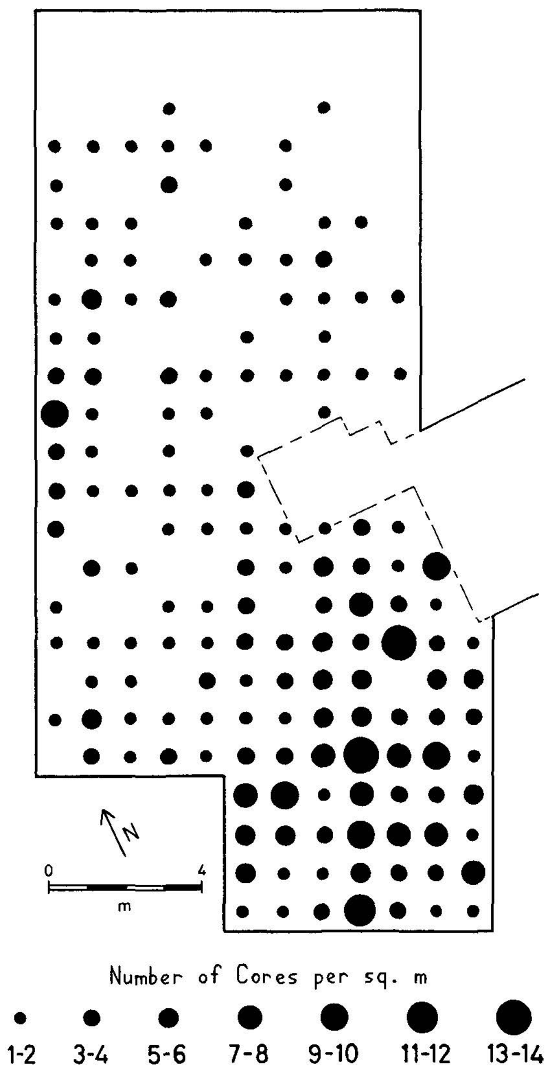
ILL 69: Trench BA: distribution of the total lithic assemblage.



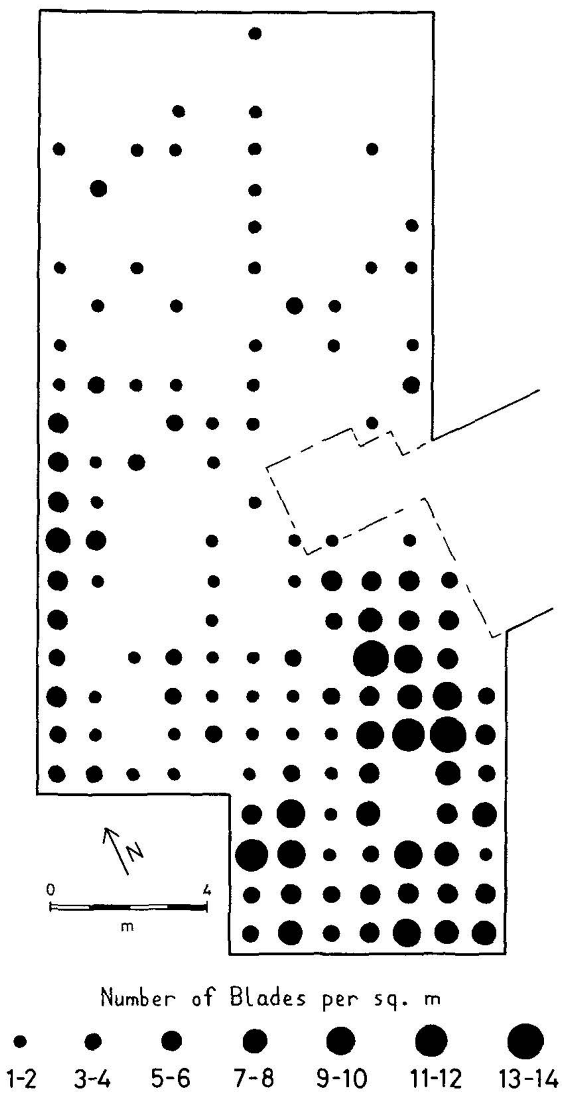
ILL 70: Trench BA: the distribution of knapping debris.



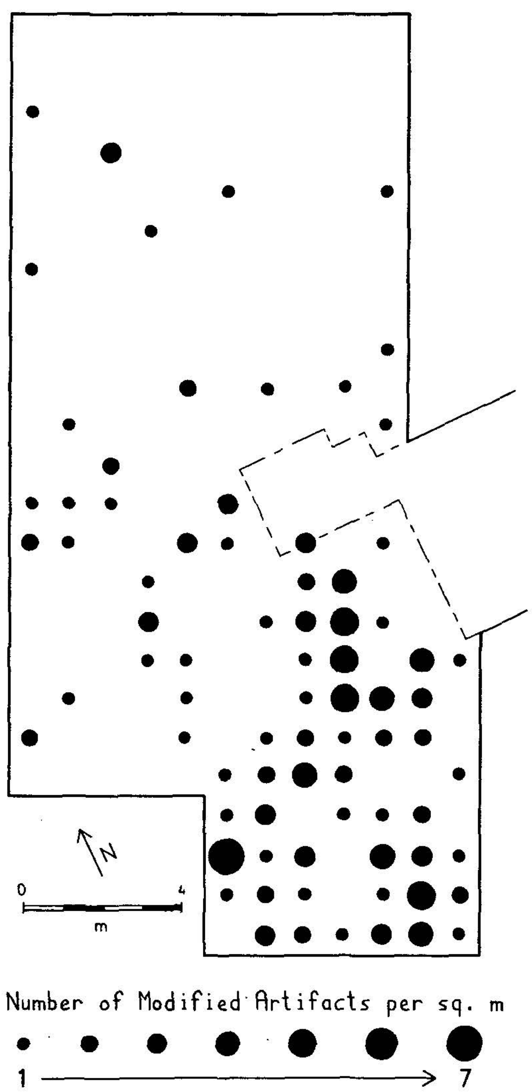
ILL 71: Trench BA: the distribution of regular flakes.



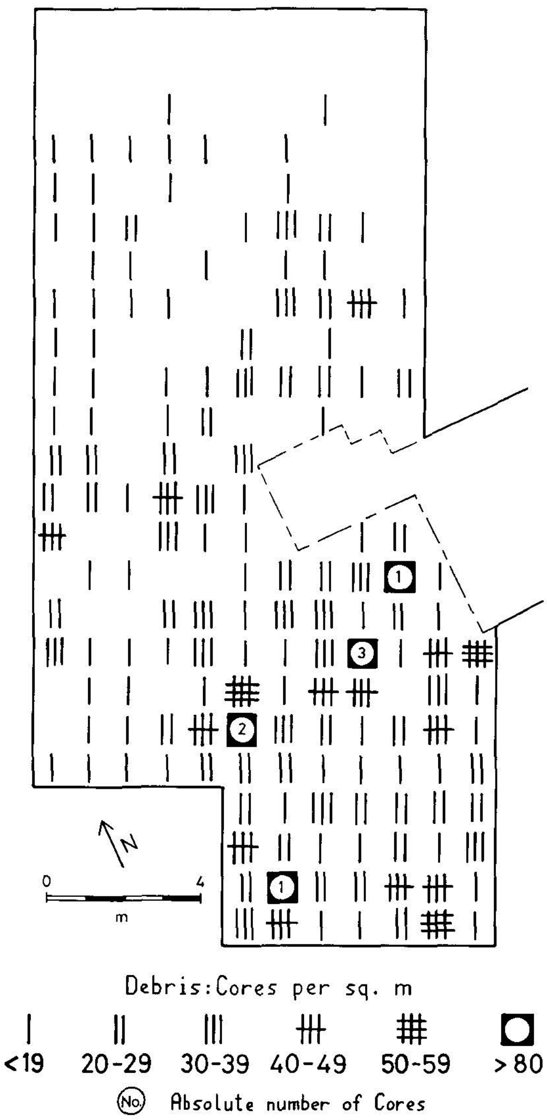
ILL 72: Trench BA: the distribution of cores.



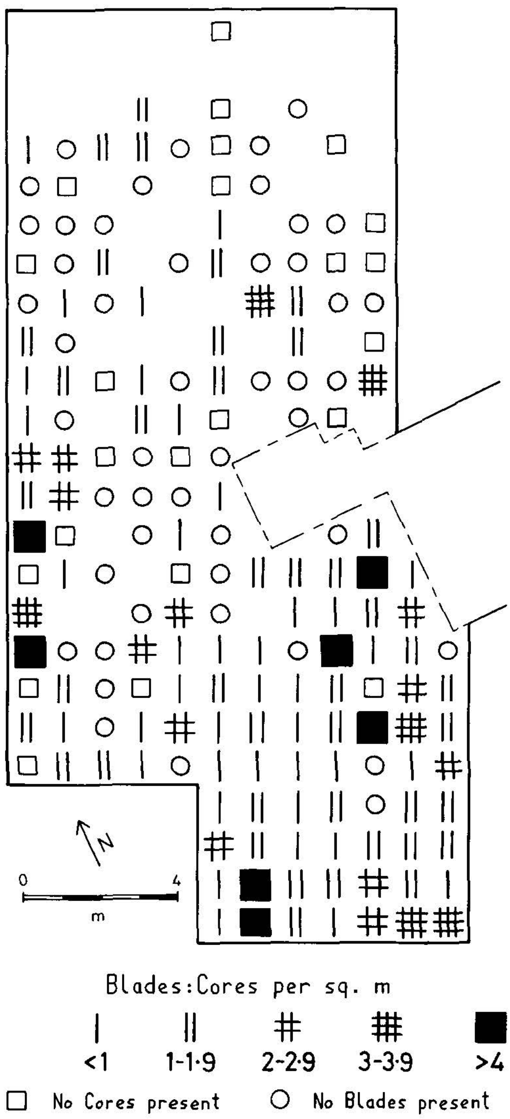
ILL 73: Trench BA: the distribution of blades.



ILL 74: Trench BA: the distribution of modified artifacts.



ILL 75: Trench BA: the distribution of debris/ cores.



ILL 76: Trench BA: the distribution of blades/cores.

	Microburins %	Rods %	Backed Bladelets %	Scalene Triangles %	Crescents %	Fine Points %	Obliquely Blunted %	Lamelles Gra. %	Inverse Points Fine %	Double Edge Crescent %	Waste %	Total no. of artifacts
Sample Sq.												
1				33	33						33	3
2	17						17				66	6
3			8	14	4						73	49
4	2		10	8			4				67	48
5			8	8	4	4				4	72	25
6	8		17	8			8				58	12
7		10		10			10				70	10
8	2		10	5	15	2			5		61	41
9	11				11	22		11			44	9
Trench												
AC	5	1	17	10	2	7		1			56	82
AD	5	1	10	21	1	1	1	2			58	109
AG	2		11	10	3	2	3			3	65	60
AH	5		4	17	2		4	1			67	98
AJ	1		8	12	3	1	1			1	72	165
BA	2		19	16	6		2				54	48
BB				50							50	2
BC				33			33				33	3

Table 13: The microlithic assemblage: composition of the assemblage by area.

PIT	PEBBLES	CORES	BLADES	DEBITAGE	Fragments	Backed Blades	Scalene Triangles	Double Edge Crescents	Crescents	Rods	Microburins	Fine Points	Obliquely Blunted	Scrapers	Borers	Edge Retouched	Inverse Points	Burins	TOTAL
AD 1	1	1	40	453	9	2	2							2		1		1	512
AD 2	1	12	104	3096	21	9	14		3	1	1	1	1	3	2				3269
AD 3			4	56															60
AD 4				7			1												8
AD 5	1	11	117	2151	30	4	5				3			3			1		2326
AD 6		2	13	305	3	3	1												327
BA 4/5	1	20	34	3055	6	2		3	1	1				3		1			3127
BA 6				59															59
BA 7	1	1	38	1627	6	3			2						2				1680
BA 8		8	35	3285	4				1	1									3344
BA 9		4	18	1353	4	2								1		1			1383
					Microliths									Non-Microlithic					

Table 14: Pits AD 1–6 & BA 4–9: lithic contents.

CONCLUSIONS

Although the artifactual deposits were composed primarily of knapping debris, the evidence does not suggest that Kinloch was simply a production site. Production was geared towards the manufacture of blades and modified tools based on blades, and a number of other morphological tool types were made. There is evidence that at least some of these tools were used for a range of tasks, and the different patterns of the tools across the site suggest that particular activities were concentrated in separate areas. The interpretation of these patterns is problematical as, although a variety of features was examined (particularly in Trench BA), the level of truncation and the long period of use of the site make the detailed association of the artifact patterns with stratified features difficult. Furthermore, the present analysis cannot suggest whether the activities carried out on site involved the maintenance, use, or curation of tools.