

**ARTIFACT DISTRIBUTIONS ON HOUSEPIT FLOORS
AND SOCIAL ORGANIZATION IN HOUSEPITS
AT KEATLEY CREEK**

by

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B.A., University of British Columbia, 1986

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ARTIFACT DISTRIBUTIONS ON HOUSEPIT FLOORS

AND SOCIAL ORGANIZATION IN HOUSEPITS

AT KEATLEY CREEK

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Abstract

The purpose of this analysis is to identify, characterize, and explain patterns in the distributions of artifacts on the floors of three housepits at the Keatley Creek site. This site, located on the east side of the Fraser River, about 30 km north of Lillooet, B.C., is one of the last large pithouse villages in British Columbia's Interior Plateau region which has remained relatively undisturbed since its abandonment. Between 1986 and 1989, excavators working here uncovered most of the floors of three housepits which appear to have been last occupied just before the site was deserted about 1100 years ago. The data collected in the course of these excavations and the subsequent analysis is probably the largest, most complete, and most accurately recorded body of data ever amassed on material culture distributions within B.C. housepits.

The patterned use of space on pithouse floors in the last occupation can be a major source of artifact patterning observed in archaeological floor deposits. Co-residential groups which were organized differently in social terms should also have organized their use of space differently, producing different patterns in the distributions of artifacts on the floors where they lived.

Previous research has suggested that, during the Kamloops Phase of the Plateau Pithouse Tradition (c.1200-200 B.P.), the largest pithouses at large pithouse village sites in the Mid-Fraser River region of British Columbia's Interior Plateau may have been occupied by groups which were more hierarchical in their social organization than contemporary groups in smaller houses.

Three housepits of varying sizes were excavated from this period at the Keatley Creek site in the Mid-Fraser River region. The distributions of lithic artifacts on the floors of these housepits, all of which date to the Kamloops Phase, are examined in this analysis. Statistical analysis and visual inspection of the distributions of fire-cracked rock, debitage, and modified artifact types revealed clear patterns. Notably, three concentric zones divided into radial segments by the hearths were distinguished in the largest pithouse both by the distributions of several classes of artifacts and by the

arrangement of features on the floor. In the two smaller houses, the clearest distinctions were between opposite sides of the floors. The possible contribution of a variety of cultural and non-cultural processes to the formation of these assemblages was considered. It was concluded that the observed patterns were best explained as the products of cultural processes related to the social organization of space during the periods when the houses were last occupied. Differences between areas of the floors in terms of the quantity and kinds of artifacts they contained were interpreted as evidence that different areas were used for different purposes. Some of the differences were attributed to sex specific activities, craft specialization, or status distinctions. The radial segments which cross-cut the concentric zones in the largest house were interpreted as evidence for the division of space among several somewhat independent domestic groups within a hierarchically-organized corporate group. The bilateral patterns on the smaller floors could not be interpreted in this fashion.

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Chapter I

Introduction

The purpose of this analysis is to identify, characterize, and explain patterns in the distributions of artifacts on the floors of three housepits at the Keatley Creek site (EeR1 7). This site, located on the east side of the Fraser River, about 30 km north of Lillooet, B.C., is one of the last large pithouse villages in British Columbia's Interior Plateau region which has remained relatively undisturbed since its abandonment. Between 1986 and 1989, excavators working here uncovered most of the floors of three housepits which appear to have been last occupied just before the site was deserted about 1100 years ago. The data collected in the course of these excavations and the subsequent analysis is probably the largest, most complete, and most accurately recorded body of data ever amassed on material culture distributions within B.C. housepits.

It was hoped that the results of this analysis might be relevant to questions concerning social organization in large pithouse villages which have been raised by earlier researchers in this region (Stryd 1971, Hayden et al. 1985). Different forms of social organization within residential structures may produce different patterns in the arrangement of areas used for different purposes. Thus, artifact types and spatial units were defined so as to distinguish between areas used for different purposes.

Chapter 2 of the thesis explains how the three floors were divided into sectors which were defined around discrete clusters of artifacts. The locations of various features were also considered in the definition of the sectors. Lithic artifacts found on the floors were classified on the basis of formal attributes which were thought to be functionally significant.

The analyses of the distributions of the various artifact types are presented in Chapter 3. Within each housepit, sectors of the floor were compared in terms of the frequency, per unit of floor area, of fire-cracked rock, debitage, and modified lithic artifacts. Statistically significant differences between sectors were taken as evidence that

different processes were involved in the deposition of artifacts in different parts of the floor. Visual examination of the distributions of artifact classes which exhibit significant variability in their distribution between sectors helped to further define patterns in the distribution of lithic artifacts on the floors.

Patterns in the distributions of several artifact classes distinguished three concentric zones on the floor of the largest housepit. These zones were divided into radial segments by the boundaries of hearths and artifact clusters. In the two smaller houses the clearest distinctions were between opposite sides of the floor. The observed patterns were interpreted as the products of structured cultural behavior which occurred on the floors during the last occupations of the houses.

Chapter 4 considers a variety of cultural and non-cultural processes which might have contributed to the formation of the floor assemblages. Processes which might have introduced artifacts not associated with activities which occurred on the floors are examined, as are processes which might have displaced artifacts from primary contexts. The habitual use of different areas of the floor for different activities is identified as the most important factor in the formation of the patterns observed in the distributions of lithic artifacts on the three floors.

In Chapter 5, a model is proposed which suggests how different forms of social organization might have resulted in different patterns in the use of space in different houses. The model is based on the work of earlier researchers in this region (Stryd 1971, Hayden et al. 1985) who argue that the largest pithouses at large pithouse village sites in the Mid-Fraser River region might have been occupied by groups which were more hierarchical in their social organization than contemporaneous groups in smaller houses.

I argue that the forces to which the formation of these large, hierarchically-organized, co-residential corporate groups is attributed would have lead to competition for status and resources within, as well as between, those groups. Within large co-residential corporate groups, smaller groups, united by close consanguinal and affinal ties, would have maintained domestic economies somewhat

independent of one another. Each independent domestic group would, very probably, have occupied a separate space within a pithouse residence. These independent domestic spaces would all have been used for generally similar activities. Each independent domestic space would, very likely, have included a hearth.

Co-residential groups whose most important internal divisions were based on age and sex would probably have divided their living spaces along more functional lines. Separate areas might have been reserved for different activities and some of those activities might be sex specific. Some areas might also have been reserved for craft specialists. However, divisions of space resulting from status differentiation and economic competition are not expected in the dwellings of less hierarchical groups.

I argue that the concentric zones identified in the largest housepit can be radially divided around hearths and artifact clusters. This pattern is more consistent with the model of independent domestic spaces within the residence of a large, hierarchically-organized corporate group than are the bilateral arrangements in the two smaller houses.

Thus, the results of this analysis are consistent with the proposition that the largest pithouses at this site were occupied by groups which were organized differently from contemporary groups living in smaller structures. In addition, the patterns observed in the largest house are consistent with the model proposed for the social organization of space in the residences of large, hierarchically-organized corporate groups.

Of course, these consistencies do not conclusively demonstrate either proposition. Patterns observed in three housepits cannot lead to definitive conclusions about a village of over a hundred houses. The observed patterns may also be susceptible to other explanations. However, this analysis does show that meaningful patterns can be detected in the distributions of artifacts on the floors of at least some of the pithouses in this region. It also suggests that further research into whether the residents of houses of different sizes were organized differently should be fruitful.

It must be emphasized that as an initial examination of artifact

patterning on housepit floors of the B.C. Interior, this study is of necessity exploratory. The interpretation of some patterns seems quite clear and straightforward; the interpretation of other patterns is more problematic. However, with more data, more experience, and more comparisons, it is expected that, in the future, many of today's remaining problems will be resolved and even deeper insights into past cultures on the Plateau will emerge.

Chapter 2: Methodology

Selection of Housepits

Archaeological investigations at the Keatley Creek site were begun in 1986 under the project title Fraser River Investigations in Corporate Group Archaeology (FRICGA). The long term goals of this project are: 1) to obtain evidence for and explain the prehistoric existence of residential corporate groups in the Mid-Fraser River region of the Canadian Plateau culture area, and 2) to obtain information concerning the development of complex hunter-gatherers and the rise of socioeconomic differentiation. Housepits 3, 7, and 12 were selected for areal excavation according to the following criteria:

- 1) Since socioeconomic complexity was thought to be related to housepit size, and since hierarchical corporate groups, in particular, were thought to have been associated with the largest houses, a wide range of housepit sizes were sought for excavation.
- 2) To avoid confusion and assemblage mixing, pithouses with clearly defined occupation floors, undisturbed by later construction events were sought for excavation.
- 3) In order to reach meaningful conclusions about the relative socioeconomic complexity of groups who lived in large, as opposed to small pithouses, pithouses were sought for comparison that were as nearly contemporaneous as possible.
- 4) Earlier research indicated that the largest houses were last occupied at the end of the first millennium a.d. This period roughly corresponds with the beginning of the Kamloops Phase of the Canadian Plateau Pithouse Tradition. The entire Kamloops Phase is estimated to date between 1200 and 200 BP (Richards and Rousseau 1987:41). The pithouses sought were, therefore, of different sizes, with a single clearly defined floor stratum containing artifacts diagnostic of the early Kamloops phase.

Housepit size

The diameters of 102 housepits in the core of the Keatley Creek site were measured from rim crest to rim crest along the north-south and east-west axes. A few of these housepits had been truncated during the construction of later pithouses but reliable measures of the two diameters were obtained for 77 housepits. The average of the two rim-crest-to-rim-crest diameters of Housepits 12, 3, and 7 are 9m, 14m, and 19m, respectively. This represents a good range of housepit sizes at Keatley Creek. The rim-crest-to-rim-crest diameters of the 77 untruncated housepits range from a low of 4.25m to a high of 20m with a mean of 11.13m. The histogram in Figure 2.01 shows the distribution of these diameters. Housepit 7 is among the largest at the site and Housepit 3 is representative of the peak at the high end of the distribution. Housepit 12 is just below the average size.

Thirty-six percent (36%) of the cultural depressions at Keatley Creek have average rim-crest-to-rim-crest diameters of less than 9m and it might have been desirable to include a pithouse from the very small range of sizes (average diameter < 7m). On the other hand, it is uncertain whether the smallest depressions were used as residences. Many of the smaller houses that were tested were stratigraphically confusing or predated the Kamloops phase. No housepit smaller than Housepit 12 was found at Keatley Creek which satisfied the other selection criteria. Moreover, a pithouse with a diameter of 5m is unlikely to have housed more than a single nuclear family. The questions which motivated this research deal largely with the division of space between families so it is of greater usefulness that all of the housepits selected are large enough to have held at least two distinct family groups.

Single occupations and contemporaneity

Test excavations in all three of the selected housepits revealed evidence of only a single, complete, intact floor in each. Lenses attributed to earlier occupations were later discovered under the most recent floor along the southwest, west, and northwest

Housepit widths

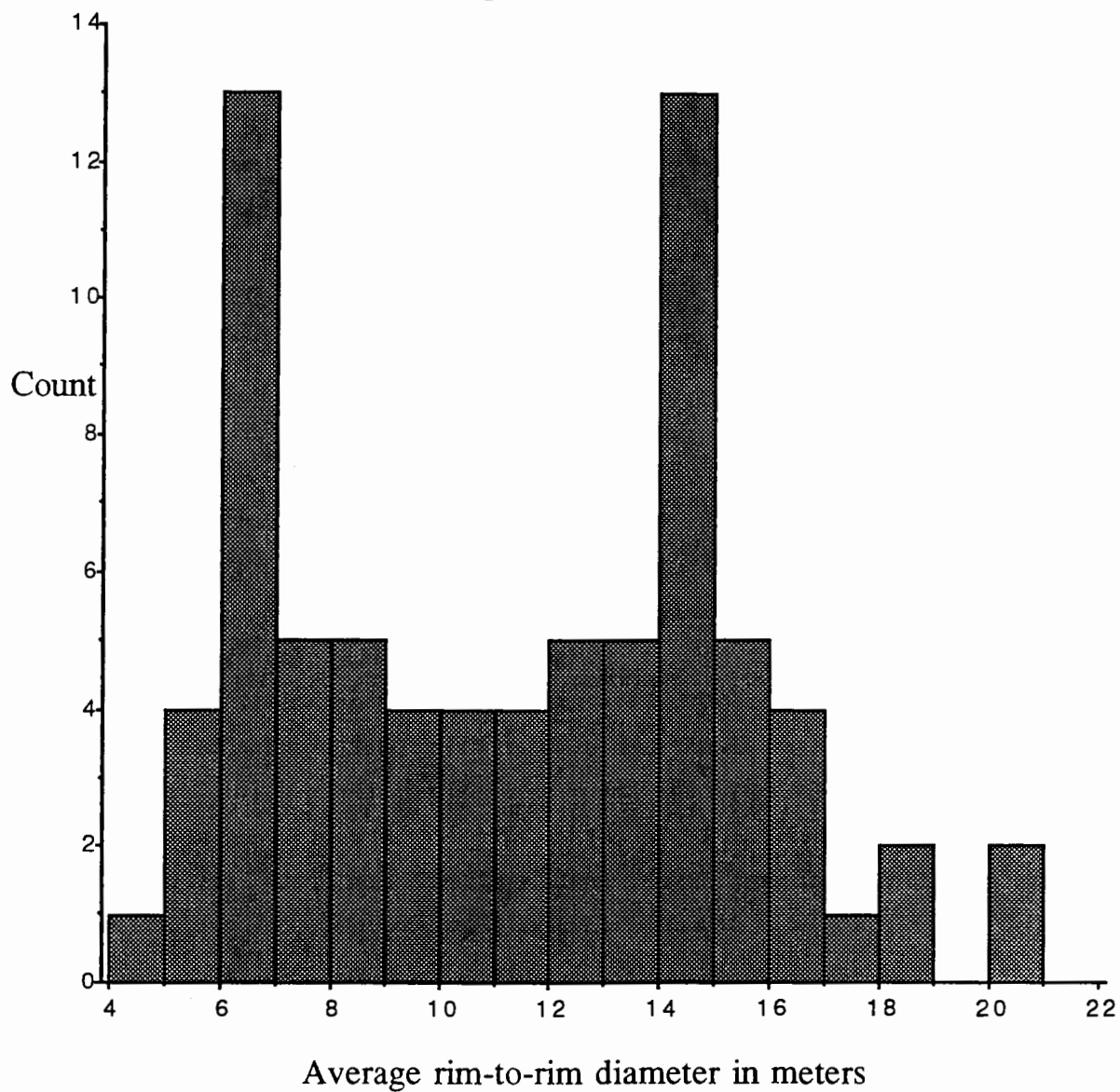


Figure 2.01. Distribution of the average rim-to-rim diameters of 77 untruncated housepits at the Keatley Creek site. Intervals include the lowest values.

perimeter of Housepit 7. In most of these areas, the most recent floor was readily distinguishable from the earlier deposits.

Projectile points diagnostic of the Kamloops phase were found in the floor strata in Housepits 3 and 7 and in the roof of Housepit 12. A projectile point which has been attributed to the transition between the Kamloops Horizon and the preceding Plateau Horizon (Rousseau, pers. comm.) was found in the floor stratum of Housepit 12 during the subsequent areal excavation. On the basis of this evidence the best estimate, for the date of the last occupation of Housepit 12 is 1300-1100 bp.

Charred fragments of the roof framework found lying on the surface of the floor strata in Housepits 3 and 7 returned radio-carbon dates of 1080 ± 70 bp for both houses. Since Housepits 3 and 7 cannot have been last occupied before this wood was cut and incorporated into their roofs, this suggests that these structures may have been occupied slightly later than Housepit 12. The presence of several projectile points diagnostic of the Kamloops Phase in the floor strata of both of the larger housepits provides further evidence of final occupations during the Kamloops Phase. Housepit 12 may, in fact, have been occupied later than the date ascribed to the single diagnostic artifact found in its floor. So it is at least possible that the three pithouses were occupied approximately contemporaneously or within a few generations of each other.

Excavation

Test trenches and the recognition of strata

The excavations of Housepits 3, 7, and 12 began with 50 cm wide test trenches extending, in units 2m long, from the southernmost points on the housepit rims to points near the center of each housepit depression. All of the material removed during testing and the subsequent areal excavations was screened through 1/4 inch (6.35mm) mesh. In the course of the test excavations the excavators were able to distinguish several different strata. Below the surface layer and inside the housepit rims, the bulk of the deposits were identified as various components of the collapsed pithouse roofs. The stratigraphy of the rim and roof strata is complex and generally not

relevant to the questions considered in this thesis. More detailed analyses of these strata are presented elsewhere (Iannone 1990; Muir 1988, and Prentiss 1991).

Typically the floors were finer, darker, and more compact than the overlying roof. The two strata were most difficult to distinguish where the roof deposits were unusually fine or where the floor extended across a filled-in pit or posthole. Pit fill tended to be coarser and less compact than the rest of the floor. Artifacts were frequently found lying flat on the surface of the floor as were the charred remains of beams and other roof materials. These occurrences were generally helpful in recognizing the interface between floor and roof. The floors were also characterized by the presence of salmon bone which was much rarer and more decayed in the roof (Kusmer 1991:8). While the floor strata could not be consistently recognized on the basis of any single characteristic, the excavators were generally able to identify it with some confidence on the basis of a polythetic combination of color, texture, compactness, artifact orientation, and faunal content. The floor of each housepit will be described in greater detail in Chapter 3.

Areal excavations

After the principal strata had been identified, the excavation of the test trenches was completed following the natural stratigraphy wherever possible. A grid of 2m squares tied in to the site datum was then superimposed on each of the housepits selected for extensive excavation so that one edge of the test trench lay along the edge of a row of squares. The squares were labeled alphabetically in the order in which excavation was begun. Each square was subdivided into 16 numbered subsquares each 50cm square. Subsquares were excavated as independent excavation units from the surface down to the sterile glacial till. Figures 2.02, 2.03, and 2.04 show the arrangement of squares and subsquares in each of the selected housepits.

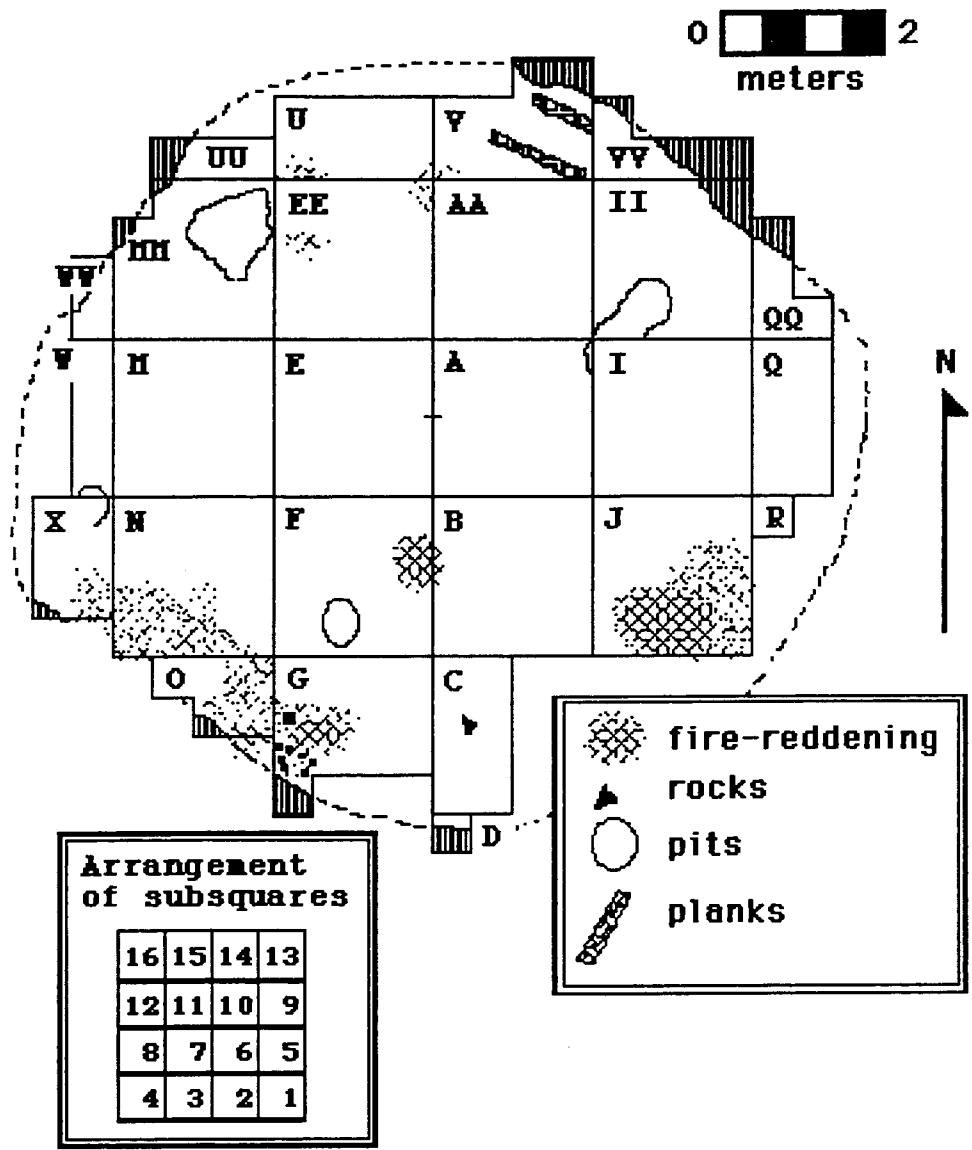
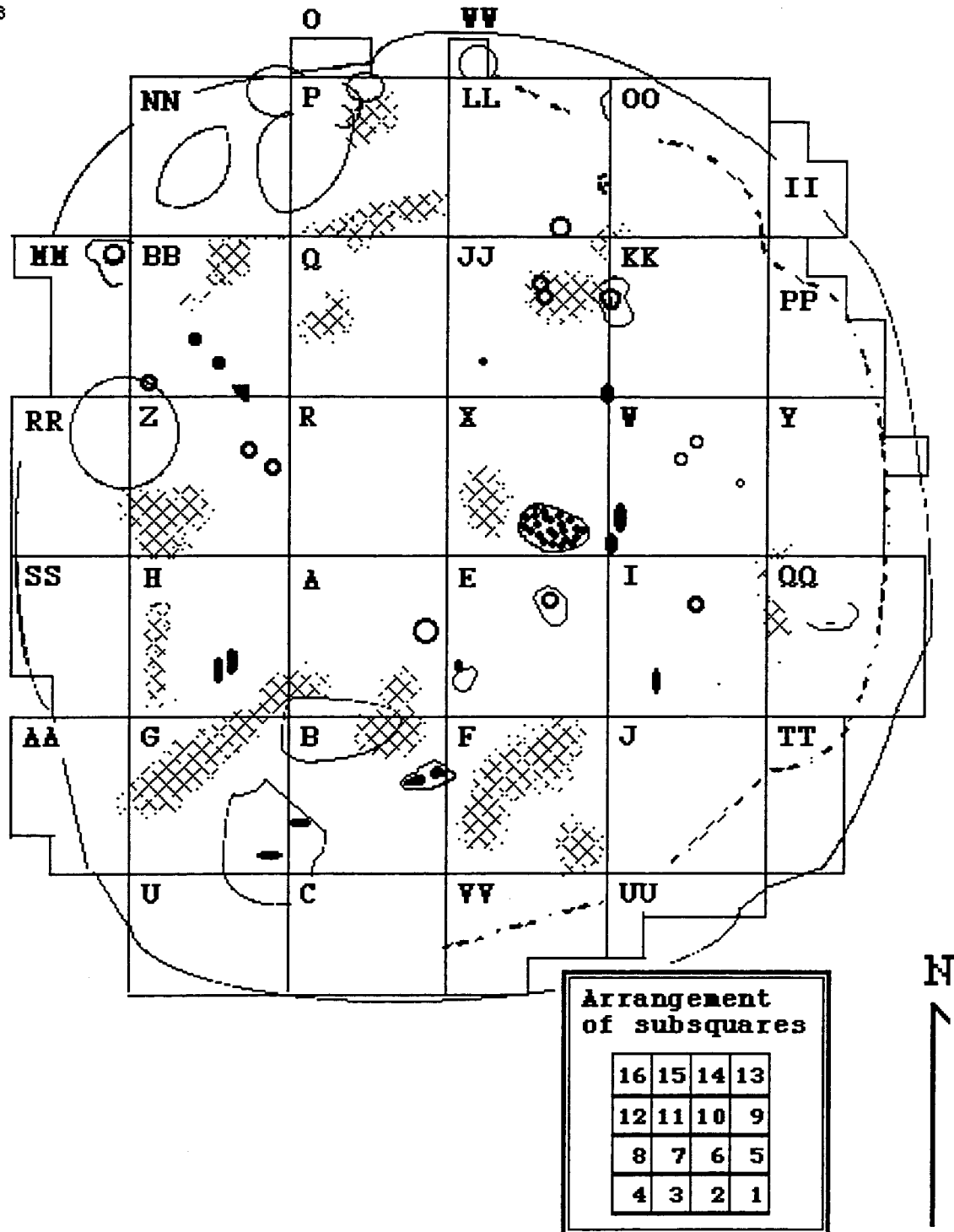


Figure 2.02. Arrangement of squares and subsquares on the floor of Housepit 3.



Arrangement of subsquares

16	15	14	13
12	11	10	9
8	7	6	5
4	3	2	1

Figure 2.03. Arrangement of excavated squares and subsquares on the floor of Housepit 7.

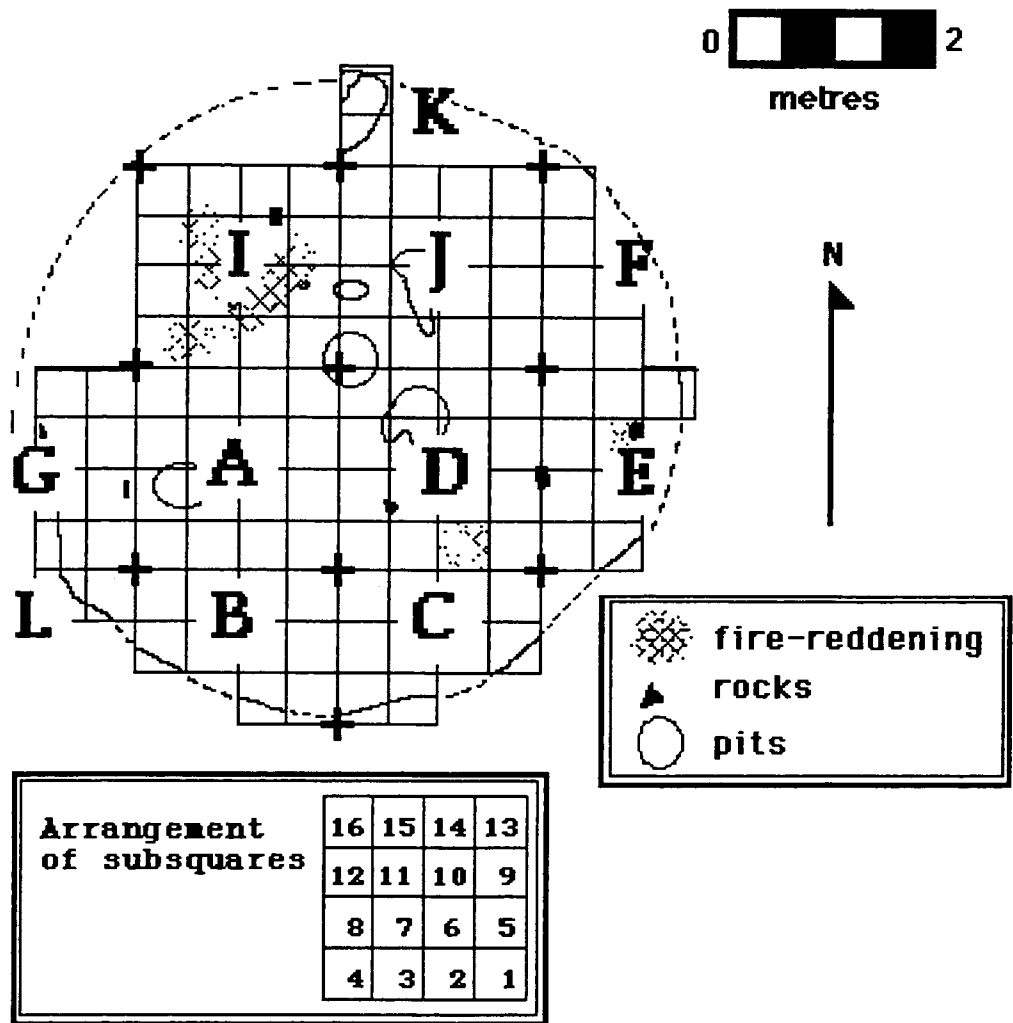


Figure 2.04. Arrangement of excavated squares and subsquares on the floor of Housepit 12.

Various methods were employed to isolate stratigraphic components within the roofs. These are discussed in detail in field reports (Alexander, 1990; Handly, 1990; Iannone, 1990). The bottom 5cm of the roof, identified in the profiles of adjacent subsquares, was always excavated as a single level. In order to facilitate the recognition of the interface between the roof and the floor, this level was excavated with special care. Often it was completed with a whisk broom. For the most part, the floors were less than 5cm thick. Where they exceeded this thickness, they were excavated in arbitrary 5cm levels. In the areas of Housepit 7 where the stratigraphy of the floor was complicated by previous occupations special efforts were made to isolate the natural strata.

The provenience of lithic artifacts on the floors of Housepits 3, 7, and 12 are thus defined by the square, the subsquare and, where applicable the level within the floor stratum. The basic unit of spatial analysis across the floor is the 50 cm x 50 cm subsquare. The artifact clusters and sectors defined below are defined as groups of subsquares. Since the median thickness of all the floor deposits is only about 3cm, the vertical dimension has been ignored in the definition of these analytic units. In Housepit 7, artifacts associated with any but the most recent occupation have, so far as possible, been excluded from the floor assemblage.

Criteria for defining sectors

The goals of this analysis include the recognition of areas which were consistently used for different activities and areas which were consistently used by separate "domestic groups" (defined below) within a house. Sectors of the housepit floors were defined according to criteria which were intended to isolate areas used for particular activities and areas used by particular domestic groups.

These criteria are:

1. Areas with high artifact densities were probably used for different activities than areas with low artifact densities and separate concentrations of artifacts are probably the products of distinct behavior patterns. Sector boundaries should, therefore, be drawn so

as to contain rather than divide artifact clusters. The definition of artifact clusters is discussed below.

2. For the same reasons, boundaries should be drawn so as to maintain the integrity of areas where artifact densities are relatively low. The definition of low density areas is discussed below.

3. Sectors should be large enough to accommodate a cooperative work area or a nuclear family, which is considered to be the smallest functional domestic unit. Space requirements and the definition and size of domestic units will be discussed below.

4. The minimal number of sectors defined within a housepit should be consistent with the maximum number of domestic units estimated to have occupied the pithouse. Population estimates will be discussed below.

5. Some specialized activity areas may have been centered around hearths; alternatively hearths may have been included in areas occupied by domestic groups. Therefore, where clearly recognizable hearths are present, the boundaries of sectors should be drawn so that each hearth is completely contained within a sector. If numerous hearths are identified, the boundaries of sectors should be drawn so that as many sectors as possible contain a hearth.

6. Storage pits dug near the periphery of the house floor may have been under the direct control of some group within the coresidential group and located in an area occupied by that group. Therefore, the boundaries of sectors should be drawn so that each storage pit is completely contained within a sector.

7. The large posts which supported pithouse roofs would have been convenient boundary markers as well as supports for sleeping platforms and obstacles to the use of nearby space. Therefore, where there is a clearly recognizable pattern of large postholes, lines drawn from the major postholes to the housepit rim will be treated as probable boundaries between sectors.

8. The main entrance to these structures is assumed to have been through the center of the roof, as described in the ethnographies. Ethnographic accounts also indicate that sleeping platforms and storage areas were located around the periphery of the house floors (Teit 1906:214; Bouchard and Kennedy 1977:64). It is, therefore,

considered most likely that common areas, passageways, and the like would be located near the center of the floor while independent domestic spaces would most likely be arranged around the periphery, so that each domestic group had access to the central space. Boundaries should therefore be drawn so as to distinguish between the center and the periphery of the floors.

In the actual definition of sectors in the three housepits it was not always possible to satisfy all of these criteria. Conflicts between the criteria were resolved on a judgmental basis.

Definition of artifact clusters and low density areas

A preliminary examination of the distribution of all lithic artifacts, including debitage, on the three housepit floors demonstrates that they are not homogeneously distributed. Figures 2.05, 2.06 and 2.07 show that, in the floor stratum in each of the three housepits, subsquares with artifact frequencies so low or so high that they would be expected to occur in less than 5% of cases in randomly distributed populations with these means are, in fact, much more common. Furthermore, subsquares with unexpectedly high or unexpectedly low artifact frequencies tend to be adjacent to other units with similar values, at least in the two largest housepits. Groups of three or more adjacent subsquares with unexpectedly high ($p < .05$) artifact frequencies form the centers of the clusters referred to in this study. Since artifact frequencies appear to decrease as the distance from these centers increases, each artifact cluster is bounded by the subsquares, lying between any two such centers, which have the lowest artifact frequencies. All of the subsquares between the central concentration and the boundary are included in the "cluster". The boundary subsquares were assigned to one or the other of the clusters they separate on a judgmental basis.

Unusually large groups of adjacent subsquares with unexpectedly low ($p < 0.05$) artifact frequencies are separately defined as low density areas and are not included in artifact clusters. Low density areas occasionally include a few isolated subsquares with higher artifact frequencies.

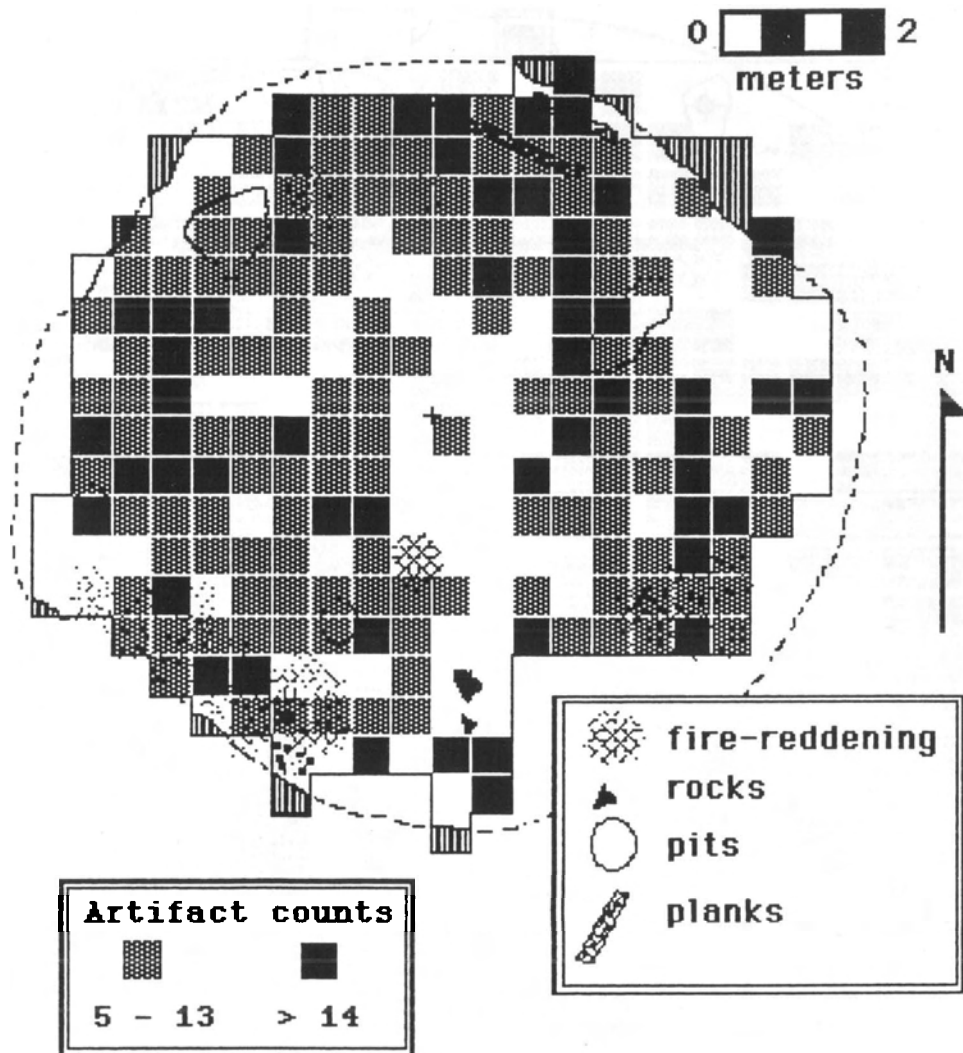
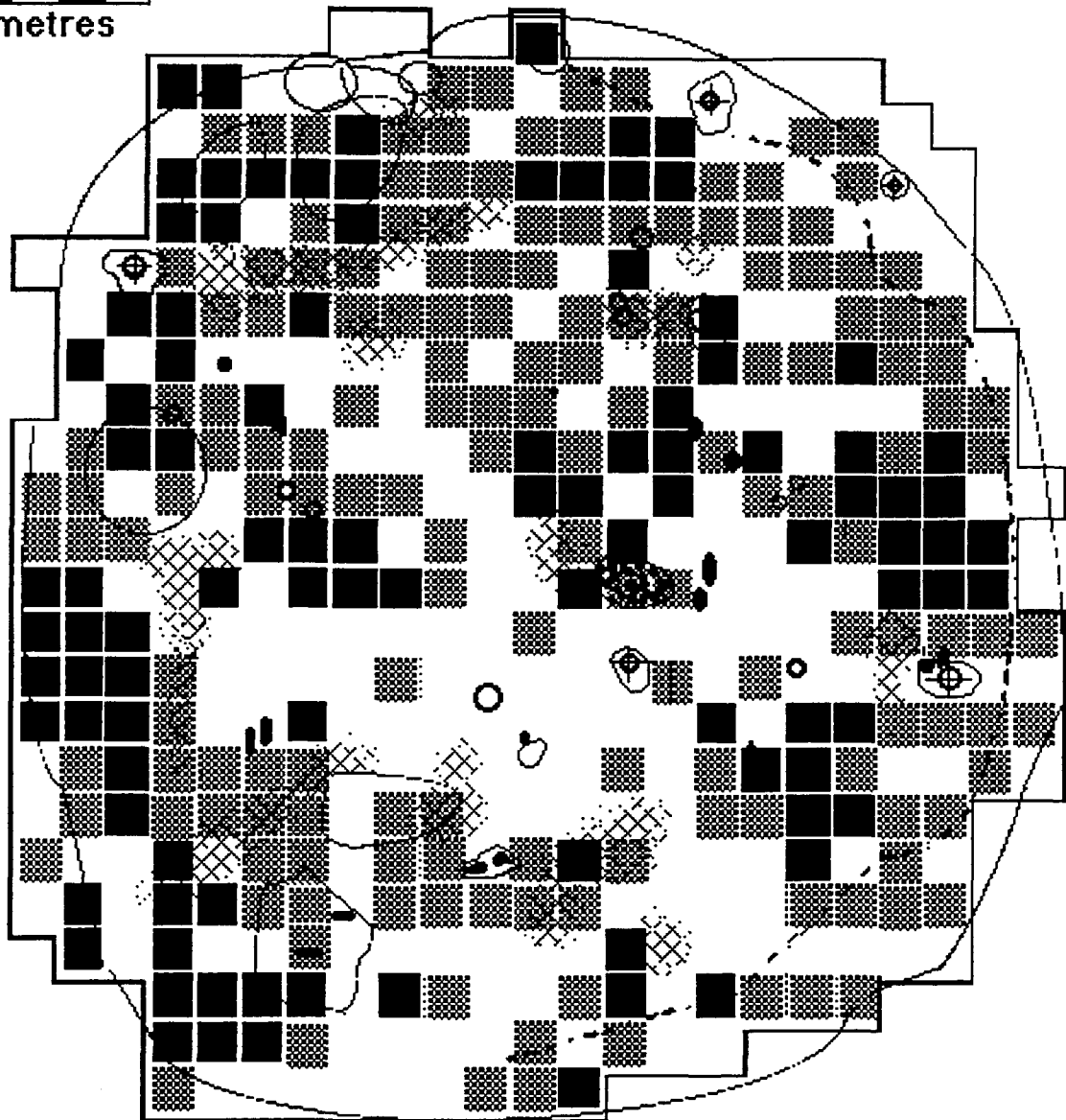











Figure 2.05. Frequencies of modified artifacts and debitage in subsquares on the floor of Housepit 3. Artifact frequencies less than 5 or greater than 13 have a less than 5% probability of occurring in a random distribution of this population.

0  2
metres



Artifact counts
 9-18
 > 18

 posthole
 rocks
 fire-reddening
 pits
 edge of bench
 edge of floor
 pits used in latest occupation

N
↑

Figure 2.06. Frequencies of modified lithic artifacts in subsquares on the floor of Housepit 7. Frequencies less than 9 and frequencies greater than 18 are improbable at the 0.05 level in this population.

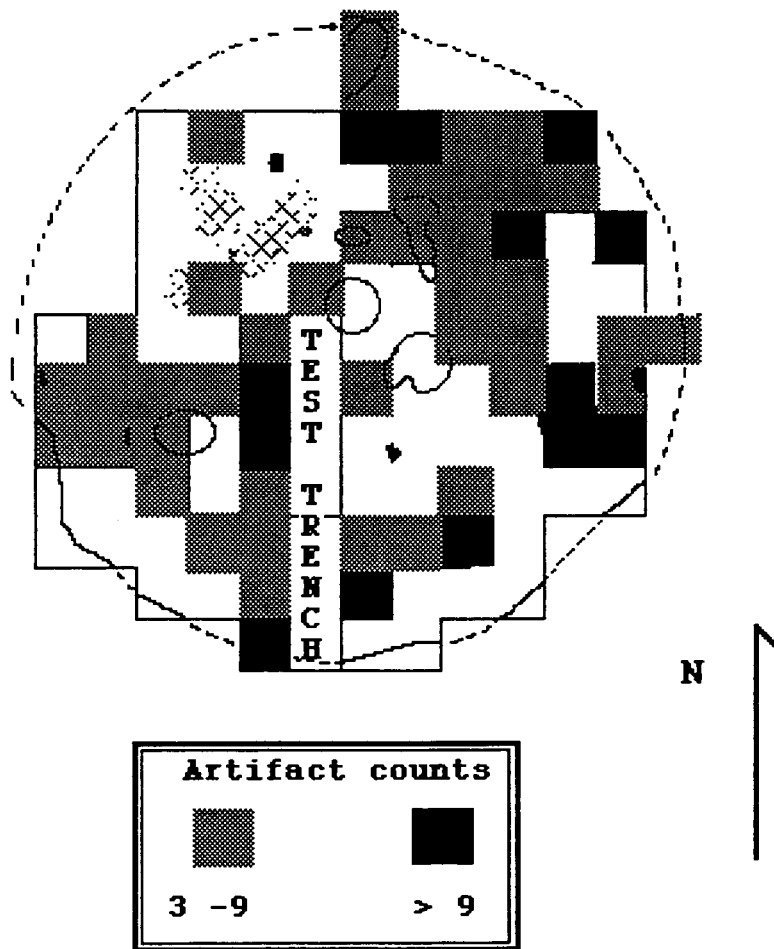


Figure 2.07. Distribution of modified artifacts and debitage on the floor of Housepit 12. Frequencies less than 3 or greater are improbable at the 0.05 level for this population.

The artifact clusters and low density areas defined according to these criteria in Housepits 3, 7 and 12 are illustrated in Figures 2.08, 2.09, and 2.10. The locations of storage pits, major postholes, hearths and concentrations of fire-cracked rock are also shown in these figures. Associations between these features and the artifact clusters will be examined in detail when the independent domestic spaces and special purpose areas in each of the housepits are described below. Generally the boundaries of artifact clusters do tend to enclose rather than divide hearths and major storage pits and to follow the lines established by the arrangement of major postholes, at least in the two largest housepits. The co-variation of these four parameters enhances the confidence that can be placed in the sector definitions as representing actual behavioral and social divisions within the housepits.

Estimating pithouse population densities

In the smallest housepit, the smallest artifact clusters defined by the method described above occupy as few as eight subsquares, that is, two square meters. This is too little to be considered as an independent domestic space. The largest clusters include as many as 60 subsquares or 15m². This is a reasonable size for a domestic unit but may also, in some cases, represent adjoining or overlapping activity areas. In light of this, the hypothetical independent domestic spaces and special purpose areas laid out on the three house floors sometimes combine clusters. The size of the areas defined as possible independent domestic spaces was based on estimates of pithouse populations, the spacing between hearths associated with clusters of fire-cracked rock, and probable family size.

Previous research into the relationship between the floor area of dwellings and the number of inhabitants have produced a variety of formulae for estimating population on the basis of floor area. On the basis of rather limited data, with actual ratios ranging from less than 1m²/person to over 22m²/person, Naroll (1962) suggested 10m²/person as a rule of thumb. More recently, Cook and Heizer (1968) have proposed a formula which allots 13.92 m² to each of the

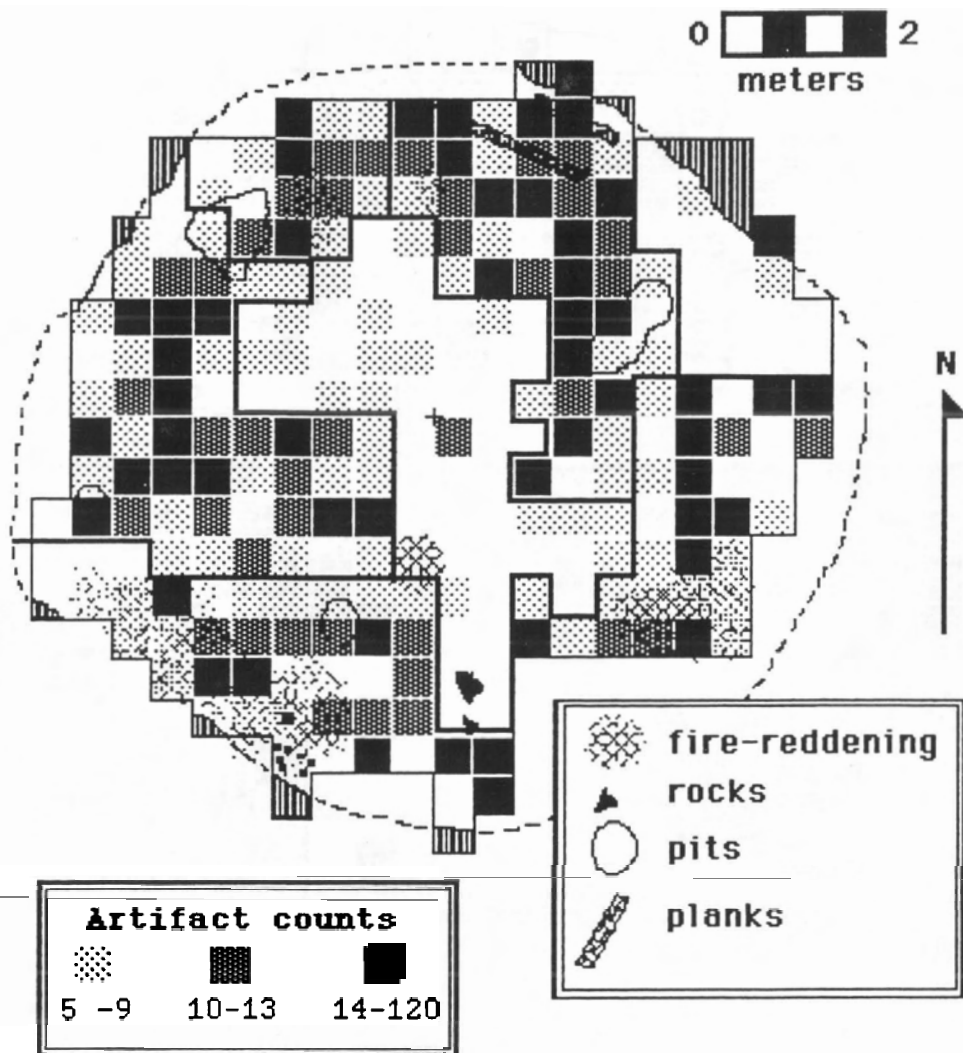


Figure 2.08. Frequencies of modified lithic artifacts and debitage in subsquares on the floor of Housepit 3. Frequencies less than 5 and frequencies greater than 13 have a less than 5% probability of occurring in a random distribution of this population. Clusters and low-density areas were defined around contiguous groups of subsquares with improbable artifact frequencies.

0 2
metres

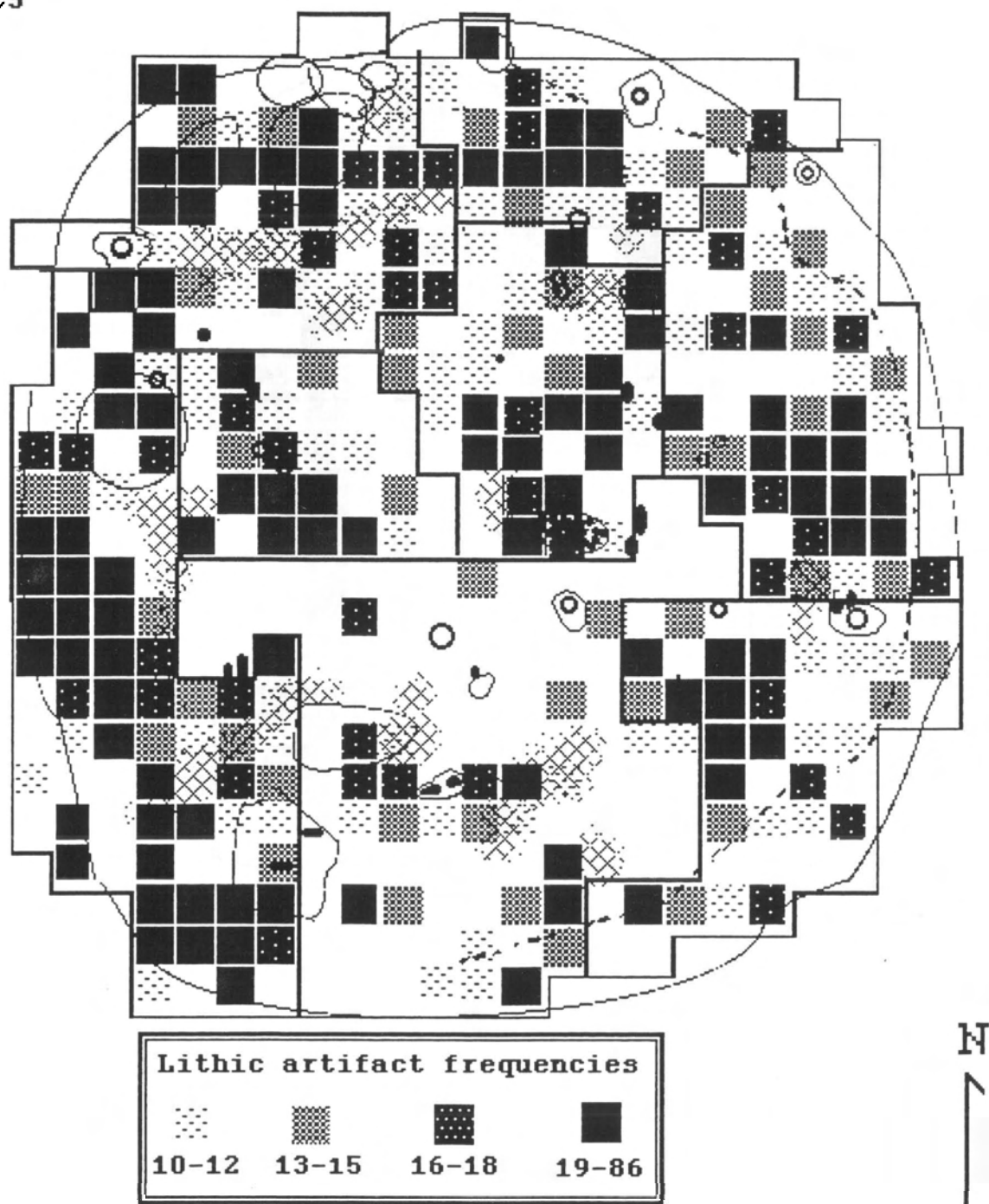


Figure 2.09. Frequencies of modified lithic artifacts and debitage in subsquares on the floor of Housepit 7. Frequencies less than 9 and frequencies greater than 18 are improbable at the 0.05 level in this population. Clusters and low-density areas defined around contiguous groups of subsquares with improbable artifact frequencies.

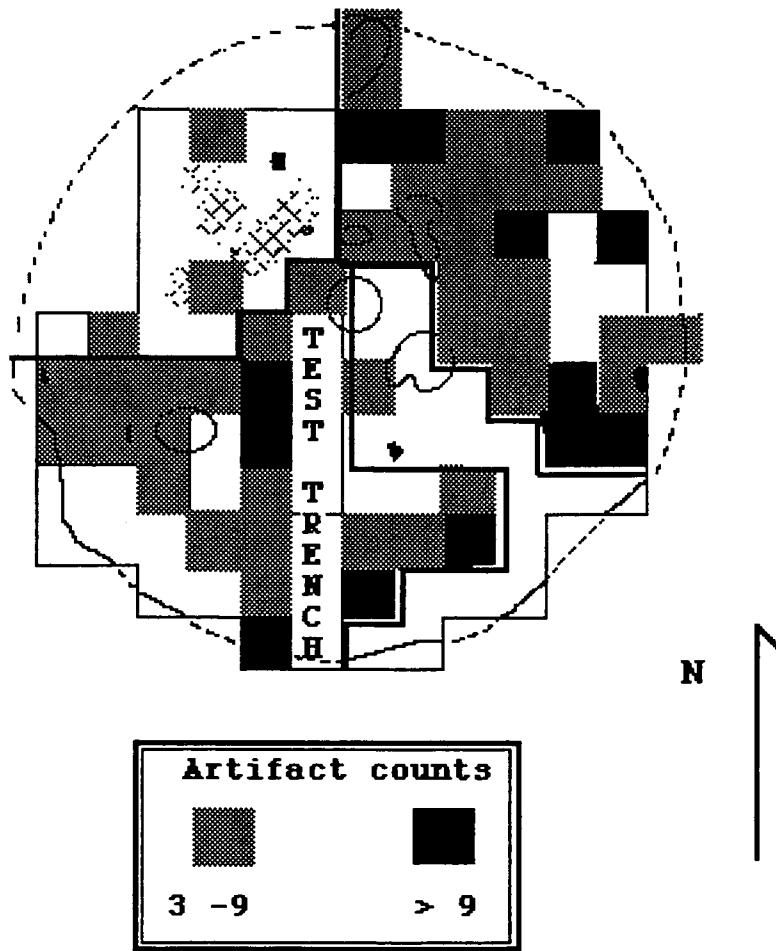


Figure 2.10. Low-density areas identified on the floor of Housepit 12. No clusters of artifacts were identified on this floor.

first six inhabitants and 9.2 m^2 to each additional person. To judge from the figures Teit (1900:192) recorded from British Columbia's interior plateau, both of these formulae would greatly underestimate the population of the pithouses being considered here.

Teit's (1906:192) observations suggest that 15 people typically occupied a pithouse which was laid out as a circle with a diameter of 20 feet (6.1m) in the initial stages of construction. Also according to Teit, 30 people typically occupied a house which was initially laid out as a 40 foot (12.2m) diameter circle. These diameters produce a maximum possible floor area of 29.2 m^2 for the smaller houses and 116.9 m^2 for the larger houses. This allows 1.9 m^2 per person and 3.9 m^2 per person, respectively.

Since the diameters Teit recorded probably reflect the diameters of the initial excavations at the surface, the actual floor areas of these houses were apt to be substantially less than the possible maximum. Given the relative dimensions of the pithouse in Teit's diagrams (Teit 1900: figs. 135 & 136), a pithouse with a diameter of 12.2m at the surface, would have had a floor area of 88.0 m^2 , or 2.9 m^2 for each of 30 people. A pithouse with a diameter at the surface of 6.1m would have had a floor area of 22.0 m^2 , providing 1.5 m^2 for each of 15 people.

The dimensions of the excavated housepits at the Keatley Creek site indicate that the walls of the pits were often less steep than those in Teit's diagram. Thus, the total area of the floors in the pithouses in Teit's report and the resulting values for floor area per person may well have been even less. It is unlikely that they were much greater. One resident for each three square meters of floor area is, therefore, a conservative estimate of the minimum population density of the largest pithouses. One and a half (1.5) square meters per person could be considered a reasonable maximum for the smallest houses. For the purposes of this study, one person for each 2.5 m^2 of floor area will be used as a best approximation of the populations of Housepits 3 and Housepit 7. At this density, Housepit 7, with an estimated floor area of 113.1 m^2 , would have provided room for 45 inhabitants. Housepit 3, with an estimated floor area of 78.5 m^2 , has space for 31. Teit's figures indicate that smaller houses

may have been more densely populated than larger ones. For Housepit 12, where the floor is only 7m across, one person for every two square meters may be a more accurate estimate, allowing room for a maximum of 19 inhabitants. Table 2.01 shows the range of possible population values for these housepits at different population densities.

House floor Radius (m)	Area (m ²)	Pithouse Population									
2.50	19.6	19	13	9	7	6	5	4	4	3	
3.00	28.3	28	18	14	11	9	8	7	6	5	
3.50	38.5	38	<u>25</u>	19	<u>15</u>	12	10	9	8	7	HP12
4.00	50.3	50	33	25	20	16	14	12	11	10	
4.50	63.6	63	42	31	25	21	18	15	14	12	
5.00	78.5	78	52	<u>39</u>	31	<u>26</u>	22	19	17	15	HP3
5.50	95.0	95	63	47	38	31	27	23	21	19	
6.00	113.1	113	75	<u>56</u>	45	<u>37</u>	32	28	25	22	HP7
6.50	132.7	132	88	66	53	44	37	33	29	26	
7.00	153.9	153	102	76	61	51	43	38	34	30	

m ² / /person	1	1.5	2	2.5	3	3.5	4	4.5	5
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Table 2.01: Pithouse populations for the relevant range of floor areas and population densities. The underlined values show the range of the best estimates for the populations of the housepits indicated in the right margin, with the most probable value printed in bold type.

These estimates are quite consistent with data obtained from a sample of 10 pithouses sites in temperate to arctic environments (Crellin, Hayden, and Holmberg pers. comm.). These data indicate a positive relationship between mean January temperature and average population density on pithouse floors. Where mean January temperatures ranged from -24° C to -30° C average population densities ranged from 0.82 persons/m² to 2.20 persons/m². Where mean January temperatures ranged from -10° C to +10° C average population densities ranged from 1.40 persons/m² to 2.84 persons/m². Recorded mean January temperatures in the area around the Keatley Creek site range from -3° C to -8° C (Beil et al. 1985).

Estimating the size of domestic units

For the purposes of this study a domestic group or domestic unit is defined as a social group sharing a domestic space and cooperating in domestic tasks, notably the procurement and preparation of food. The members of a domestic unit would likely have slept in the same shared space as well. The average size of these groups is difficult to estimate because the composition of family groups may have varied considerably. In a polygynous system such as that described for the historic Lillooet (Teit 1906:269), a prosperous family might have included two or more mothers, their unmarried or recently married children, and their spouse as well as unmarried siblings, elders, and, possibly, slaves. This suggests a maximum family size of upwards of a dozen. Alternatively, co-wives of wealthy men might have established their own separate, and smaller, domestic units including their children and possibly elderly parents and unmarried siblings. The minimum size of a domestic unit was probably not less than three or four. Economic competition was an important feature of ethnographically recorded cultures in this region (Teit 1906:255-257, 1909:571-574) and may have been more intense in the period when these houses were occupied (Hayden et al, 1985). Large groups probably had important advantages in this competition. Individuals and small nuclear families would have faced strong incentives to attach themselves to larger groups perhaps through channels of kinship. Individuals and very small groups are, therefore, unlikely to have maintained separate domestic economies within larger coresidential groups.

For heuristic purposes, I have estimated the size of the average domestic unit at six or seven. At 2.5 m² per person this allows room for seven families in Housepit 7, five in Housepit 3, and two in Housepit 12. With allowances for greater population density and reduced family size the estimate for Housepit 12 might be raised to three families.

In Housepits 3 and 7, these estimates correspond quite closely with the number of sectors defined by the boundaries of artifact clusters and the locations of features. There are five sectors in

Housepit 3 and nine Housepit 7. Both houses include a central sector defined around a low density area. These central sectors are so clearly different from the remaining sectors that they will not be considered as spaces which may have been occupied by domestic units. So there are four sectors which may have been occupied by domestic units in Housepit 3 and eight in Housepit 7.

The analytic method employed in this thesis depends on the recognition of differences between different areas of the floors. So six sectors were defined on the floor of Housepit 12 using the criteria defined earlier. Some of the sectors defined on the floor of Housepit 12 may, however, be too small to have been used as activity areas or to have served as domestic spaces for even the smallest domestic units. A description of each house floor and the sectors defined on it follows.

Definition of sectors

Housepit 7

The artifact clusters defined for Housepit 7 are illustrated in Figure 2.09. One of the most striking features of this map is the large low artifact density area in the southern central zone of the house. This area, tentatively interpreted as a special common area, was defined as the low-density South Center sector (see Figure 2.11). Extensive fire-reddened areas are common in this housepit and are usually associated with concentrations of fire-cracked rock (see Figures 2.12 and 2.13). The distribution of these hearths made it possible to include one hearth in each of six out of seven sectors defined around periphery of the floor. These were labelled according to their compass orientation; NW, W, SW, SE, ESE, ENE, and NE Sectors (Figure 2.11). As previously explained, the boundaries of artifact clusters, the locations of storage pits, the bench along the eastern edge of the floor and the locations of major postholes were also considered in the definition of these sectors.

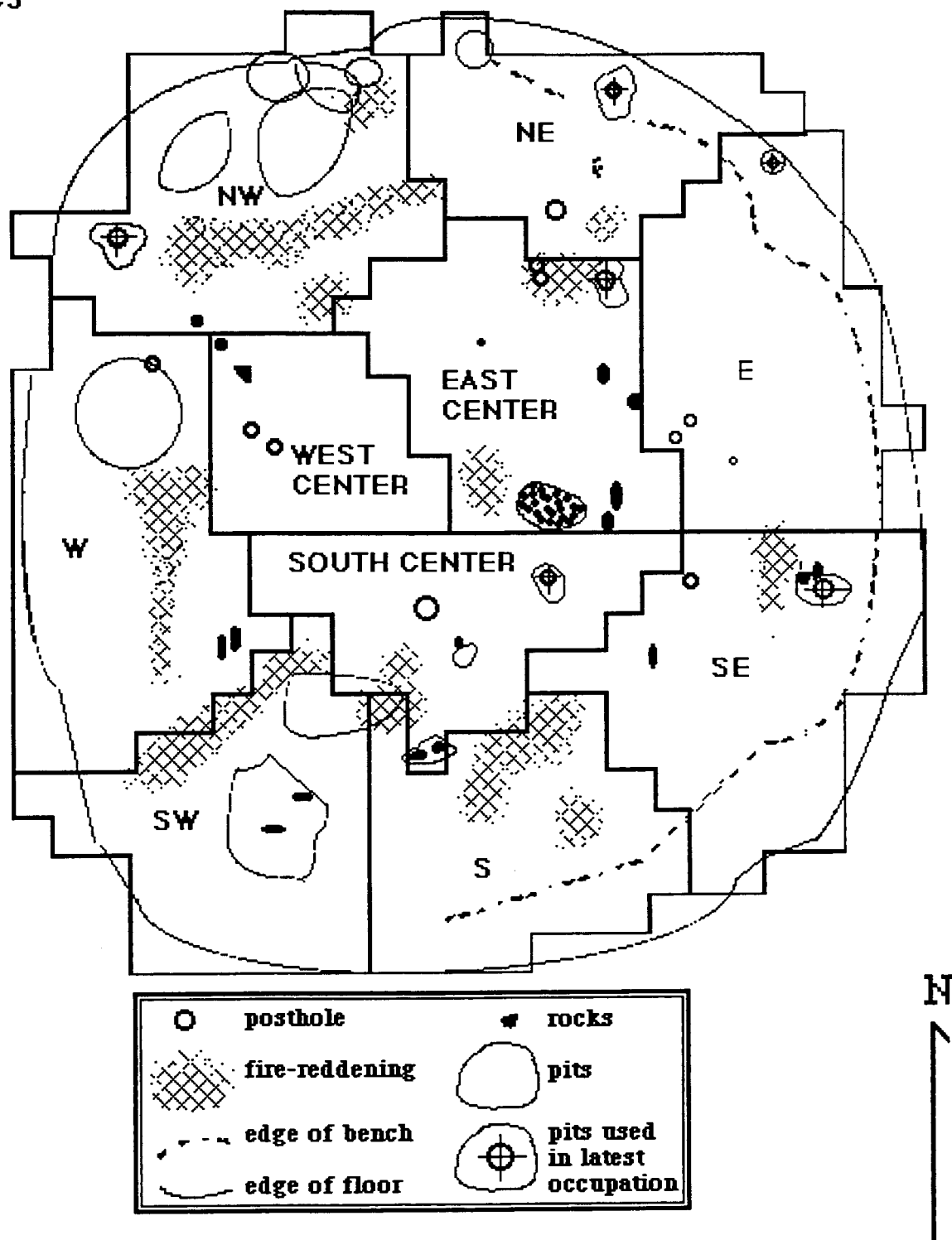
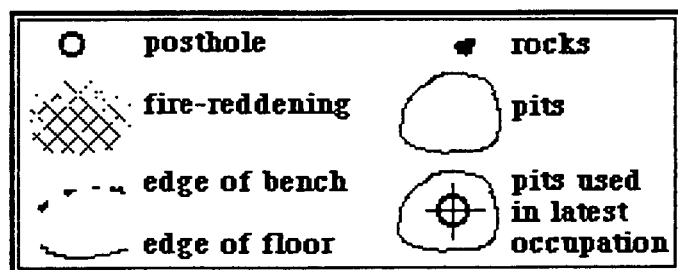
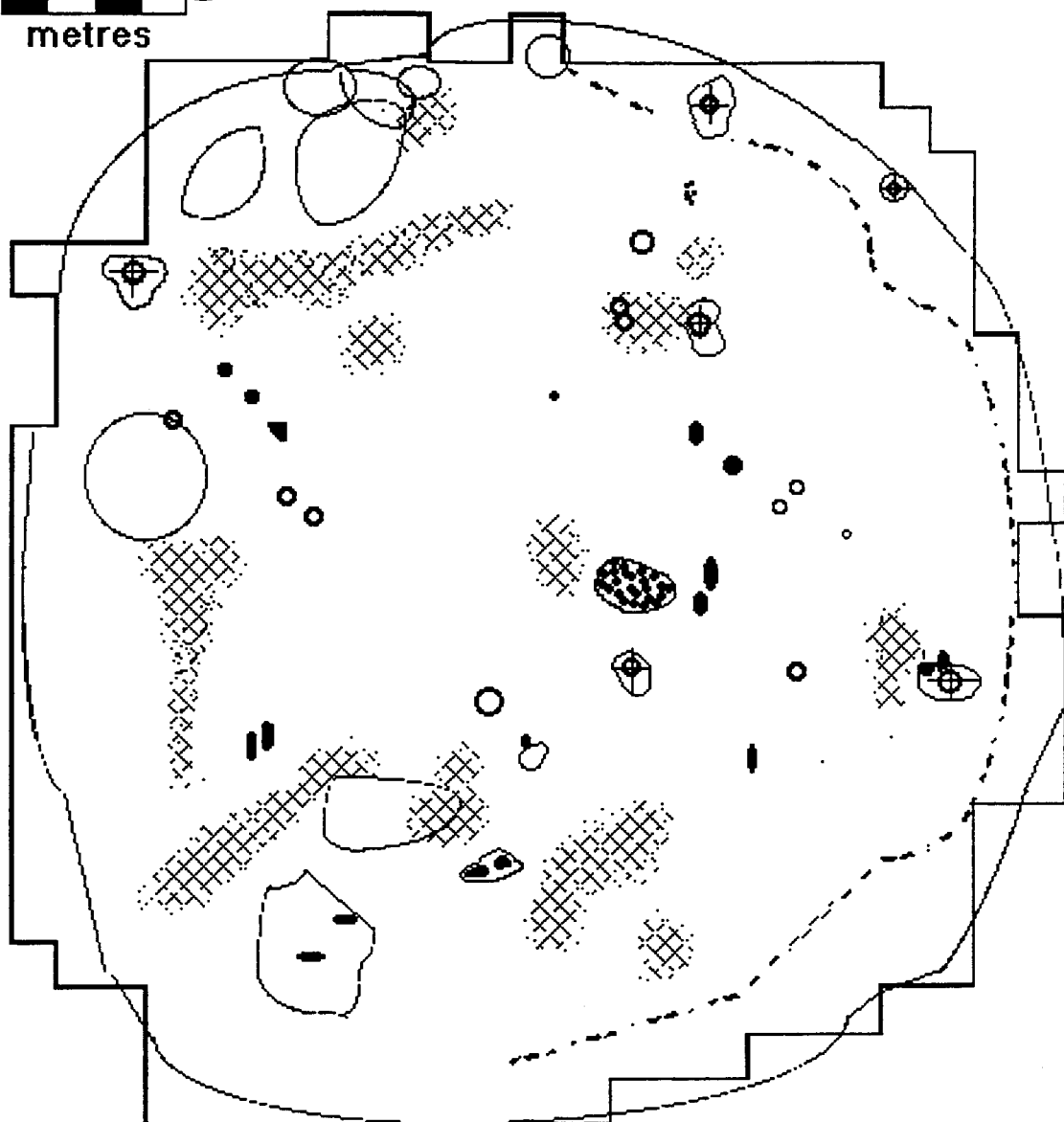


Figure 2.11. Sectors defined as analytic units on the floor of Housepit #7.

0 2
metres



N
↑

Figure 2.12. Features on the floor of Housepit 7.

0  2
metres

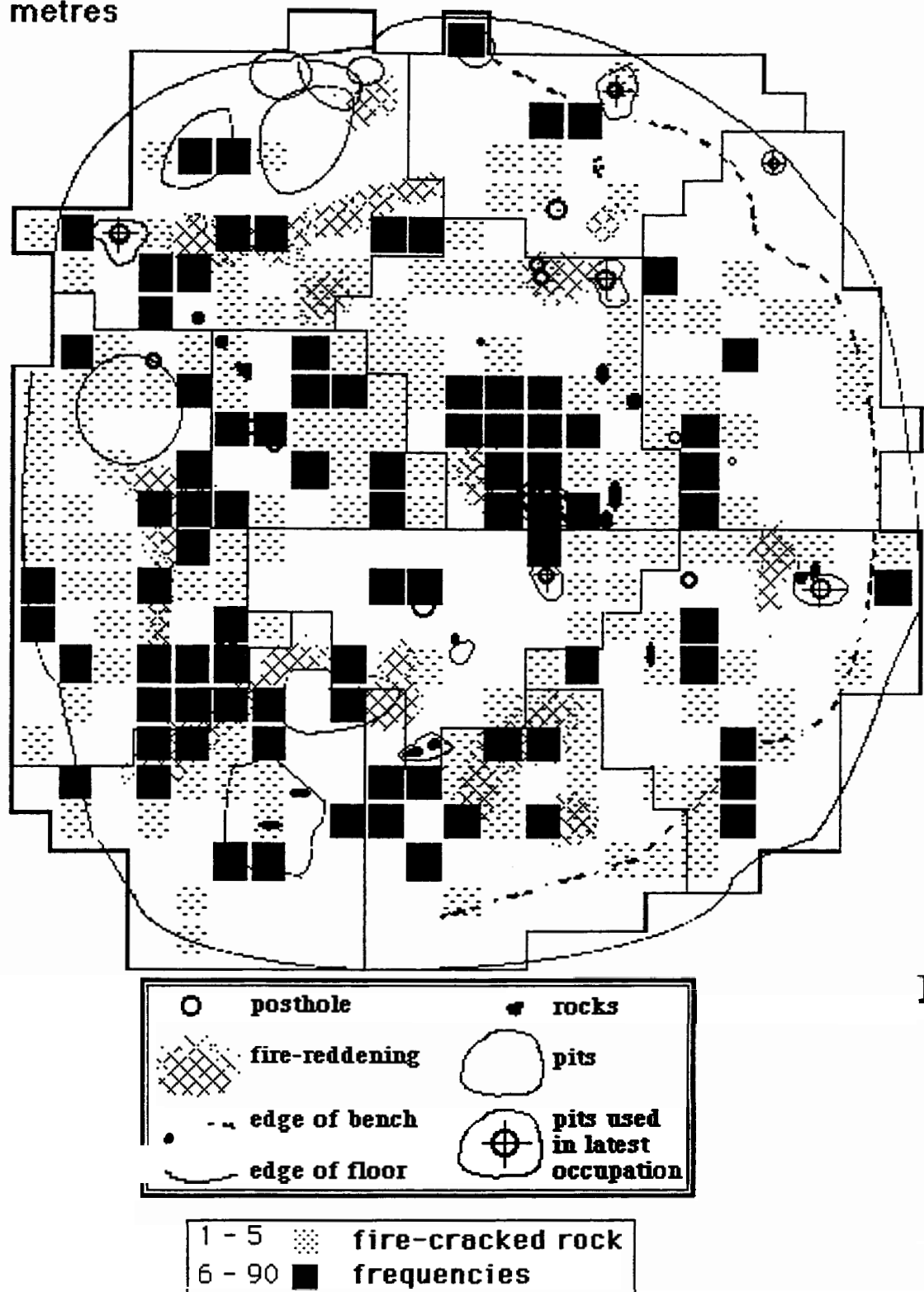


Figure 2.13. Distribution of fire-cracked rock on the floor of Housepit 7.

Two additional sectors were defined in the northern central part of the floor (Figure 2.11). The East Center and West Center sectors include artifact clusters which were not clearly associated with any of the peripheral sectors. The West Center sector also includes a hearth while the East Center sector includes two pits, one of which contained a large quantity of fire-cracked rock.

The East Center and West Center sectors have areas of 12m^2 and 6.5m^2 , respectively. The discussion of pithouse populations presented above suggests 1.5m^2 as a reasonable estimate of the minimum area per person in the smallest houses. In larger houses, where a greater proportion of the floor may have been devoted to communal spaces, 1.5m^2 will also serve as an estimate of the minimum area required for each occupant of an independent domestic space, defined here as the space used by an independent domestic unit for sleeping and domestic tasks. On this basis, the West Center sector is large enough to have been a domestic space for a family of three or perhaps four. Provisionally, however, both the West Center and East Center sectors were considered as potential special purpose activity areas, for the following reasons: 1) the East Center and West Center sectors are located in the central part of the floor.

Ethnographic data and practical considerations supporting the division of the house floors into a central zone, assumed to have been used for communal rather than domestic activities, and a peripheral zone, presumably devoted to sleeping, eating, food preparation and other domestic tasks, were presented earlier. The large, low-density Center Sector which is so clearly defined on this floor bolsters this interpretation;

2) the East Center Sector, in particular, includes a pit full of fire-cracked rock which is a unique feature on this floor suggestive of some special activity in this area;

3) the East Center and West Center sectors are also substantially smaller than any of the independent domestic spaces defined around the periphery of the floor. Alternatively, these two sectors may have been domestic areas assigned to slaves or to domestic units of the lowest rank. The relatively small size of these sectors and their inconvenient location in what was probably a high traffic area are

consistent with this interpretation. The activities provisionally attributed to the Inner sectors will, of course, be re-evaluated once analysis of the spatial distribution of artifact types has revealed how they differ from the peripheral sectors.

Housepit 3

The distinction between the central zone and the periphery is even more obvious in Housepit 3. In this case, the low density area, again labeled the Low-density Center Sector, clearly extends into the both the northern and the southern parts of the house. A clear posthole pattern helped to define the four peripheral sectors which were labeled according to compass orientation; NE, NW, SW, and SE Sectors (see Figure 2.14 and Figure 2.15). The boundaries of artifact clusters were also considered in establishing the boundaries of sectors (see Figure 2.08). Fire-reddened areas occur in all but the NE Sector. However, with the exception of one hearth near the center of the floor in the SW Sector and another in the SE sector, fire-reddened areas are superficial in Housepit 3. The hearth in the SE sector was covered by the floor stratum and appears, therefore, to have been associated with an occupation preceding the final occupation of Housepit 3. The superficial fire-reddening may have resulted from the burning of the house after its abandonment. Fire-cracked rock is largely concentrated near the center of the floor and is not clearly associated with any of the fire-reddened areas (see Figure 2.16). Medium or large sized storage pits occur in all but the SE Sector but only one pit, in the NW sector, is identified with the last occupation. Planks, which may be the remains of a bench, were found near the housepit wall in the NE Sector.

Housepit 12

The sectors defined for Housepit 12 are shown in Figure 2.17. The distribution of artifacts on this floor does not distinguish the central part of the floor from the peripheral area as clearly as it did in Housepits 7 and 3. In fact, while the distribution of lithic artifacts on this floor is not random or uniform, there is less tendency for subsquares with unexpectedly high ($p \leq .05$) artifact frequencies to cluster together here than in the larger housepits (see Figure 2.10).

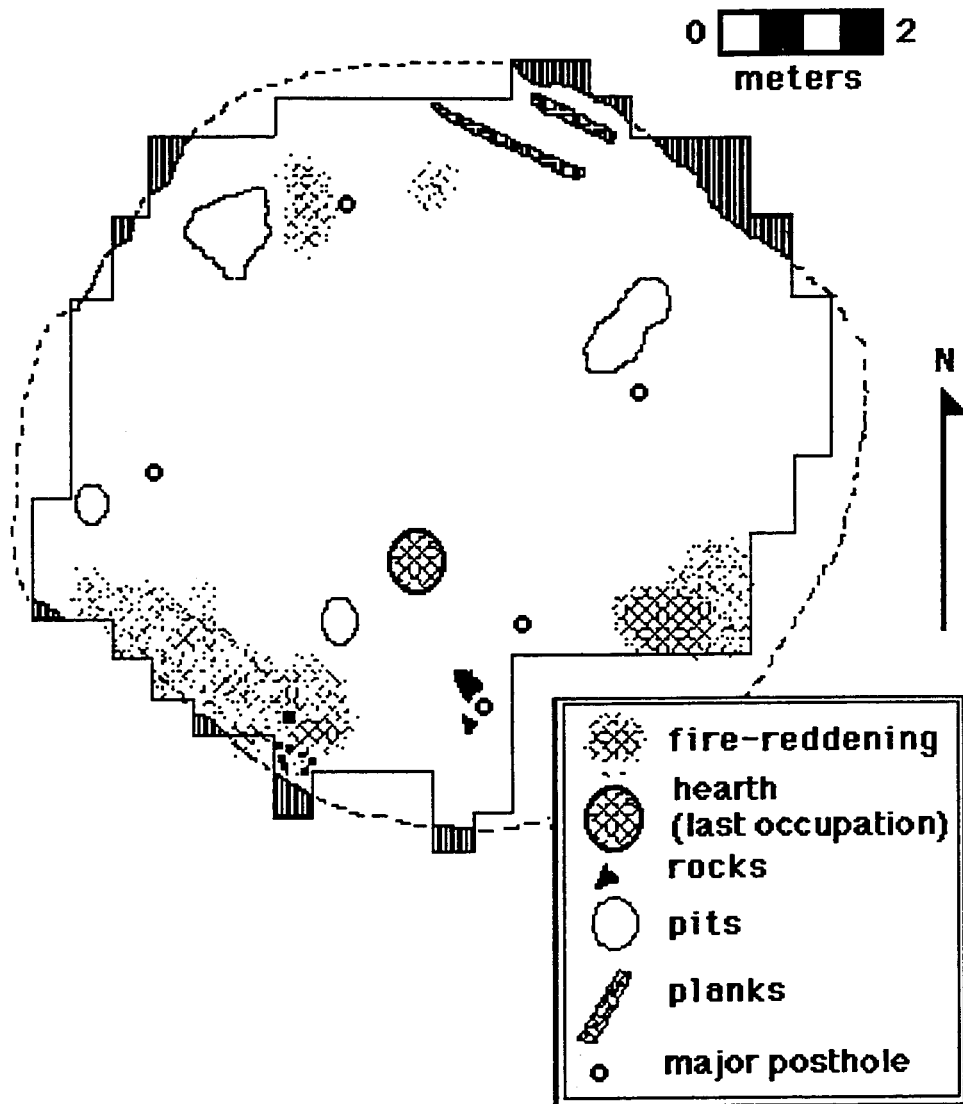


Figure 2.14. Features on the floor of Housepit 3.

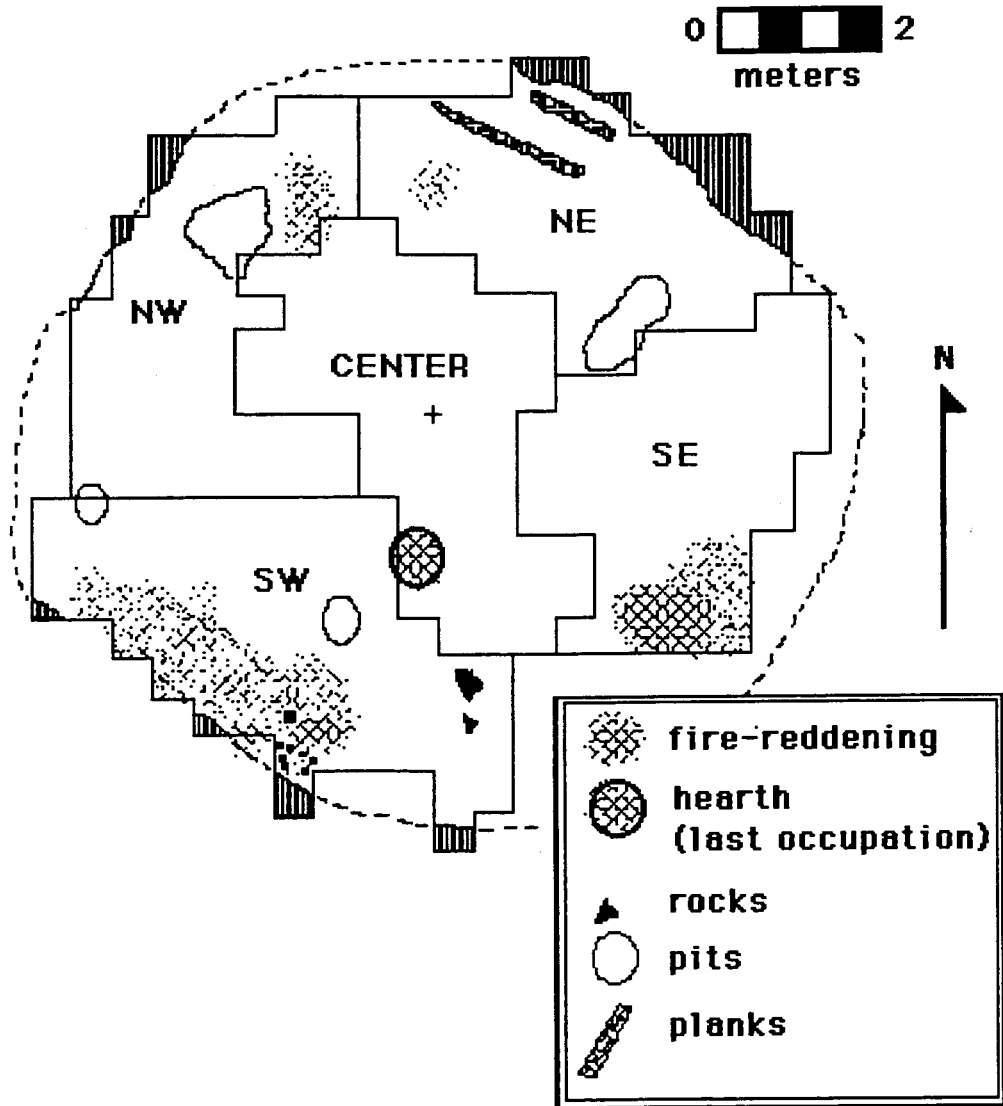


Figure 2.15 Sectors defined as analytic units on the floor of Housepit 3.

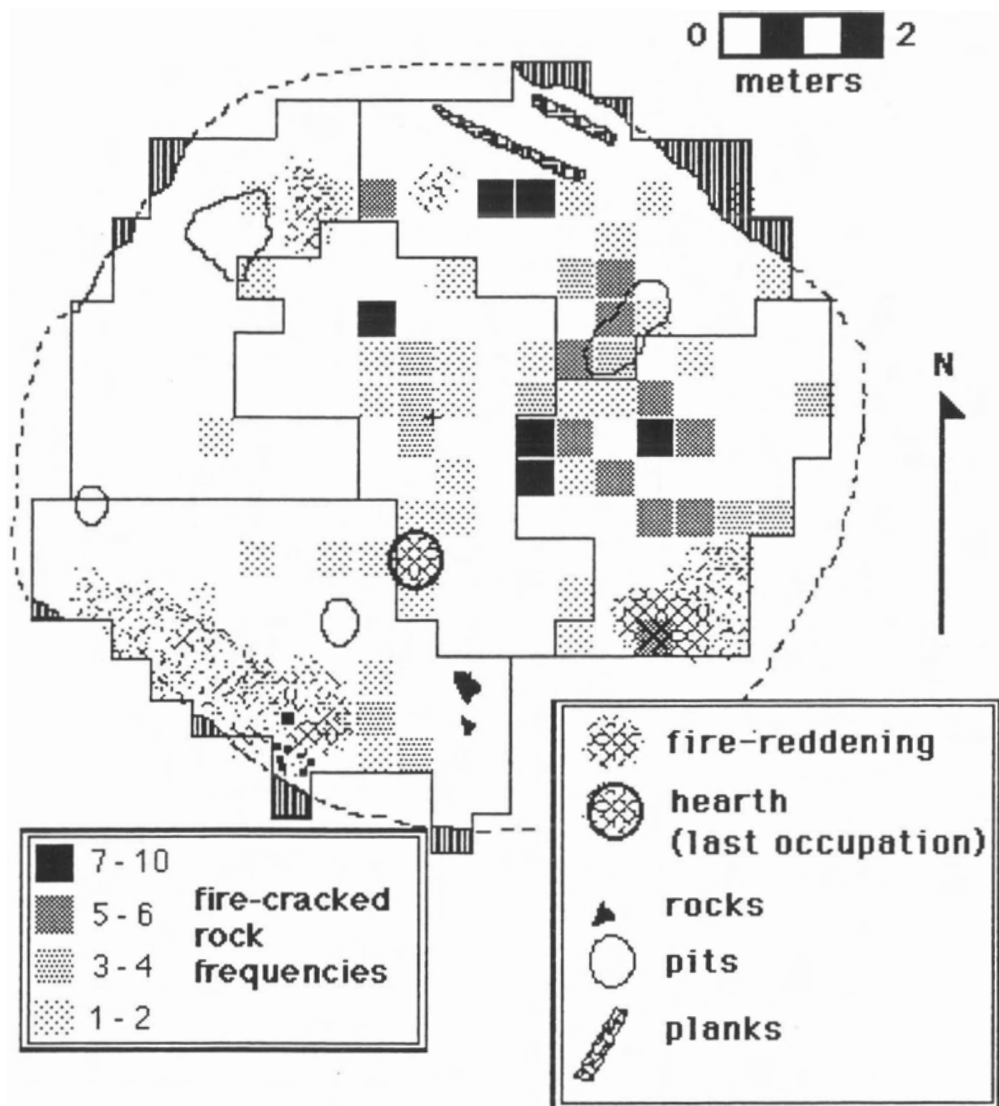


Figure 2.16. Distribution of fire-cracked rock on the floor of Housepit 3.

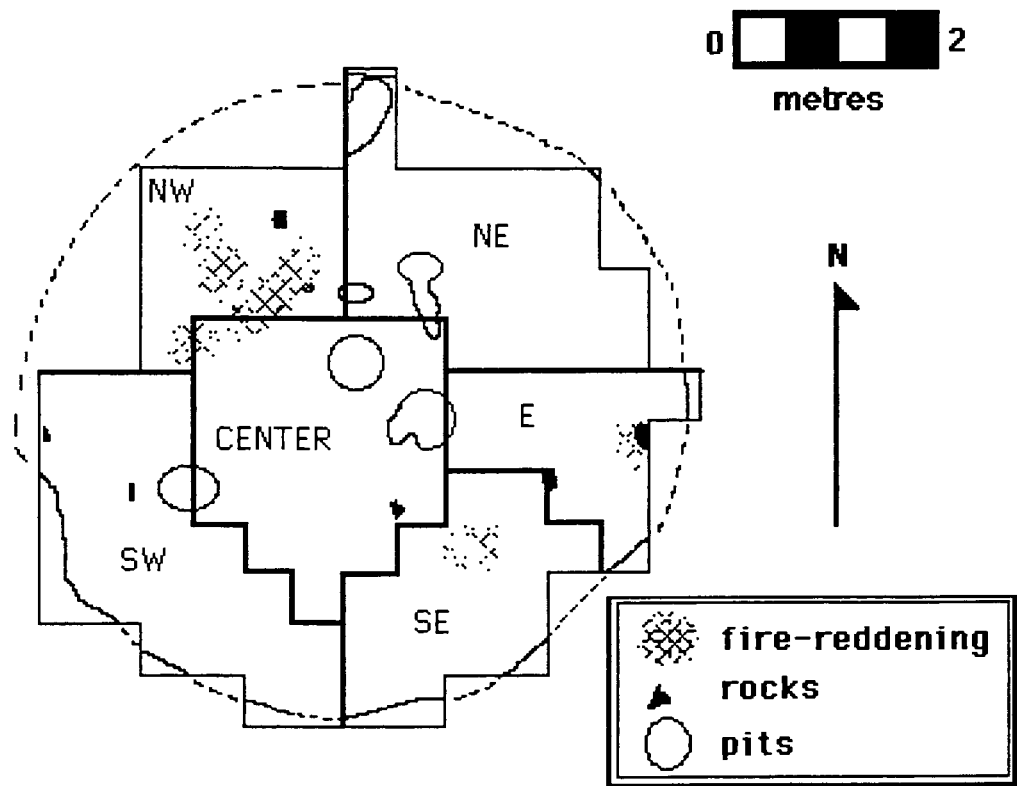


Figure 2.17. Sectors defined as analytic units on the floor of Housepit #12.

Artifact clusters which fit the definition used in this study are too rare to be of much use in defining sectors in Housepit 12. This is largely the result of the relatively low density of lithic artifacts on the floor of this housepit which could reflect either a shorter period of occupation or a relatively low rate of lithic consumption, perhaps due to poverty. The lack of clusters could also be a consequence of the whole floor having been regularly used for a variety of activities, as might be expected in a smaller house.

The apparent major artifact cluster, extending from the center of the floor to its southern edge, is, at least in part, the product of excavation methods which, in the exploratory phase, employed a 200cm by 50cm trench as the smallest excavation unit. Artifact frequencies for the floor stratum in the two trench units were divided by four to provide an average value for each of the four subsquares they represent. The most that can be said with confidence is that the western third of the floor is distinguished from the eastern two-thirds by the absence of subsquares with unexpectedly high ($p \leq .05$) artifact frequencies.

There is a low-density of artifacts around the only fire-reddened area on this floor (see Figure 2.18). Storage pits are mostly concentrated in a 2m square area the center of which is located about 1m southeast of this possible hearth (see Figure 2.18). There is no apparent pattern of postholes.

For analytical purposes the western part of the floor has been divided into a Southwest sector and a Northwest sector with the northwest sector containing the hearth. A central sector containing all of the major storage pits and two adjacent subsquares with unexpectedly high ($p \leq .05$) artifact frequencies was also defined. The remainder of the floor, along the eastern perimeter of the house, was divided into three roughly equal sectors each including 3 or 4 subsquares with unexpectedly high ($p \leq .05$) artifact frequencies. The smallest of these sectors contains 16 subsquares and represents an area of about 4.5m^2 if an allowance is made for unexcavated areas. This is near the lower limit for the size a domestic space that could accommodate a family of three.

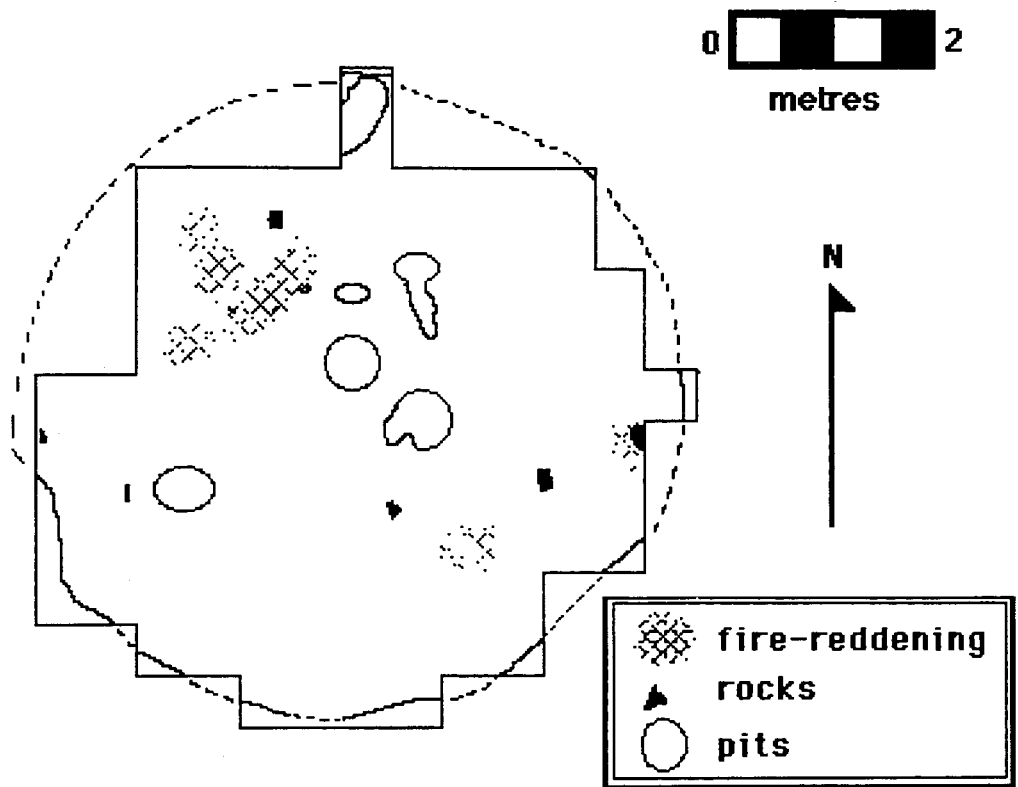


Figure 2.18. Features on the floor of Housepit 12.

Typology

Once the three house floors had been divided into sectors, the next task was to develop some measure of the differences and similarities among the lithic assemblages from the different sectors. To this end the lithic artifacts from each subsquare of the floor strata were sorted into two broad categories: unmodified lithic debitage, and all other lithic artifacts including all modified flakes. Lithic debitage was sorted into 5 flake types in 4 size categories. The frequencies of vitreous trachidacyte (commonly referred to as "basalt") flakes, chert or chalcedony flakes, and obsidian flakes were also recorded, as were the numbers of stained flakes, weathered flakes, and flakes with cortex on more than 30% of the dorsal surface. In Housepits 3 and 12 a count of fire-spalled flakes was also taken. Many of these observations are not directly pertinent to the present inquiry, but will be used in other analyses comparing site formation processes of roof, floor, and rim deposits.

Each of the modified artifacts was classified into one of 97 types and described in terms of the following attributes: maximum dimension, flake type, raw material type, degree of fragmentation, extent of reduction, retouch and wear, degree of weathering, presence or absence of fire-spalls, presence or absence of hide-polish, and presence or absence of cortical surface.

Hill and Evans (1972) argue that meaningful typologies cannot be formulated without first stating the purpose to be served by the typology. In the present case, artifact types and attributes were defined with a view to distinguishing areas used for different activities and areas occupied by groups with different social statuses. Artifact types and attributes which might be indicative of craft specialization or sex specific tasks were also of interest. The artifact types and attributes considered most relevant to each of these questions are listed and discussed below. A complete typology with the definitions employed in the analysis of the artifacts appears in Appendix A.

General purpose expedient flake tools	
expedient flake tools with acute edges	
retouched flakes	
and inverse retouched flakes	(70,170)
flakes with light bifacial retouch	(140)
expedient flake tools with scraper edges	
single, double and convergent scrapers	(150,164,165)
inverse and alternate scrapers	(63,156)
utilized flakes	(180)
Special purpose expedient flake tools	
notches	
small notches	(54)
large notches	(154)
small piercers	(153)
Extensively retouched tools	
heavily retouched scrapers	
single, double and convergent scrapers	(150,164,165)
inverse and alternate scrapers	(63,156)
Endscrapers	(162)
Spall tools	(183,184)
Key-shaped scrapers	(158)
Unifacial and bifacial borers	(133,152)
Unifacial and bifacial perforators	(132,151)
Bifacial knives	(130)
Bifaces	
Stage 2 (edging) bifaces	(192)
Stage 3 (primary thinning) bifaces	(193)
Stage 4 (secondary thinning) bifaces	(131)
Projectile points	(101-129)
Abraders	(201)
Anvils, mortars, and pounding stones	(185,206, 211)
Artifacts associated with lithic reduction	
Hammerstones	(190)
Cores	(186)
Core-rejuvenation flake	(182)
Bipolar cores	(146)
Debitage types including:	
primary flakes	
secondary flakes	
billet flakes	
bipolar flakes	
shatter	

Table 2.02 Artifact types organized into "functional" categories. Type numbers for the artifacts in each category are listed at the right margin.

Types used to distinguish areas used for different activities

The categories of artifact types listed in Table 2.02 were considered to be useful in distinguishing areas used for different activities. Note that the intent here is not necessarily to identify the products of specific activities or to associate particular artifact types with particular tasks. Rather it is to determine whether collections of artifacts from different sectors represent different activities.

Most of the types and attributes used in this study may have had some functional significance. However, to simplify the analysis, the artifact types in Table 2.02 have been organized into categories believed to reflect broad functional distinctions. Miscellaneous categories and a few other types now suspected of having no functional relevance are not included in this list.

Expedient Flake Tools

Apart from debitage, the great majority of the lithic artifacts in the assemblages from the floors of Housepits 3, 7, and 12 are simple flake tools with minimal, single episode resharpening or use retouch. In this study, these artifacts are referred to as expedient flake tools because they can be fashioned quickly in response to immediate needs. They are, perhaps, the category of lithic tools most likely to be deposited at or near the place where they were used. The relatively short time invested in their manufacture along with their relatively short use-life makes them more expendable and less susceptible to curation than more carefully retouched tools. Expedient flake tool types defined in the typology include: utilized flakes, unifacially retouched flakes, inversely retouched flakes, bifacially retouched flakes, small piercers, and large and small notches. Single scrapers, double scrapers, convergent scrapers, inverse scrapers, alternate scrapers which exhibit evidence of only a single episode of retouch are also included. However, artifacts in any of the scraper categories which exhibit evidence of more than a single episode of resharpening will be classified as heavily-retouched scrapers for the purposes of this analysis. The expedient flake tool types can be grouped into

general purpose expedient flake tools and special purpose expedient flake tools.

General purpose expedient flake tools

It is not certain whether all of these types were functionally distinct, that is, whether all were designed and used for different purposes. Many are fairly basic tools with a broad range of potential applications. These have been classified as general purpose expedient flake tools. Even within this category, however, functional distinctions can be drawn with some confidence between two broad categories of expedient flake tools: 1) expedient flake tools with acute edges (spline-plane angle $< 45^{\circ}$), which are best suited to slicing or cutting presumably soft materials, and 2) expedient flake tools with scraper edges (spline-plane angle $> 45^{\circ}$) which, as the name suggests, are better adapted to scraping or shaving hard materials.

Expedient flake tools with acute edges include retouched flakes, inverse retouched flakes, and flakes with light bifacial retouch (bifacially retouched flakes). The distinctions between unifacial retouch and bifacial retouch in this category may or may not be functionally significant. Bifacial retouch, which tends to be found on larger more robust flakes in these assemblages, may increase durability and reduce sharpness but it often appears to be simply a stylistic variant of the unifacial flake tool type.

Expedient flake tools with scraper edges include all of the scraper flake tool types. The different scraper types are classified according to the number of retouched edges and whether the dorsal or ventral (inverse) surface of the flake was retouched. Double scrapers and alternate scrapers which have two scraper edges and convergent scrapers with converging scraper edges may represent efforts to extend the life of existing tools or they may have been designed for more comfortable holding, with a backing edge opposite the working edge. They may also have been intended for special tasks . At present, there is no compelling reason to suppose that they were intended for different purposes than the simple single edged

scrapers. Inverse scrapers and alternate scrapers, both of which have scraper retouch on the ventral surface of the flake, may be functionally distinct from the other scraper types in that the relationship between the comparatively smooth ventral surface of the flake and the working edge is opposite to that found in the other scraper types. Any possible functional significance of this difference is, however, unclear.

Utilized flakes are also classified as general purpose expedient flake tools. No distinction was made between those with acute edges and those with scraper edges.

Special purpose expedient flake tools

Three additional artifact types have been classified as expedient flake tools; notches, small piercers, and pieces esquillees. Two of these types, notches and small piercers, are near the top of the list of the most frequently occurring tool types, though they are not nearly as common as the acute-edged flake tools and simple scrapers. Both seem somewhat more specialized than the acute-edged flakes and scrapers, though perhaps still useful in a variety of applications.

Notches are formed by removing a single flake from the edge of the flake on which the tool is made. Small notches are made on relatively thin flakes with spline-plane angles of $< 45^\circ$. The width of the notch created by the flake removal is less than 5mm. Large notches are formed on thicker flakes with spline-plane angles $>45^\circ$ and the notch formed by the flake removal is typically wider. The size of the notch is thought to be related to the size of the cylindrical objects presumed to have been worked with these tools. Small notches might, for example, have been used to work basketry elements while large notches may have been used to shape arrow or dart shafts.

Small piercers are typically formed on small thin flakes with a short sharp projection either at the intersection of a break and a retouched edge or extending out from a retouched edge. In most cases they are also distinguished by wear or retouch at or near the point of the projection. They would have been useful for piercing

soft, thin materials. Suggested applications include piercing birch bark or soft leather to permit stitching and piercing human skin for blood-letting or tattooing.

Pieces esquillees, which are characterized by crushing on two opposing edges, are rare in these assemblages. They are presumed to have been used as wedges for splitting hard materials like bone and wood.

Interpreting the distributions of expedient flake tool categories

Most of the functional distinctions used above to classify the expedient flake tool types probably do differentiate categories of artifacts which were designed and used for different functions; cutting as opposed to scraping, for example. This is not to say that the different categories of expedient flake tools are directly indicative of different activities. Most of the tasks likely to have been performed on the house floors, from the preparation of animal and vegetable foods to the working of bone, hides, wood, and fibers in the manufacture of various goods, could well have involved the use of tools from several of these functionally distinct categories. However, different tasks would, most probably, have used the different categories of expedient flake tools in different proportions. Thus, if the lithic assemblages from two sectors of a house floor differ significantly in terms of the relative frequencies of the major categories of expedient flake tools, it seems reasonable to argue that a different set of tasks was performed in each sector.

It is difficult to predict the relative frequency with which any of the expedient flake tool categories would have been deposited in the performance of any of the diverse suite of tasks which are referred to in this study as domestic activities. A wide range of variables would need to be considered including not only the relative importance of cutting and scraping in each task but also the rates of wear for different types of edge on different materials, the number of times each type of flake tool can practically be resharpened, the relative costs of resharpening or replacing each type of flake tool, and the possibility of recycling one type of flake tool into another.

Since it is also difficult to accurately estimate how often any particular task would have been performed in a typical domestic economy, it is not possible, without extensive experimental research, to characterize, *a priori*, a typical domestic tool kit in terms of the relative frequencies of the expedient flake tool types.

Still, cutting, shaft smoothing, and piercing can be assumed to be identifiable basic components of most domestic activities. If most of the artifact clusters from the sectors provisionally interpreted as single family domestic spaces include the major categories of expedient flake tools in similar proportions, those proportions can, at least provisionally, be considered typical of a domestic assemblage in this context.

Heavily retouched task-specific tools

With the exception of cores and debitage, the remainder of the chipped stone tool types were classified as heavily retouched task-specific tools. Typically they are more extensively worked and require greater time and care in their making than do expedient flake tools. Most of these artifacts exhibit evidence of extended use. Many have a characteristic shape presumed to conform to either manufacturer's design for a specific application or the design constraints imposed by repeated use, resharpening, and/or hafting. Artifact types classified as heavily retouched task-specific tools include: any scraper exhibiting evidence of more than a single episode of retouch, all endscrapers, spall tools, key-shaped scrapers, unifacial and bifacial borers, unifacial and bifacial perforators, bifacial knives, Stage 2 (edging) bifaces, Stage 3 (primarily thinning) bifaces, Stage 4 (secondary thinning) bifaces, and projectile points. Generally, these types occur much less frequently than the expedient flake tool types.

Endscrapers are formed on fairly thick flakes. The working edge at the distal end of the flake is created by the removal of several long parallel flakes usually extending from the ventral surface to a flat dorsal surface. This type is thought to be associated with hide

working and many of these artifacts do exhibit hide-polish. Endscrapers are the most common of the heavily retouched task-specific artifact types.

Spall tools are also thought to be associated with hide working. They are formed on cobble spalls, usually of quartzite, with scraper retouch along the edge of the spall.

Key-shaped scrapers are formed on fairly thick flakes, typically of chert or chalcedony. They are characterized by a broad base extending to a projection formed by the convergence of straight edge with a concave edge. Scraper retouch usually extends around the perimeter of these tools. In a recent analysis Rousseau (1988) concludes that key-shaped scrapers were used in woodworking with the concave edge usually serving as the working edge.

Unifacial and bifacial borers and perforators are artifacts with projections or points. The functions ascribed to these artifacts are indicated by their names. Generally the flakes on which these tool are formed are proportionally thicker than in artifacts classified as projectile points, bifaces, or bifacial knives while the projecting parts are narrower and the overall form of the tools is less regular. Artifacts interpreted as drills tend to have more rounded tips than those interpreted as perforators and may exhibit evidence of wear on the lateral edges near the tip typical of rotation against the walls of a hole.

Bifacial knives have bifacially reduced surfaces and a form similar to a modern knife blade. Typically, both edges of the tool are retouched. One edge may be blunted by retouch, presumably to serve as backing opposite the cutting edge, or both edges may be acute. Bifacial knives are interpreted as cutting tools and were probably intended for heavier duty and more extended use than acute flake tools such as flakes with light bifacial retouch.

Bifacially reduced artifacts other than those which exhibited the forms characteristic of bifacial knives, bifacial drills, bifacial perforators, or one of the projectile point types were classified according to their stage of reduction using the stages of biface reduction proposed by Callahan 1979). Stage 2 bifaces, also termed edged pieces are retouched around their perimeters but lack extensively reduced surfaces. The ratio of width to thickness for these artifacts is usually less than or equal to 2.00. Stage 3 bifaces or primarily thinned pieces have reduced surfaces with flake scars which meet at the center of the piece. Bifaces thinned to this extent have a lenticular cross-section with a width/thickness ratio between 3.00 and 4.00. On Stage 4 bifaces or secondarily thinned pieces flake scars extend across the center line and may undercut flake scars originating at the opposing edge. The width/thickness ratio may be greater than 4.00 and spline-plane angles are typically less than 45°.

Bifaces in all stages of reduction could have been used as tools. The earlier stages may also represent failures or unfinished projects. No specific function is ascribed to any of these artifact types, though concentrations of such tools may be taken as evidence of some distinctive activity. Bifaces have been interpreted as portable tools which were typically used on forays away from residential sites. As such, they have been interpreted as men's tools. Concentrations of bifaces may, therefore, be helpful in distinguishing between men's and women's areas on the three floors.

Three temporally diagnostic **projectile point types** occur in clear association with the deposits considered in this study. Kamloops points, which are side-notched and generally smaller than the earlier types, are the most common type in Housepits 3 and 7. Concentrations of Kamloops points may be taken as evidence of specialization in hunting or arrow making. Earlier projectile point types include Plateau points, Shuswap points, and fragments of one Lochnore point and one Lehman point, all of which are described in the typology (Appendix A). Generally, the earlier point types are presumed to have been introduced from earlier deposits, perhaps as curiosities or playthings or for recycling (Teit 1906:519). It is also

possible that atlatl technology, which is associated with Plateau phase point types, continued to be used well after the introduction of bow and arrow technology in Kamloops times.

Abraders are sandstone slabs with polished, striated surfaces. They were presumably used to grind bone, antler, and stone into useful shapes. A domestic economy which made regular use of pointed and edged bone tools; awls and needles for example; would have needed an abraded to keep those tools sharp or to manufacture new ones. While only a few bone and antler tools are associated with the lithic assemblages from the three housepits, the regular use of a variety of bone and antler implements is reported in the ethnographies (eg. Teit 1906:203-204, 1909:473-475). Their absence here is most likely the result of curation and removal before the housepits were abandoned.

Artifacts associated with lithic reduction include cores, core rejuvenation flakes, bipolar cores, hammerstones, and all types of debitage. Given the preponderance of expedient flake tools in these assemblages it seems likely that the generation of flakes was a regular domestic activity. Lithic raw materials were imported to the Keatley Creek site from considerable distances and were probably a valued commodity.

Cores and hammerstones as well as primary flakes and large billet flakes (maximum dimension >2cm) suitable for later use as flake tools are likely to have been curated and may, therefore, have been left in separate storage areas. Many still usable artifacts in these categories may have been removed when these pithouses were abandoned. Bipolar cores, core rejuvenation flakes, and less useful categories of debitage (i.e. small billet flakes, bipolar flakes, secondary flakes, and shatter) are more likely to have been left *in situ* as primary refuse.

Also of interest, though not defined in the typology, are several granite boulders which were found between hearths on the floor of Housepit 7 (Figure 2.12) and in the SW sector of Housepit 3 (Figure

2.14). These may have been used as anvils for crushing bone or other materials.

The distinguishing characteristics of all the debitage types associated with lithic reduction are presented at length in Appendix A but will be considered briefly below. Some possible interpretations of the distribution of these artifact types will also be discussed.

Billet flakes have properties which have been shown, experimentally, to result from removal with a soft hammer (Hayden and Hutchings, 1989). They are associated with biface reduction. Bifaces may sometimes have been manufactured from large flakes simply as a means of generating large billet flakes suitable for use as expedient flake tools.

Bipolar flakes are crushed at both ends and have relatively straight ventral surfaces as a result of compression between a hammerstone and an anvil stone. Exhausted cores and bifaces may have been reduced to bipolar cores in this fashion as a means of extracting every possible useful flake.

Flakes not identified as billet flakes, bipolar flakes or shatter were classified either as **primary flakes** or **secondary flakes**. Primary flakes have some potential for use as tools and are distinguished by size (maximum dimension $>2\text{cm}$) and the presence of at least 1cm of edge suitable for retouch. Primary and secondary flakes may be identifiable as the products of direct percussion with a hard hammer or they may simply lack the characteristics which would unequivocally identify them as billet flakes or bipolar flakes.

Debitage was also sorted into four **size categories**: $\leq 1\text{cm}$, $>1\text{cm} \leq 2\text{cm}$, $>2\text{cm} \leq 5\text{cm}$, $>5\text{cm}$. This classification may also be useful in distinguishing between areas used for different purposes. Areas of the house floors used for certain activities are likely to have been regularly cleared of large objects. High traffic areas like the center of the floor would probably have been kept clean as would spaces habitually used for sitting or lying down. On the other hand, areas used for storage or provisional discard might contain concentrations of large flakes.

Summary

In this chapter, sectors were defined around features and clusters of artifacts on the floors of the three housepits. Artifact classes were defined with reference to attributes thought to have functional significance. The next chapter, Chapter 3, deals with the statistical analysis of the distributions of each artifact class among the sectors of each of the three floors. Artifact classes which occur in some sectors in frequencies which would be improbable had the artifacts been deposited randomly will be taken as evidence that different areas of the floors were used for different purposes. Visual examination of the artifact distributions of artifacts and features will help to define those areas.

Other processes which may have contributed to the formation of patterns in the distributions of lithic artifacts on the floors will be considered in Chapter 4 but, in the analysis of artifact distributions in Chapter 3, any patterns which are identified will be provisionally explained in terms of patterned human behavior during the final occupation of each housepit.

Two distinct types of patterning can be expected to have resulted in restricted areas used for specialized activities as opposed to reduplicated domestic areas occupied by somewhat independent groups. In their most extreme forms, specialized activity areas should exhibit a narrow range of tool types (eg. endscrapers and spall tools in areas used for hide-working). In contrast, domestic groups should leave behind a broad spectrum of tool types associated with diverse activities. Domestic assemblages should cluster around sleeping/storage areas or around domestic activity zones, such as hearths. In extreme cases, all of the domestic assemblages in a house are expected to be very similar to one another, while assemblages from specialized activity areas should be nearly unique.

In reality, these extremes are probably rare. Usually, different domestic groups would be involved in different activities according to the preferences and abilities of their members. Differences in socioeconomic status between groups would also influence their manufacturing and consumption behavior. For example, high-status

families could be expected to delegate menial tasks to their social inferiors.

On the other hand, areas normally used by a single domestic group may sometimes have become the loci of specialized activities involving other members of the broader coresidential group. Hunters may have congregated around the hearth of a hunting leader to gear-up for an impending expedition. Well-lit domestic areas may have occasionally been appropriated for activities involving detailed work. Ritual manufactures may have been reserved to the domestic areas of high-status groups while low-status domestic areas were selected for particularly messy tasks.

Certain types of activities are particularly likely to have been conducted in specialized activity areas. These include; activities requiring good lighting, activities producing large quantities of debris (possibly de-hairing hides, butchering, core reduction, and debarking wooden shafts), and activities requiring large amounts of space (possibly hideworking; spear, arrow, or bow manufacture, or basket making).

In some societies there are special activity areas for men and women. If specialized activities were organized according to gender, women's and men's tools should cluster together in different areas. Some modified artifact types can be associated with women's tasks (fire-cracked rock, endscrapers, and spall tools, and possibly anvils and abraders (Stevenson 1984), or with men's tasks (bifaces, key-shaped scrapers, and projectile points, and probably cores and hammerstones). Where concentrations of these types occur they will be interpreted with reference to questions related to the division of work and space along gender lines.

Socioeconomic inequalities between domestic groups can be expected to be reflected in the distributions of status items including pipes, ochres, carved pieces, and objects of rare materials such as nephrite and copper, although these items tend to be rare and highly curated. Lithic raw materials such as chert, chalcedony, and obsidian, which are desirable and relatively rare, should also be differentially distributed between groups of different status. Since the Keatley Creek village was a large community, access to firewood was

probably somewhat limited and labor-intensive, as well so large quantities of fire-cracked rock, large hearths, and large domestic areas may all be indicators of high-status. Other labor-intensive tasks, especially tasks, such as hide-working, which may involve some control over access to raw materials, are also expected to be associated with high-status domestic groups.

It will be argued that sectors where some artifact classes occur in improbably high frequencies were used for different activities (whether domestic activities or specialized activities) than sectors where the same artifact classes occur in improbably low frequencies. Also, it will be argued that sectors where most artifact classes occur in similar proportions were used for similar purposes. It is assumed that the three pithouses were primarily residential structures and that general domestic activities were the most common activities which occurred there. The identification of several distinct areas which appear to have been used for similar purposes involving broad spectra of tools will, therefore, be taken as evidence of several distinct domestic areas which were probably occupied by distinct domestic groups within the larger coresidential group.

Another major dimension of variation in patterning involves the absolute density of artifacts. In some cases, areas of the floor which are similar in terms of the classes of artifacts which were found there may differ in terms of size and/or artifact densities. Such differences can be interpreted not only in terms of possible differences in the intensity of activities which occurred there, and in terms of differential cleaning, but also with reference to possible differences in the status of the groups which occupied the different areas.

These interpretations will be reviewed in Chapter 4, with reference to the influence of a variety of assemblage formation processes and again in Chapter 5 with reference to proposed models of the social organization of space.

Chapter 3: Analysis of the distribution of artifact types and attributes within housepits

The last chapter showed: 1) how the floor strata in Housepits 3, 7, and 12 were divided into sectors which were to be compared in terms of the lithic artifacts they contained, 2) how categories of artifact types and attributes were defined which were so clearly representative of different functions that significant variability in their distribution between sectors could reasonably be interpreted as evidence that different sectors were used for different sets of activities (note that no specific activity is, necessarily, associated with any of these categories; instead, each category is defined by attributes which indicate that it was used for different activities than artifacts in other categories.), and 3) how additional categories of artifact types and attributes were defined which were considered indicative of status differences, sex-specific activities, and craft specialization.

The following sections are concerned with the assessment of variability between the sectors within each of the three housepits in the distributions of these types and attributes. Analyses of the variability within housepits will allow more informed interpretation of the use of the spaces represented by the sectors so that, eventually, all the sectors in all three housepits may be compared to determine whether similar interpretations are born out by similar distributions of artifact types and attributes.

In general, the interpretations presented at this stage of the analysis will be based on the assumption that the distributions of all classes of lithic artifacts on the three house floors are the products of cultural behavior related to the habitual use of certain sectors of the floor for the same purposes throughout the final occupations of the houses. The appropriateness of this assumption will be discussed in Chapter 4.

Variability in the distributions of artifact types which are sufficiently abundant will be analyzed by means of chi-squared tests. Since the recognition of an even distribution between sectors of the

artifacts in any category is just as relevant to this research as the recognition of significant variability between sectors, a fairly conservative significance level of 0.050 has been selected for all of the chi-squared tests.

Less frequently occurring classes will require analytical methods whose results are not invalidated by low expected frequencies. The probability of that the frequencies observed could be the results of random deposition will be determined from the binomial distribution. In this case, even frequencies which have as much as a 10% chance of occurring as the result of random processes will be considered meaningful.

Analysis of the distribution of lithic artifacts on the floor of each housepit will first examine the distribution of three broad categories: fire-cracked rocks, debitage, and modified artifacts. Then the distributions of specific types of debitage and modified artifacts will be considered.

Housepit 3

Distribution of fire-cracked rocks

Fire-cracked rocks were identified by distinctive fracture patterns and discoloration (see Appendix A). Only fragments the size of a golf ball (c. 4 cm in diameter) or larger were counted. One hundred and ninety-two (192) pieces of fire-cracked rock were found on the floor of Housepit 3.

Fire-cracked rock is generally thought to have been associated with the preparation of food. Ethnographic accounts (eg. Teit 1906:280, 1909: 517) describe how small hot stones were dropped into water to boil salmon, roots and other foodstuffs. Stones cracked either while being heated in the fire or during the boiling process. To judge by the tightly clustered distributions of fire-cracked rocks on all three floors and its close association with fire-reddened areas in Housepit 7 (see Figures 2.13, 2.16, and 3.01), fire-cracked rock would appear to have been deposited in a storage context in these houses. Nastich (1954:23) says that, among the Lillooet people, who inhabited an area near the Keatley Creek site in historic times, each family stored its own fire-cracked rock.

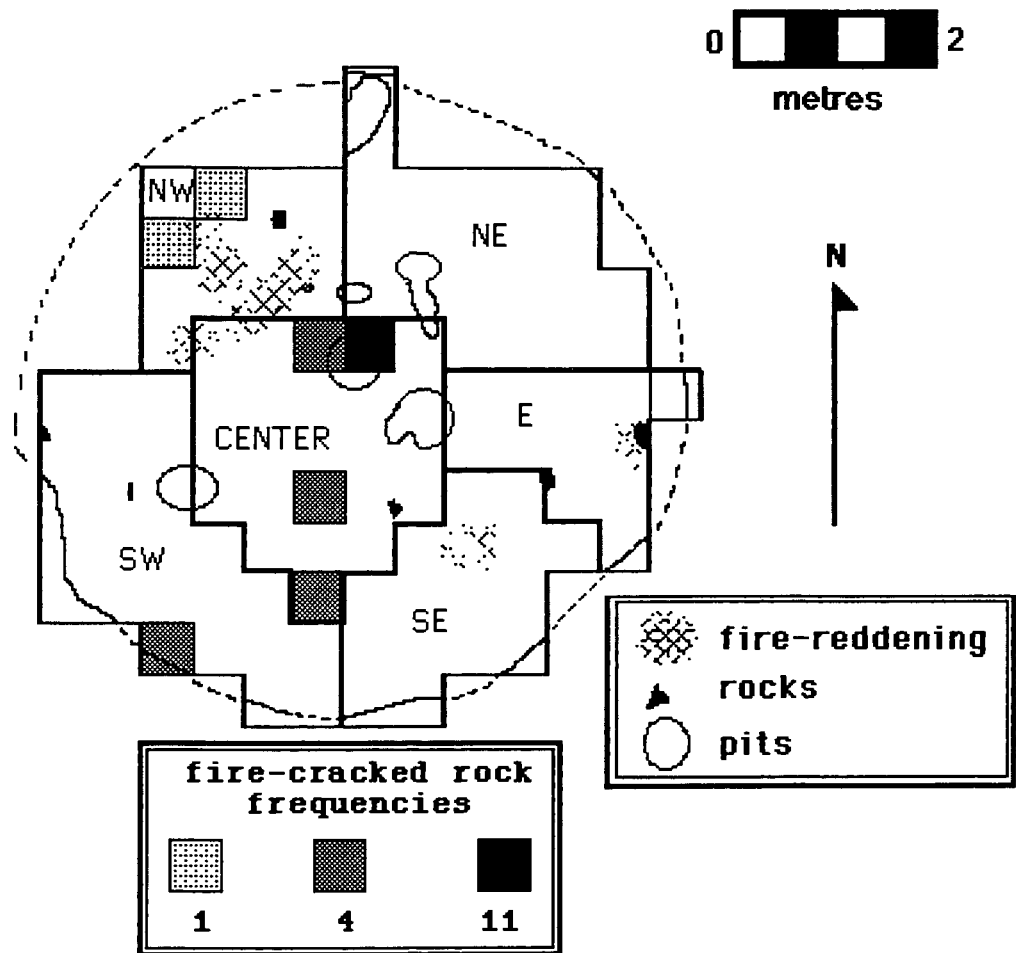


Figure 3.01. Distribution of fire-cracked rock on the floor of Housepit 12.

The distribution of fire-cracked rock on the floor of Housepit 3 is illustrated in Figure 2.16. Clearly, fire-cracked rock is quite concentrated in an area just to the east of the center of the floor. With the exception of this concentration and a small hot spot in the NE sector fire-cracked rock is sparsely distributed over most of this floor. Along much of the perimeter of the floor, from the southwest counterclockwise to the east, fire-cracked rock is almost entirely absent.

Table 3.01 lists the observed frequencies of fire-cracked rock in each of the five sectors together with expected values based on an even distribution in proportion to the number of subsquares in each sector. Not surprisingly, this distribution differs significantly from an even distribution between the sectors defined for the analysis of this floor. The differences between the observed and expected values yield a chi-squared value of 58.43 which, with 4 degrees of freedom, is significant at a probability level of much less than 0.05. Extreme deviations from the expected values appear in the Center and SE sectors, where the values are unexpectedly high, and in the two western sectors where values are unexpectedly low.

Sector	Observed frequency of FCR	No. of excavated subsquares	Proportion of total no. of excavated subsquares per sector	Expected frequency of FCR
Center	58	55	.204	39.26
SW	17	54	.201	38.54
NW	12	55	.204	39.26
NE	42	53	.197	37.83
SE	63	52	.193	37.12
	192	269	.999	192.01

Table 3.01 Observed and expected fire-cracked rock frequencies by sector in Housepit 3.

The concentration of fire-cracked rock is densest in and around subsquare A3, in the Center sector, (see Figures 2.02 and 2.16) which is about a meter northeast of the only well defined hearth on this floor which is clearly associated with the most recent occupation. From there it extends north and east, into the Southeast sector, two

to three meters in each direction. One possible interpretation of this distribution is that baskets used for stone boiling at this hearth were habitually emptied in the direction of the easternmost of the major posts supporting the roof. The remains of this post are situated roughly in the middle of the outer edge of the major cluster of fire-cracked rock (see Figures 2.14 and 2.16).

Since over half of the fire-cracked rock on this floor is found in one contiguous cluster associated with a single hearth, there is little in this distribution to suggest multiple, redundant domestic spaces. At the least, it can be argued that the residents of this house reserved a common area for the storage or disposal of boiling stones and probably used a single communal cooking area. In addition, it seems unlikely that the area occupied by a large fire-cracked rock concentration would have been used as a sleeping area (although, other areas in the Southeast sector could have been used for sleeping).

Distribution of all debitage and modified artifacts

In the section of this chapter discussing the selection of functionally distinctive artifact types and attributes it was argued that areas with relatively low densities of lithic artifacts were probably used quite differently from areas with higher artifact densities. The distribution of all lithic artifacts other than fire-cracked rock in each of the sectors on the floor of Housepit 3 is presented in Table 3.02 below and plotted on the map of Housepit 3 in Figure 3.02.

The Center sector was originally defined on the basis of a relative scarcity of artifacts so the frequency of artifacts there is, of course, substantially lower than elsewhere on this floor. There also appears to be a considerable difference between the artifact frequencies in the southern sectors and those in the northern sectors, where the heaviest concentrations of artifacts are found. A chi-squared analysis of the artifact frequencies in the different sectors will assess the probability that this distribution results from chance variation rather than a meaningful association of different artifact frequencies with different sectors.

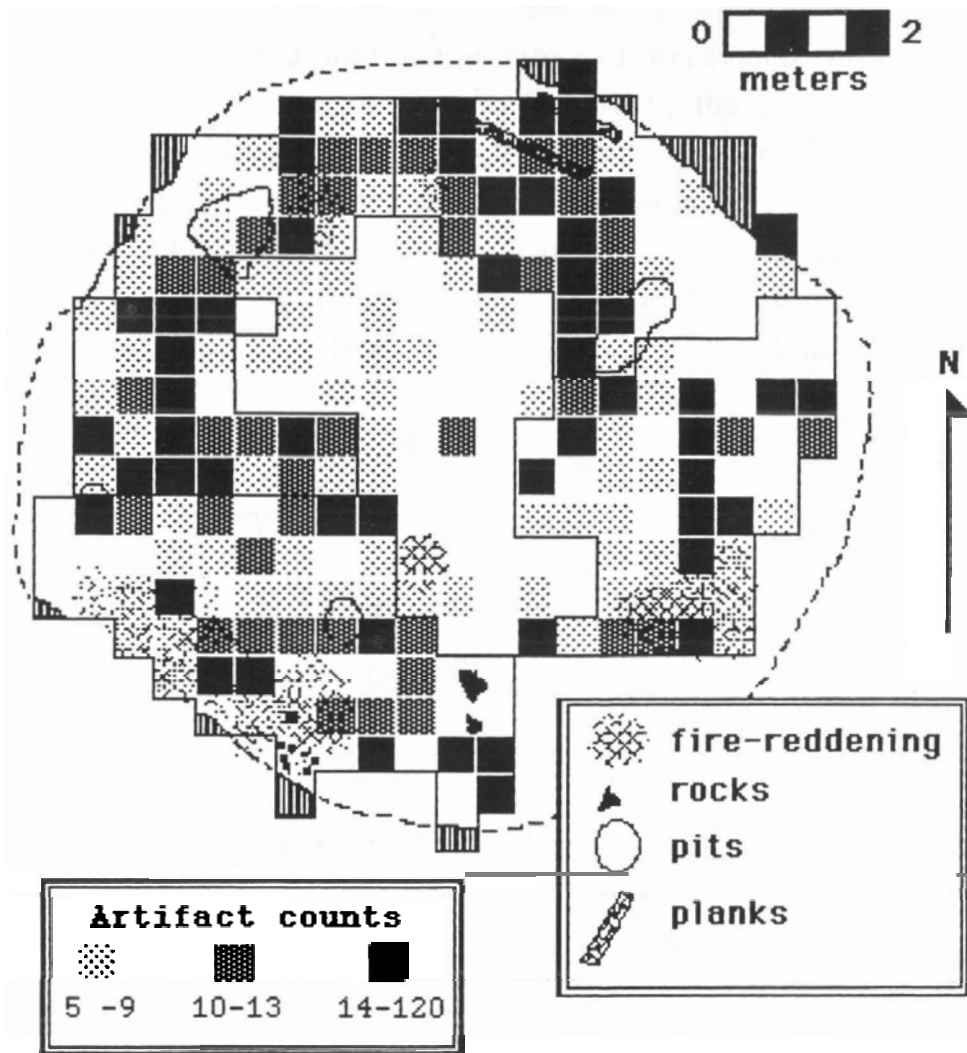


Figure 3.02. Distribution of all debitage and modified artifacts on the floor of Housepit 3, showing the boundaries of the five sectors defined as analytic units.

Table 3.02 shows the observed frequencies of all lithic artifacts for each sector of Housepit 3 and the number of excavated subsquares in each sector. As in the case of fire-cracked rock, the artifact frequency which would be expected in each sector if the artifacts had been evenly distributed between the sectors was calculated by multiplying the total number of lithic artifacts found in the floor stratum of Housepit 3 by the proportion of all the subsquares excavated in the floor of Housepit 3 which was located in that sector.

Sector	Observed artifact frequency	No. of excavated subsquares	Proportion of total no. of excavated subsquares per sector	Expected artifact frequency
Center	190	55	.204	510.33
SW	466	54	.201	501.05
NW	582	55	.204	510.34
NE	765	53	.197	491.78
SE	437	52	.193	482.50
	2496	269	.999	2496.00

Table 3.02 Observed and expected artifact frequencies by sector in Housepit 3.

Clearly, the observed artifact frequencies differ substantially from the expected frequencies in most of the sectors. A chi-squared analysis of this data yields a value of 649.34 with 4 degrees of freedom which indicates that probability of such a distribution occurring by chance is much less than .001. Since the extreme difference between the observed and expected artifact frequencies in the Center sector contributes disproportionately to this result, a second test was conducted to assess the variation in artifact frequencies among the four peripheral sectors. The relevant data is presented in Table 3.03. In this case the proportion, in each sector, of all the excavated subsquares outside the Center sector was multiplied by the total number of artifacts found on the floor outside the Center sector to obtain the expected values.

This data produces a chi-squared value of 97.187 with three degrees of freedom which, again, has a probability of much less than .001. Thus, the differences in artifact frequencies between the

peripheral sectors of the floor of Housepit 3, like that between the periphery and the Center sector, cannot be attributed to chance variation and must be explained in terms either of different uses of space or post-depositional processes. Complete interpretations of the variability between sectors will be presented after all the relevant variables have been examined.

Sector	Observed artifact frequency	No. of excavated subsquares	Proportion of all excavated subsquares	Expected artifact frequency
SW	466	54	.252	581.89
NW	582	55	.257	592.66
NE	765	53	.248	571.11
SE	493	52	.243	560.34
	2306	214	1.000	2306.00

Table 3.03. Observed and expected artifact frequencies for the four peripheral sectors in Housepit 3.

Distribution of debitage

Different functional interpretations have been ascribed to debitage as opposed to modified artifacts. So the distributions of these two categories must be considered separately.

The great majority of all the lithic artifacts found in Housepits 3, 7, and 12 is debitage. In Housepit 3 debitage accounts for 89.3% of all lithic artifacts excluding fire-cracked rock. Thus, the distribution of debitage may be expected to closely parallel the distribution of all lithic artifacts.

Sector	(O)bserved debitage frequency	(E)xpected debitage frequency	O-E
Center	156	455.54	-299.54
SW	397	447.26	-50.26
NW	533	455.54	77.46
NE	705	438.97	266.03
SE	437	430.69	6.31

Table 3.04. Observed debitage frequencies and debitage frequencies expected in a uniform distribution between all sectors of the floor of Housepit 3.

Table 3.04 shows the distribution of debitage by sector in Housepit 3, with expected values based on the proportion of all excavated subsquares in each sector.

Chi-squared analysis of the debitage frequencies yields a value of 693.24 for chi-squared with 4 degrees of freedom which indicates an even higher level of significance than was found for the distribution of all lithic artifacts. As in the case of the frequencies of all lithic artifacts, the difference between observed and expected debitage frequencies for the Center sector contributes heavily to the value of chi-squared, though, in this case, the difference between observed and expected values in the NE sector is also important. A chi-squared analysis of the debitage frequencies for the four peripheral sectors was, again, conducted to determine whether these sectors varied significantly. The data are presented in Table 3.05.

Sector	(O)bserved debitage frequency	(E)xpected debitage frequency	O-E
SW	397	522.84	-125.84
NW	533	532.52	0.48
NE	705	513.16	191.84
SE	437	503.48	-66.48

Table 3.05. Observed debitage frequencies and debitage frequencies expected in a uniform distribution for the four peripheral sectors of the floor of Housepit 3.

The debitage frequencies for the four peripheral sectors yield a chi-squared value of 110.78 with 3 degrees of freedom. The probability that this value is due to chance variation is, again, less than 0.001. Also, as in the case of the distribution of all lithic artifacts, the observed frequency differs most from the expected frequency in the NE sector, where it is higher than expected.

The very high debitage frequency in the NE sector must be viewed with some caution because 120 of the 889 pieces of debitage found there were located in Subsquare V-5, near the northern edge of the floor. The next greatest debitage frequency for any subsquare is 49. So the value for Subsquare V-5 must be considered an outlier. The observed and expected debitage frequencies for the four peripheral

sectors are presented again in Table 3.06, this time ignoring the outlying value in the NW sector.

Sector	[O]bserved debitage frequency	[E]xpected debitage frequency	(O-E)
SW	544	586.43	-42.43
NW	558	597.29	-39.29
NE	709	575.57	133.43
SE	513	564.71	-51.71

Table 3.06. Observed and expected debitage frequencies in the four peripheral sectors of the floor Housepit 3 with an outlying value ignored.

A chi-squared analysis of the differences between the observed and expected debitage frequencies which remain in the peripheral sectors when the outlier is ignored yields a value of 41.32 with three degrees of freedom which is significant well beyond the .001 level. Thus, the differences between the debitage frequencies in the NE sector and the rest of the periphery of the floor must be considered meaningful however the outlying value is regarded. The observed debitage frequencies and the differences between the observed and expected debitage frequencies are fairly similar in the SE, SW, and NW sectors. So it is assumed that the distribution of debitage among these three sectors is effectively even.

The map in Figure 3.03 shows the distribution of lithic debitage on the floor of Housepit 3 which is quite similar to the distribution of all lithic artifacts.

Distribution of modified artifacts

Since modified artifacts make up only 9.3% of the lithic artifacts found in the floor of Housepit 3, their distribution may differ substantially from the distribution of all lithic artifacts. The observed and expected frequencies of modified artifacts for all sectors of the floor of Housepit 3 are presented in Table 3.07.

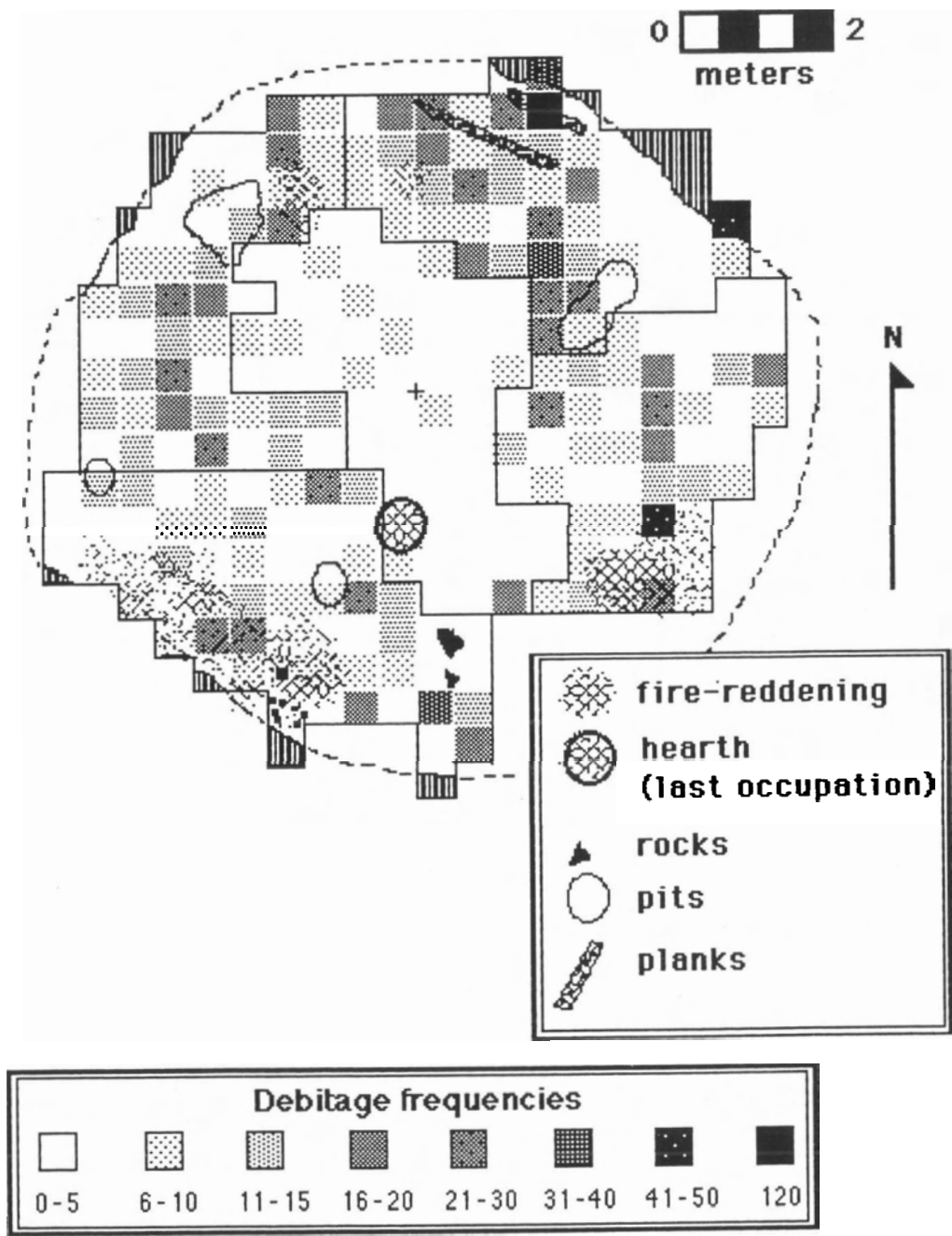


Figure 3.03 Distribution of debitage on the floor of Housepit 3.

A chi-squared analysis of these data yields a value for chi-squared of 14.12 with 4 degrees of freedom which indicates that the probability that this distribution of artifact frequencies occurred by chance is less than 0.010. As was the case for all lithic artifacts and for debitage, the difference between observed and expected frequencies in the Center contributes heavily to the chi-squared score. Once again, the analysis was repeated for the four peripheral sectors. The data are presented in Table 3.08.

Sector	(O)bserved no. of modified artifacts	(E)xpected no. of modified artifacts	O-E
Center	34	54.80	-20.80
SW	69	53.80	15.20
NW	49	54.80	-5.80
NE	60	52.80	7.20
SE	56	51.81	4.19

Table 3.07. Observed frequencies of modified artifacts and frequencies of modified artifacts expected in a uniform distribution for all sectors of the floor of Housepit 3.

Sector	(O)bserved no. of modified artifacts	(E)xpected no. of modified artifacts	O-E
SW	69	59.05	9.95
NW	49	60.14	-11.14
NE	60	57.95	2.05
SE	56	56.86	0.86

Table 3.08. Observed frequencies of modified artifacts and frequencies of modified artifacts expected in a uniform distribution between the four peripheral sectors of the floor of Housepit 3.

In this case, the value for chi-squared is 3.83 with three degrees of freedom. This indicates that the probability of this much chance variation from the expected values is somewhat less than 0.500 but considerably greater than 0.250. Since the selected significance level for the chi-squared test is 0.050 this is taken to indicate that a relatively uniform distribution of modified artifacts exists among the four peripheral sectors of the floor of Housepit 3.

To summarize, the frequencies of all lithic artifacts and of debitage in the five sectors of the floor of Housepit 3 have been shown to differ significantly from the frequencies which would be expected in an even distribution between sectors. For both frequencies, the greatest differences between observed and expected values occur in the Center sector, where the observed counts are much lower than the expected values. Debitage is most heavily concentrated in the NE sector. The debitage frequency for the NW sector is close to the expected value while the two southern sectors have relatively little debitage.

Where modified artifacts are concerned, significant variation in frequencies was discovered only between the Center sector and the four peripheral sectors. The distribution of modified artifacts among the four peripheral sectors may be considered uniform. The interpretation of the distributions of these broad categories of artifacts will depend on the results of the analyses of the distributions of narrower categories, which follow below. Provisionally, it appears that the NE sector of the floor of Housepit 3 may have been used for a set of activities which involved more lithic reduction than the activities which occurred in the other sectors. Alternatively, the NE sector may have been used as a dump or holding area for lithic debitage. As far as the Center sector is concerned, the frequencies of all lithic artifacts, debitage, and modified artifacts observed there is consistent with an earlier interpretation of the center as a high-traffic area which was periodically swept and/or as an area reserved for ceremonies or other activities involving the entire household. However, the concentration of fire-cracked rock in this sector runs somewhat contrary to this interpretation.

Debitage

The distributions of all of the flake types and the four debitage size categories defined in the typology, as well as the distributions of obsidian and chert or chalcedony flakes are relevant to questions addressed in this thesis. Uneven distributions of secondary flakes,

billet flakes, bipolar flakes or shatter may indicate that some methods or stages of lithic reduction occurred more often in some sectors than in others. Uneven distributions of large flakes, especially primary flakes and billet flakes with maximum dimensions greater than 5cm, may identify areas where useful flakes, culled from the products of lithic reduction in other areas, were stored for later use as tools. The distributions of debitage size categories may also help to distinguish high traffic areas and refuse disposal areas. Obsidian, chert, and chalcedony may have been selected as the preferred materials for tools intended for particular tasks. Access to these materials may also have been associated with higher social status.

The flake types are defined in detail in the typology (Appendix A). Primary flakes are over 2 cm in their maximum dimension and have other properties which make them especially suitable for use as flake tools. Billet flakes have properties associated with soft hammer reduction. In this analysis large billet flakes (maximum dimension > 2cm) are distinguished from small billet flakes. Large billet flakes are, most likely, the products of bifacial thinning and core reduction. In most cases they, too, are suitable for use as flake tools. Small billet flakes are considered more likely to have been byproducts of the retouch and resharpening of bifacial edges and the manufacture of projectile points. Bipolar flakes are associated with bipolar reduction of small pebbles or exhausted tools and cores. Shatter may be associated many processes of lithic reduction. Any flake which did not fall into one of the preceding five categories was classified as a secondary flake.

All of the flake types except bipolar flakes and all of the debitage size categories except Size 4 (> 5cm) are sufficiently abundant to be subjected to chi-squared analyses. Obsidian flakes alone are too rare to allow valid chi-squared approximations. So obsidian frequencies were added to the frequencies of chert or chalcedony flakes and this sum was labelled exotic flakes. The distributions of chert or chalcedony flakes and obsidian flakes are illustrated separately in Figures 3.04 and 3.05.

Chi-squared analyses of the distributions of debitage types are presented in Table 3.09. Only the distributions of secondary flakes,

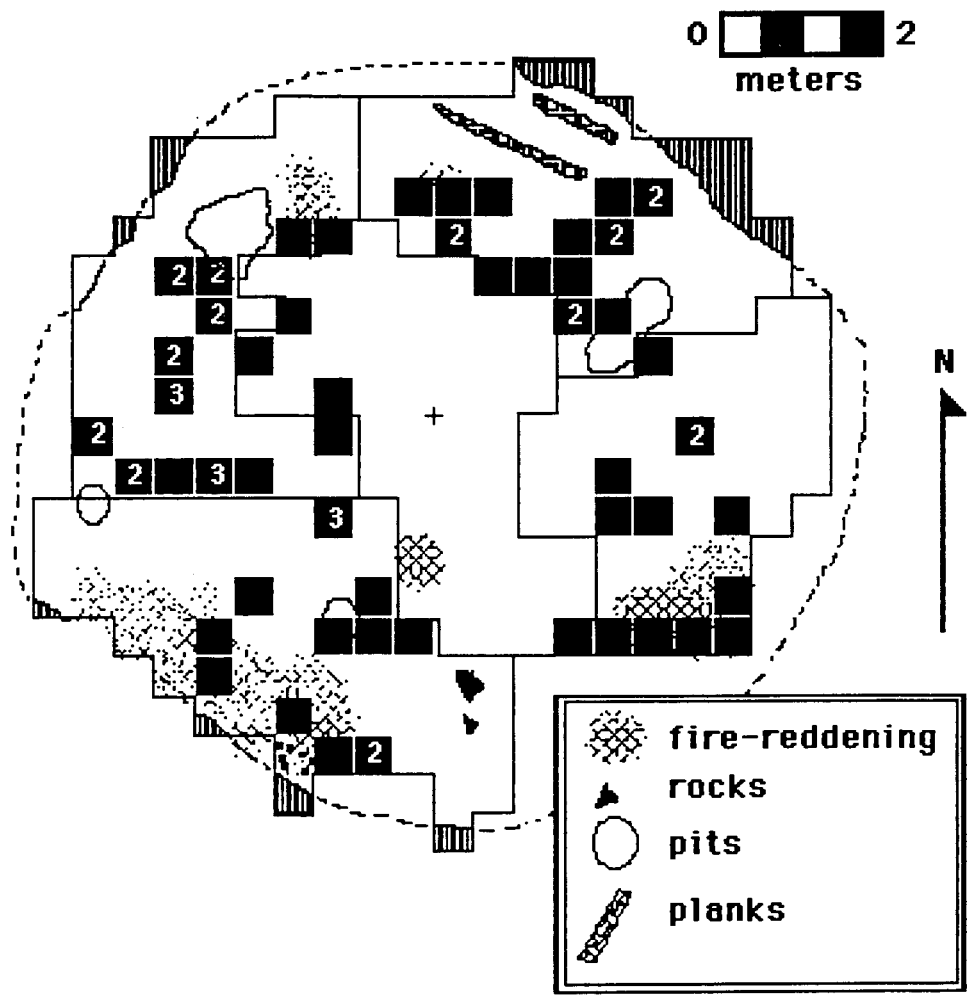


Figure 3.04. Distribution of chert and chalcedony flakes on the floor of Housepit 3.

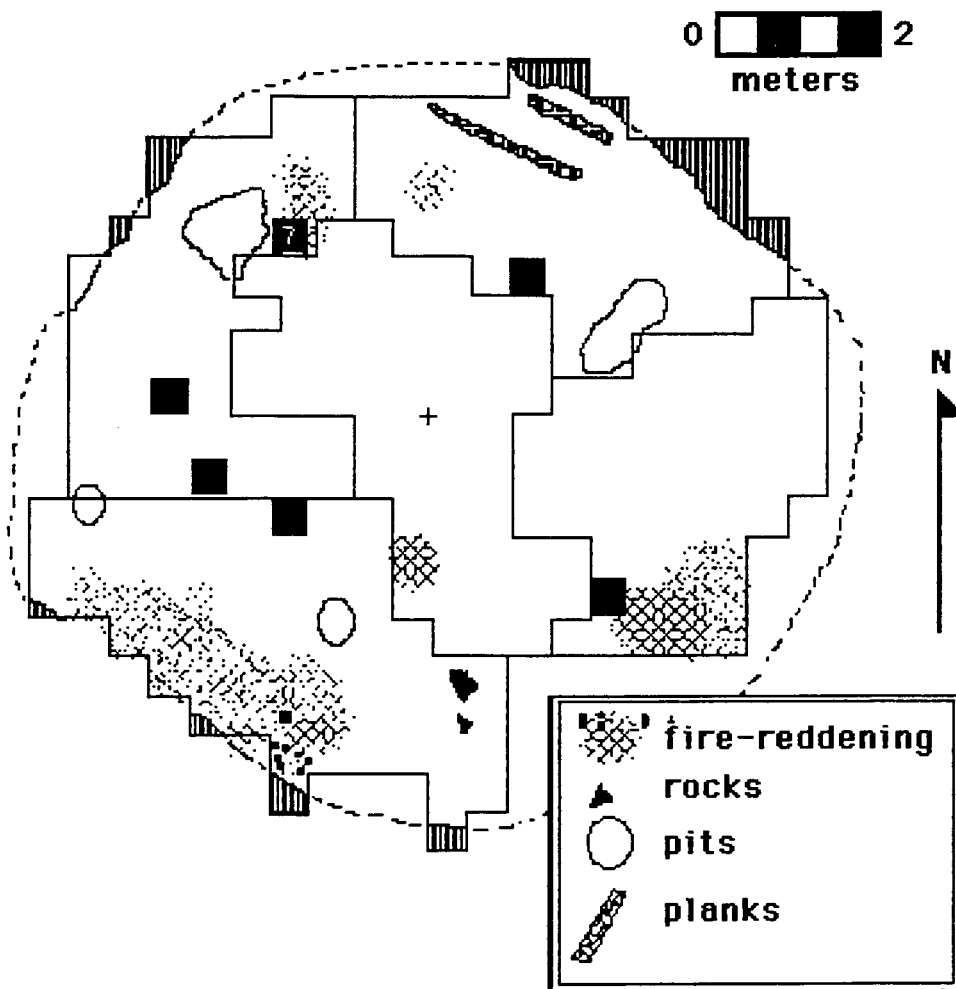


Figure 3.05. Distribution of obsidian flakes on the floor of Housepit 3.

small billet flakes, and exotic flakes produced chi-squared values which are significant at $p=0.05$ or less. The distributions of the other flake types and debitage size categories do not differ significantly from what would be expected if they were proportionately distributed among all sectors in proportion to the given density of debitage in each sector. Since the value for secondary flakes actually reflects variability in the distribution of all other debitage, only the values for small billet flakes and exotic flakes are truly meaningful.

Sector	Primary flakes			Secondary flakes			Large billet flakes		
	O	E	O-E	O	E	O-E	O	E	O-E
Center	17	13.2	3.8	122	131.6	-9.6	2	1.7	0.3
SW	34	33.4	0.6	315	333.9	-18.9	6	4.3	1.7
NW	40	45.0	-5.0	468	449.5	18.5	5	5.7	-0.7
NE	55	59.5	-4.5	605	594.5	9.5	4	7.6	-3.6
SE	42	36.9	5.1	368	368.5	-0.5	7	4.7	2.3
Chi ² d.f=4	2.98 p>0.500			17.34 p<0.005			3.72 p>0.250		
Sector	Small billet flakes			Shatter			Exotic Flakes		
	O	E	O-E	O	E	O-E	O	E	O-E
Center	10	6.0	4.0	4	3.0	1.0	4	5.7	-1.7
SW	28	15.1	12.9	10	7.6	2.4	15	14.6	0.4
NW	9	20.3	-11.3	6	10.3	-4.3	31	19.6	11.4
NE	26	26.9	-0.9	15	13.6	1.4	18	25.9	-7.9
SE	12	16.7	-4.7	8	8.4	-0.4	14	16.1	-2.1
Chi ² d.f=4	22.25 p<0.001			3.06 p>0.500			10.22 p<0.05		

Table 3.09. (O)bserved and (E)xpected frequencies and (O-E) for debitage types in the five sectors of the floor of Housepit 3 with chi-squared analyses of the variation between sectors.

Examination of the differences between observed and expected values for small billet flakes shows that there are more in the SW sector and, to a lesser extent, the Center than would be expected in an even distribution. The NW sector and, to some extent, the SE

sector are correspondingly poor in small billet flakes. In fact, the SW sector, which has less debitage than any other peripheral sector, has more small billet flakes than any other sector, including the NE sector, which is exceptionally rich in debitage.

Exotic flakes are most common in the NW sector. Nine of the twelve obsidian flakes in this assemblage were found in this sector. The NE sector has considerably fewer exotic flakes than would be expected in a proportional distribution.

While the interpretation of these results is, again, contingent on the results of the analyses of other variables, the following points are worthy of consideration: 1) The concentration of small billet flakes in the SW sector, combined with the relatively low debitage frequency and the relatively high frequency of modified artifacts already noted for this sector, suggests that the SW sector may have been used for activities which emphasized the use of tools and involved some biface reduction and/or resharpening. 2) There is little evidence of biface reduction in the NW and SE sectors. 3) The distribution of debitage types and size categories does not indicate that any other method or stage of lithic reduction predominated in any sector, except that 4) to judge by the distribution of all debitage, the NE sector seems to be the likeliest locus for intensive lithic reduction and/or disposal.

Modified artifacts

Of the 30 functional types of modified lithic artifacts which were defined for this study, 25 types were found on the floor of Housepit 3. The frequencies of each of these types in each of the five sectors are listed in Table 3.10. The distribution of these types is represented graphically in Figure 3.06.

The vertical lines in Figure 3.06. indicate the minimum number of modified artifacts in each class which was found in any of the four peripheral sectors. For example, the minimum number of utilized flakes in any sector is five, in the NE sector. These minimum frequencies define what is referred to hereafter as "the underlying tool distribution". The underlying tool distribution is common to all four peripheral sectors. As the figure shows, the Center sector also

includes most of the artifacts in the underlying tool distribution. It lacks only a few expedient scrapers and an abrader.

Artifact type	Center	SW	NW	NE	SE	Total
Expedient Scrapers	3	5	9	7	5	29
Utilized flakes	6	18	7	5	6	42
Acute expedient	6	13	3	12	5	39
Miscellaneous	6	6	7	5	9	33
Retouched scrapers	2	4	5	11	9	31
Kamloops points	2	3	6	2	3	16
Other points	1	2	1	1	2	7
Large notches	3	3	1	2	2	11
Small piercers	0	4	0	1	3	8
Bifaces	0	2	2	2	0	6
Bipolar cores	1	1	2	1	1	6
Abraders	0	1	1	2	2	6
Small notches	1	1	2	1	0	5
Spall tools	0	2	0	0	2	4
Bifacial knives	0	3	0	0	1	4
Endscrapers	1	0	2	0	1	4
Hammerstones	0	0	0	3	1	4
Core rejuvenation f.	0	1	0	2	1	4
Cores	0	0	0	1	2	3
Pieces esquillee	1	0	0	0	0	1
Perforators	0	0	0	0	1	1
Key-shape scraper	0	0	0	1	0	1
Thumbnail scraper	0	0	0	1	0	1
Pounding stone	1	0	0	0	0	1
Abraded cobble	0	0	1	0	0	1
Sector total	34	69	49	60	56	268

Table 3.10. Frequencies of modified artifact types for each sector of the floor of Housepit 3.

The percentage of all modified artifacts which is taken up by the underlying tool distribution in each sector is indicated in Table 3.11. The underlying distribution accounts for between 40% and 70% of the modified artifacts in every sector. To the extent that the distribution of modified artifacts on the floor reflects the use of space during the final occupation of this pithouse, this indicates that some activities were common to every sector. The content of the underlying distribution may give some indication of the nature of these activities.

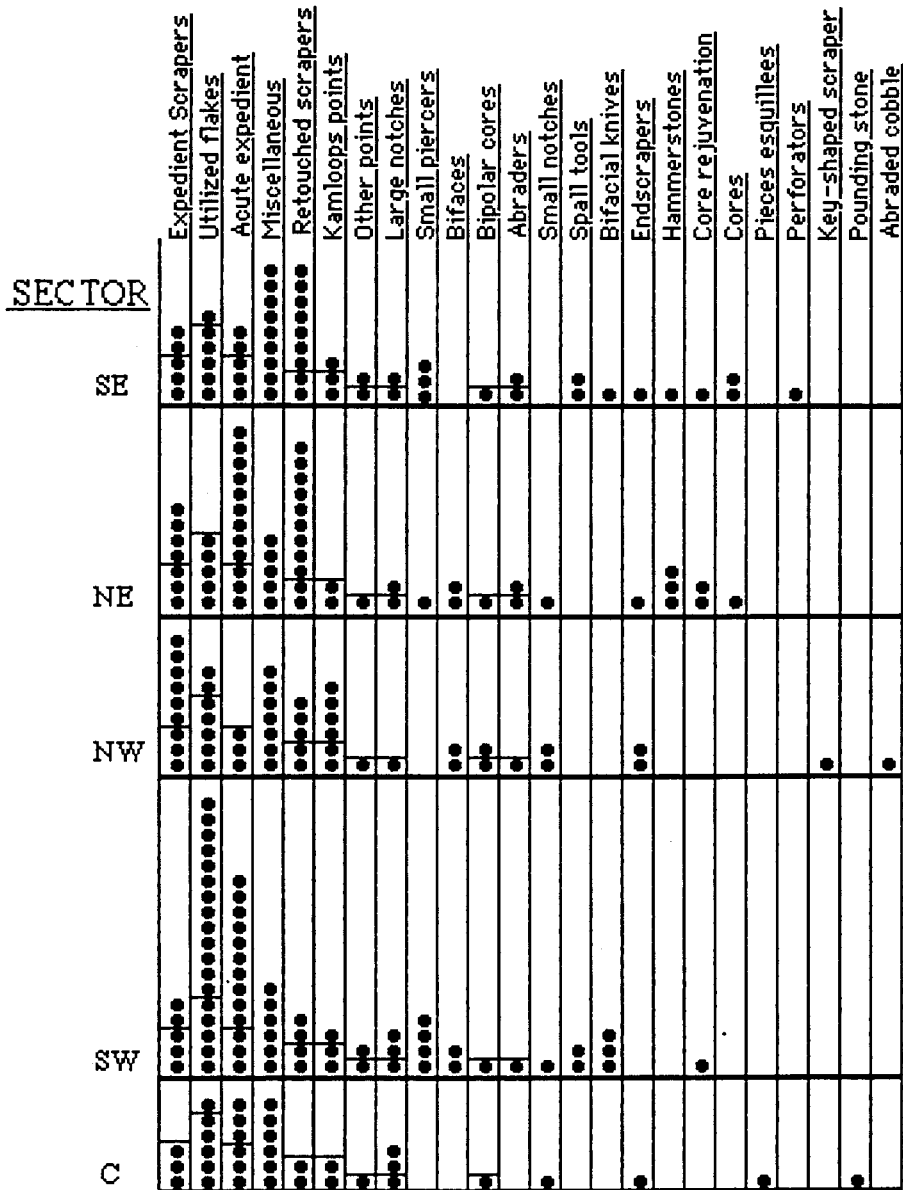


Figure 3.06. Frequency distributions of modified artifacts by sector on the floor of Housepit #3. Each point (●) represents one artifact. Horizontal lines denote the minimum frequency of each artifact class in each sector.

Sector	% of modified artifacts in underlying distribution
C	70.59 (24/34)
SW	40.58 (28/69)
NW	57.14 (28/49)
NE	46.67 (28/60)
SE	50.00 (28/56)
Total	50.74 (136/268)

Table 3.11. The underlying tool distribution as a percentage of all modified artifacts in each sector of the floor of Housepit 3.

The underlying tool distribution consists of 29 modified artifacts. The frequency of each artifact type in the underlying distribution is listed in Table 3.12.

Expedient scrapers	5
Utilized flakes	5
Acute expedient flake tools	3
Miscellaneous	5
Heavily retouched scrapers	5
Kamloops points	2
Other points	1
Large notches	1
Bipolar cores	1
Abraders	1

Table 3.12. The artifacts represented in the underlying tool distribution for the floor of Housepit 3.

The artifact types best represented in the underlying tool distribution are, of course, those which are most common in the assemblage as a whole. The majority are expedient flake tools which are unlikely to have been curated and would probably have been deposited close to where they were used. For the most part, though with the notable exception of the projectile points, the underlying distribution consists of general-purpose tools, suited to a wide range of tasks. As was suggested in Chapter 2, these are tools which would have had an important role in day-to-day domestic activities such as the preparation of food and the maintenance and repair of domestic utensils. Their distribution is, at least, not inconsistent with a model which predicts evidence of similar domestic activities in several sectors of the floor. The uneven distribution of less common artifact

classes among the sectors is, to a large extent, a consequence of their extremely low frequencies. Three cores cannot be evenly distributed among four sectors. It is, however, interesting to note that the six bipolar cores and the six abraders appear to be more evenly distributed than the seven small piercers and the six biface fragments.

Artifact type	Center	SW	NW	NE	SE
Expedient scrapers	0	0	4	3	0
Utilized flakes	1	13	2	0	1
Acute expedient	1	10	0	9	2
Miscellaneous	1	1	2	0	4
Retouched scrapers	0	0	1	7	5
Kamloops points	0	1	4	0	1
Other points	0	1	0	0	1
Large notches	2	2	0	1	1
Small piercers	0	4	0	1	3
Bifaces	0	2	2	2	0
Bipolar cores	0	0	1	0	0
Abraders	0	0	0	1	1
Small notches	1	1	2	1	0
Spall tools	0	2	0	0	2
Bifacial knives	1	3	0	0	1
Endscrapers	1	0	2	0	1
Hammerstones	0	0	0	3	1
Core rejuvenation f.	0	1	0	2	1
Cores	0	0	0	1	2
Pieces esquillee	1	0	0	0	0
Perforators	0	0	0	0	1
Key-shape scraper	0	0	0	1	0
Thumbnail scraper	0	0	0	1	0
Pounding stone	1	0	0	0	0
Abraded cobble	0	0	1	0	0
Sector total	10	39	23	33	27

Table 3.13. Frequencies of artifact types for artifacts not included in the underlying tool distribution in sectors of the floor of Housepit 3.

The bipolar cores and abraders have been interpreted as artifacts with general-purpose domestic applications, while more task-specific functions were attributed to the bifaces and piercers.

As for the projectile points, their presence in every sector suggests that, if the sectors were consistently occupied by the same distinct

groups, then every group in this household was involved in the manufacture and/or use of projectile weapons.

As the underlying tool distribution identifies the component of the assemblage of modified artifacts which all the sectors of the floor have in common, so the distribution of the remaining modified artifacts indicates how the sectors differ. This distribution is represented numerically in Table 3.13. and graphically in Figure 3.06.

Examination of this distribution points to several artifact types which appear to vary substantially in their distribution between sectors. Utilized flakes are exceptionally abundant in the SW sector. Both the SW sector and the NE sector are rich in acute-edged expedient flake tools. Expedient scrapers are more common in the two northern sectors while more of the heavily-retouched scrapers are found in the eastern part of the house. Kamloops points appear to be concentrated in the NW sector. Of the less abundant types (frequency < 15), small piercers and spall tools are found only in the southern sectors while hammerstones, cores, and core rejuvenation flakes are almost entirely confined to the eastern part of the floor.

The variability in the distribution of these artifact types between sectors suggests that, while some activities may have been common to all sectors, others were more localized. Some of this variability, especially variability in the distributions of artifact types which occur in low frequencies, may be attributable to chance variation. To assess this possibility it is necessary to determine whether the distributions of some types of modified artifacts do, in fact, differ significantly from what would be expected if artifacts of each type were deposited at random with an equal probability of occurring in any sector.

Of all the modified artifact types identified as functionally distinct, only utilized flakes, acute-edged expedient flake tools, expedient scrapers, heavily-retouched scrapers, and miscellaneous modified artifacts were sufficiently abundant to allow valid chi-squared comparisons between the frequencies in the ten sectors. In the interests of comparability and consistency, the probabilities of the

observed frequencies of all modified artifact types, including the most abundant types, were determined from the binomial distribution. The results of these tests are summarized in Table 3.14. Only utilized flakes occurred in any sector at frequencies which are improbable at the 0.05 level. Seven other types: heavily-retouched scrapers, acute-edged expedient flake tools, hammerstones, expedient scrapers, Kamloops points, bifacial knives, and small piercers occurred in improbable frequencies at the 0.10 level. The distributions of the eight artifact types with improbable distributions are illustrated in Figures 3.07 through 3.14.

Examination of maps plotting the distributions of individual artifact types revealed that some of the artifact types which do not exhibit statistically significant variability between sectors do appear to be clustered in certain areas of the floor. Consider the distributions of small notches and bifacial knives illustrated in Figures 3.12 & 3.15. Three of the five small notches occur within a four square meter area in the NW sector of the floor.

Sector	C	SW	NW	NE	SE
utilized flakes	6	<u>18</u>	7	(5)	6
heavily-retouched scrapers	2	(4)	5	11	9
acute-edged expedient flake tools	6	13	(3)	12	5
hammerstones	0	0	0	3	1
expedient scrapers	3	5	9	7	5
Kamloops points	2	3	6	2	3
bifacial knives	0	3	0	0	1
small piercers	0	4	0	1	3

Table 3.14 Frequencies by sector of modified artifact types which occur in improbable frequencies in at least one sector of the floor of Housepit 7. Frequencies with a probability less than or equal to 0.05 are underlined and printed in bold type. Frequencies with a probability greater than 0.05 but less than or equal to 0.10 are printed in bold type but not underlined. Improbably low frequencies at either level are enclosed in parentheses. The most improbable distributions are at the top of the table.

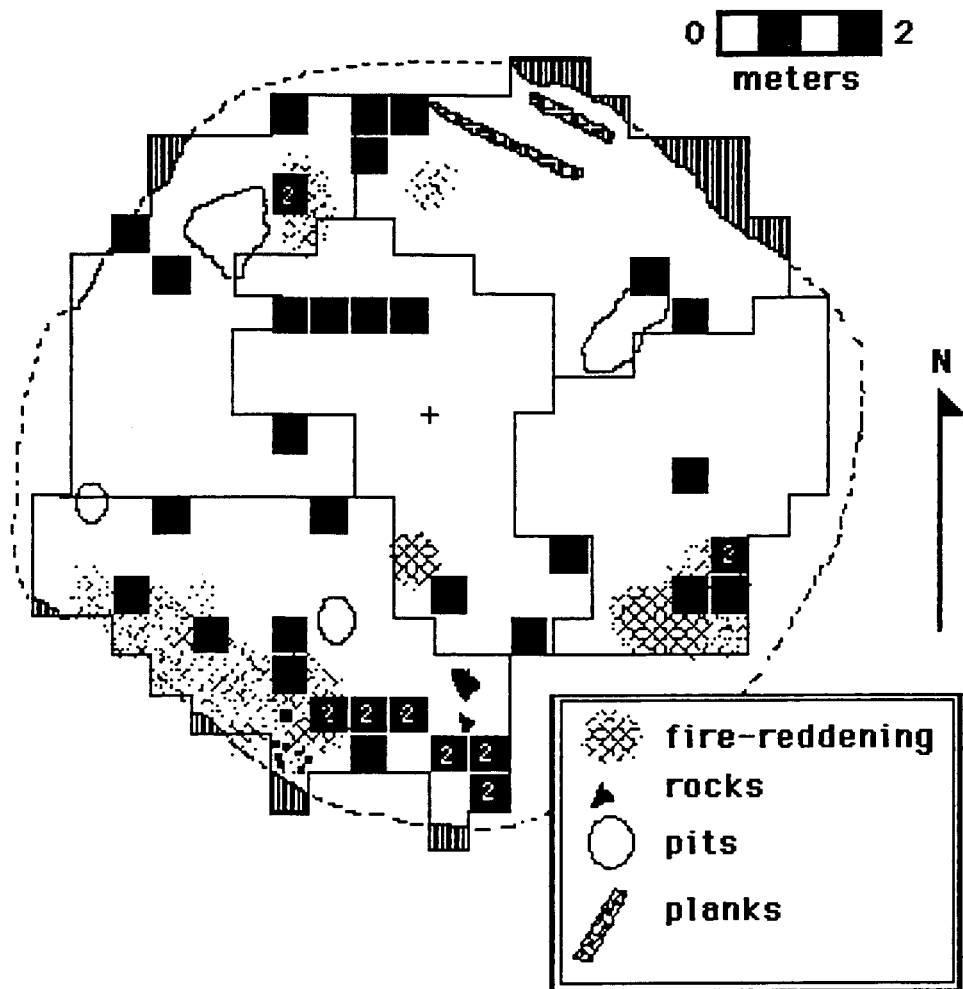


Figure 3.07. Distribution of utilized flakes on the floor of Housepit 3.

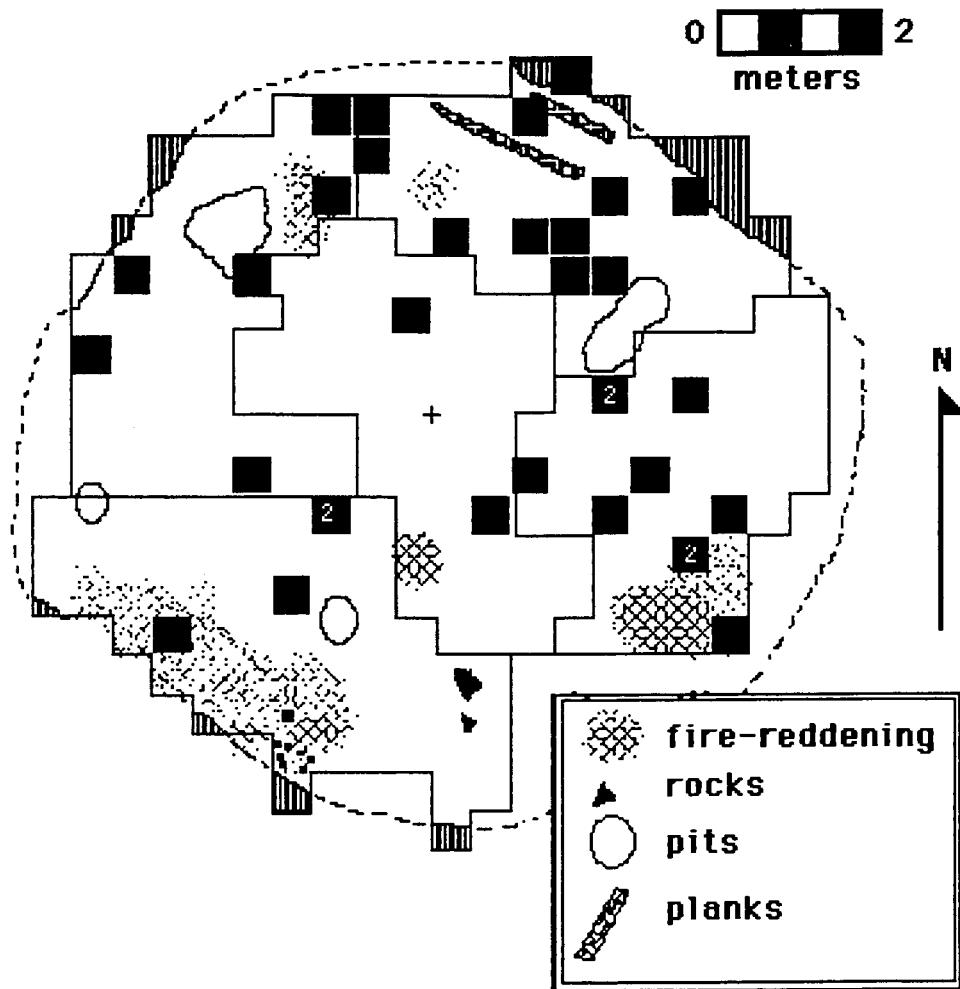


Figure 3.08. Distribution of heavily-retouched scrapers on the floor of Housepit 3.

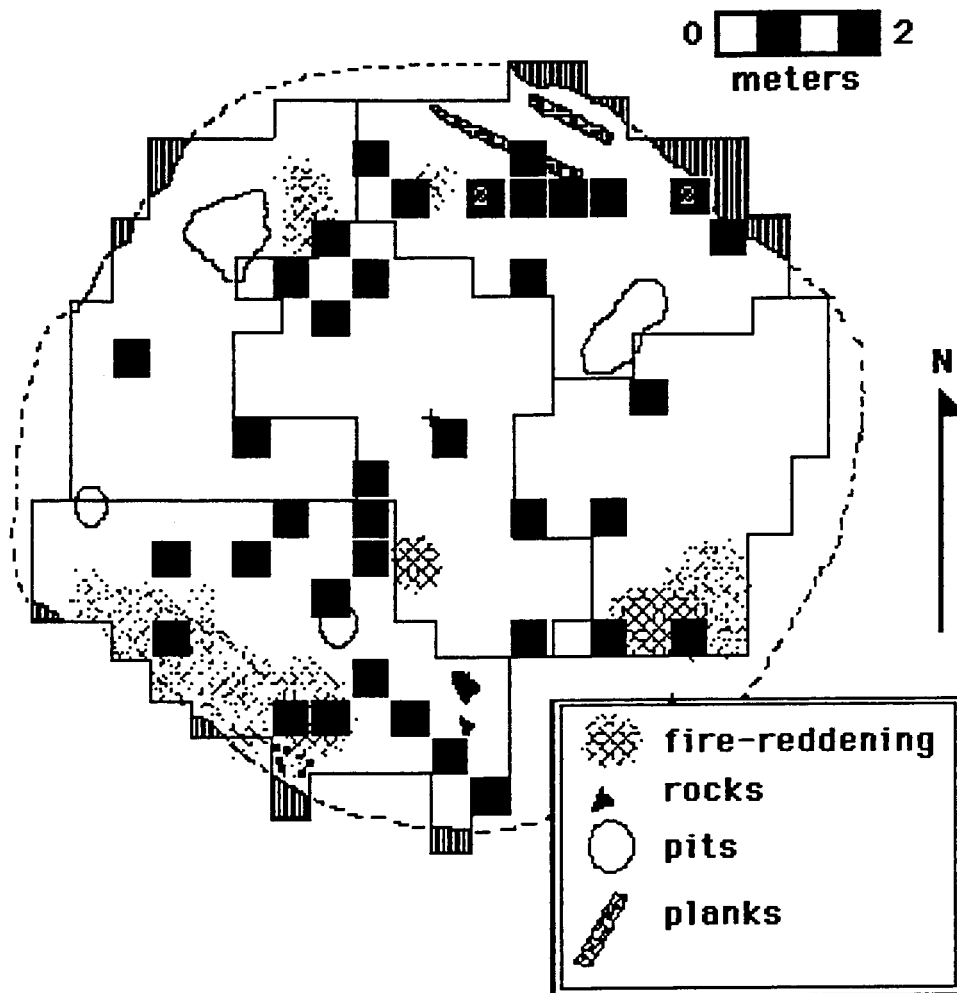


Figure 3.09. Distribution of acute-edged expedient flake tools on the floor of Housepit 3.

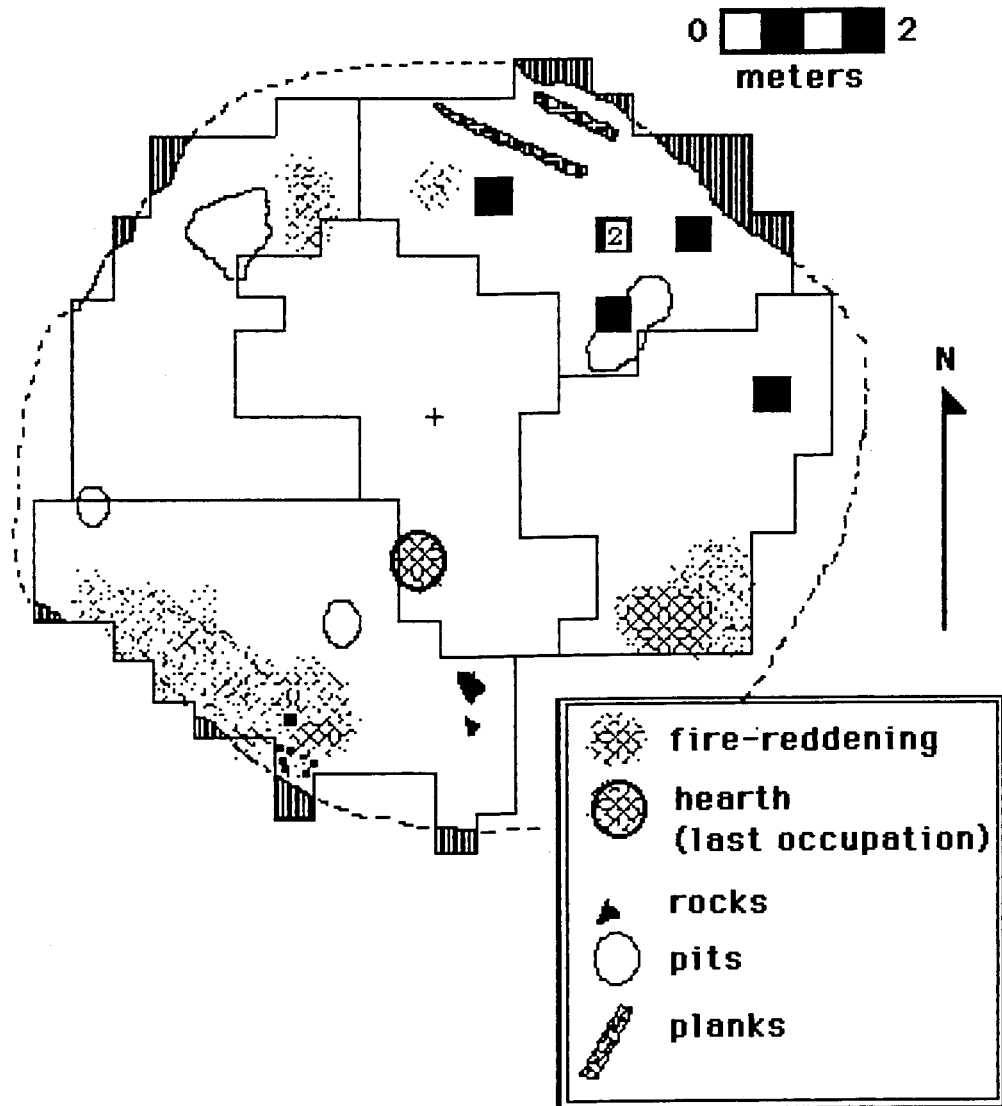


Figure 3.10. Distribution of hammerstones on the floor of Housepit 3.

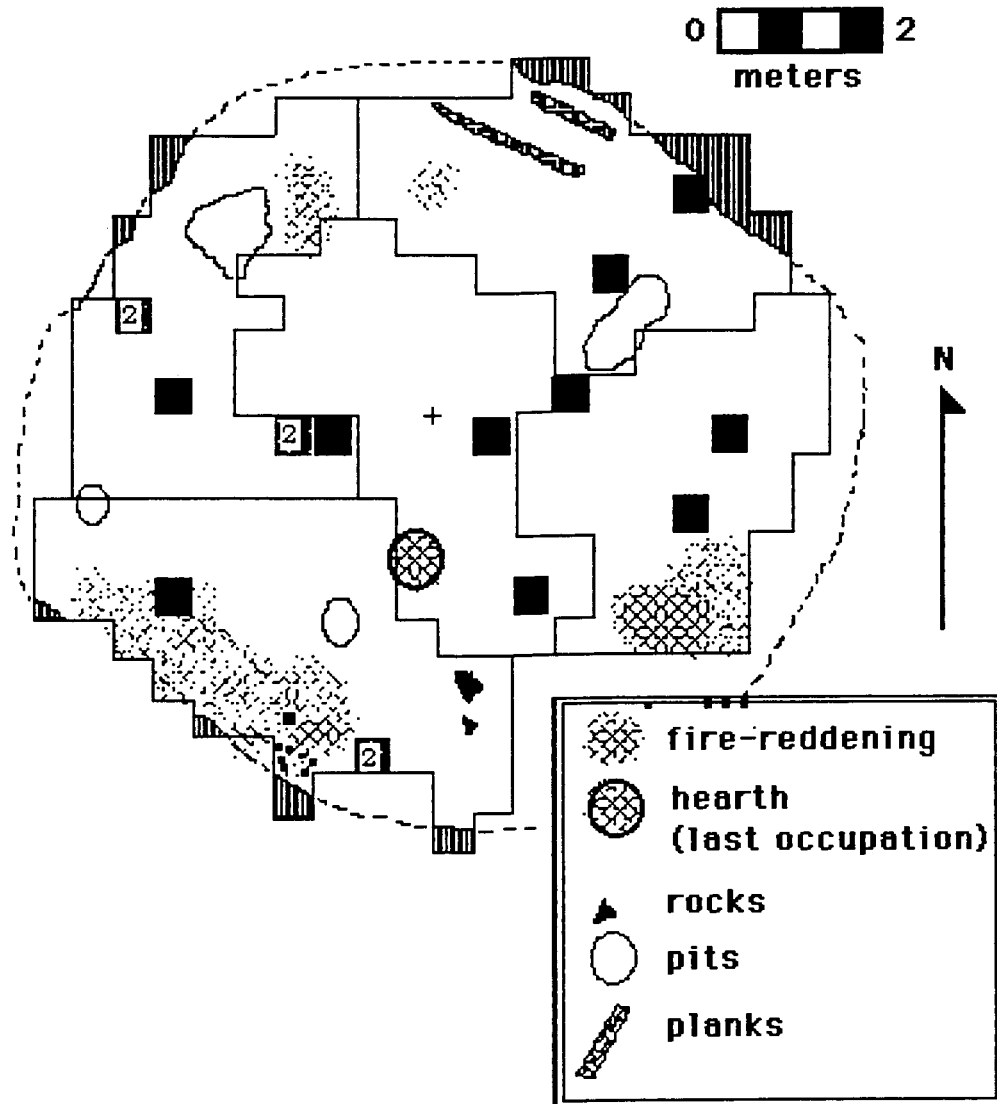


Figure 3.11. Distribution of Kamloops points on the floor of Housepit 3.

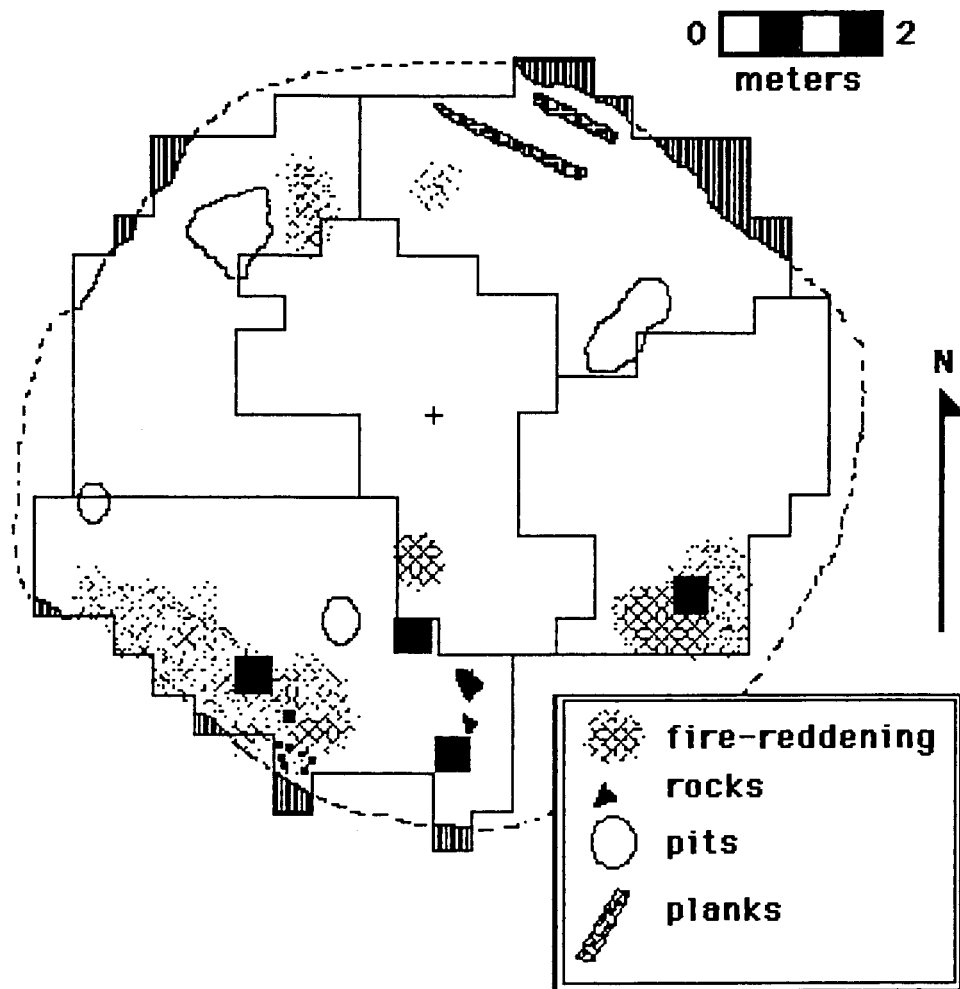


Figure 3.12. Distribution of bifacial knives on the floor of Housepit 3.

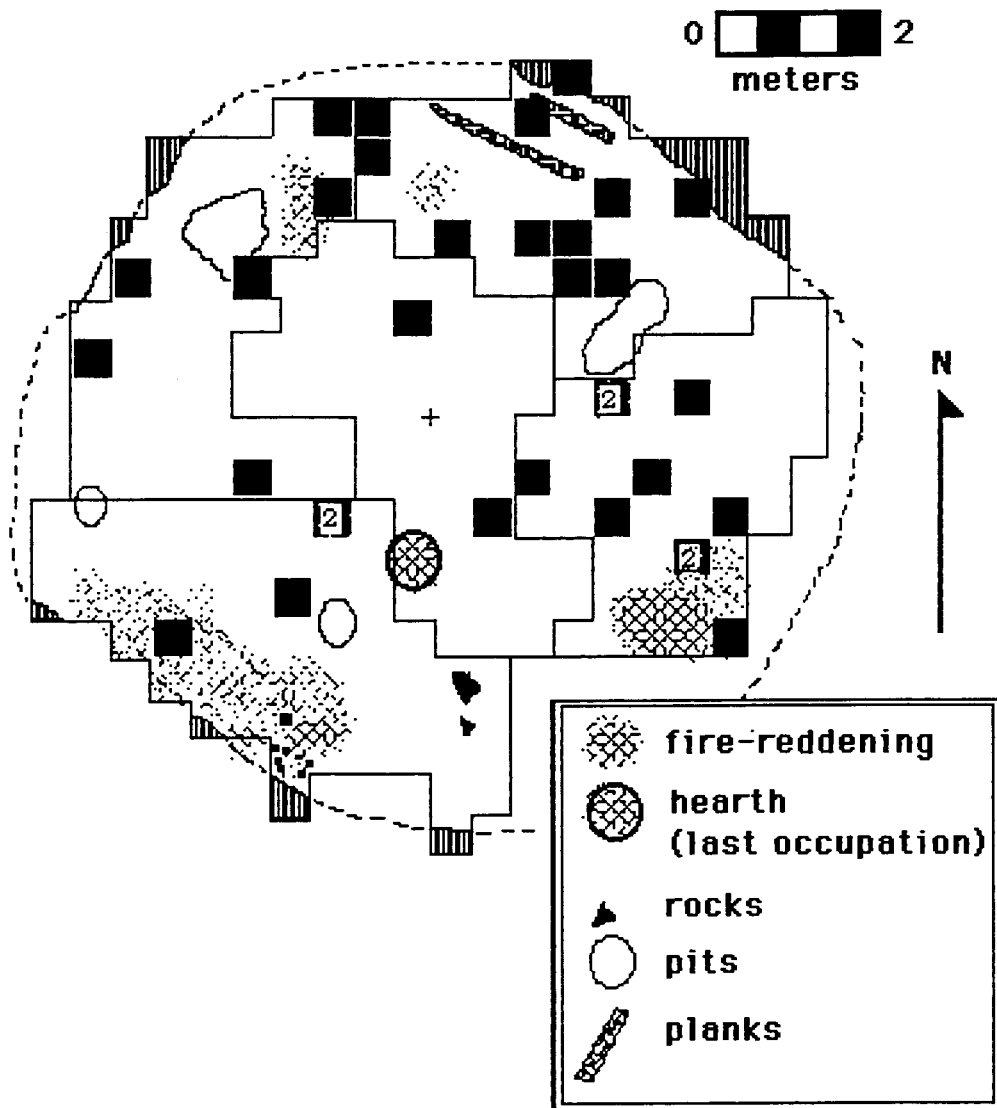


Figure 3.13. Distribution of expedient scrapers on the floor of Housepit 3.

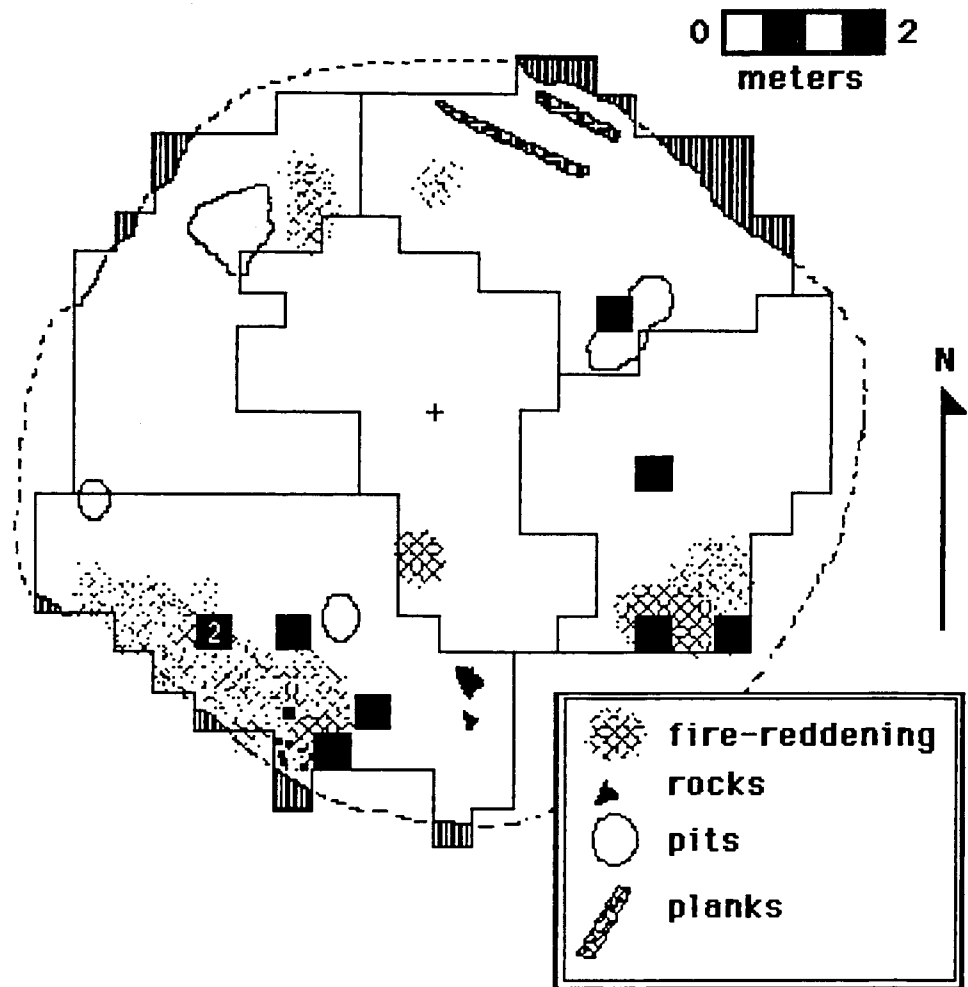


Figure 3.14. Distribution of small piercers on the floor of Housepit 3.

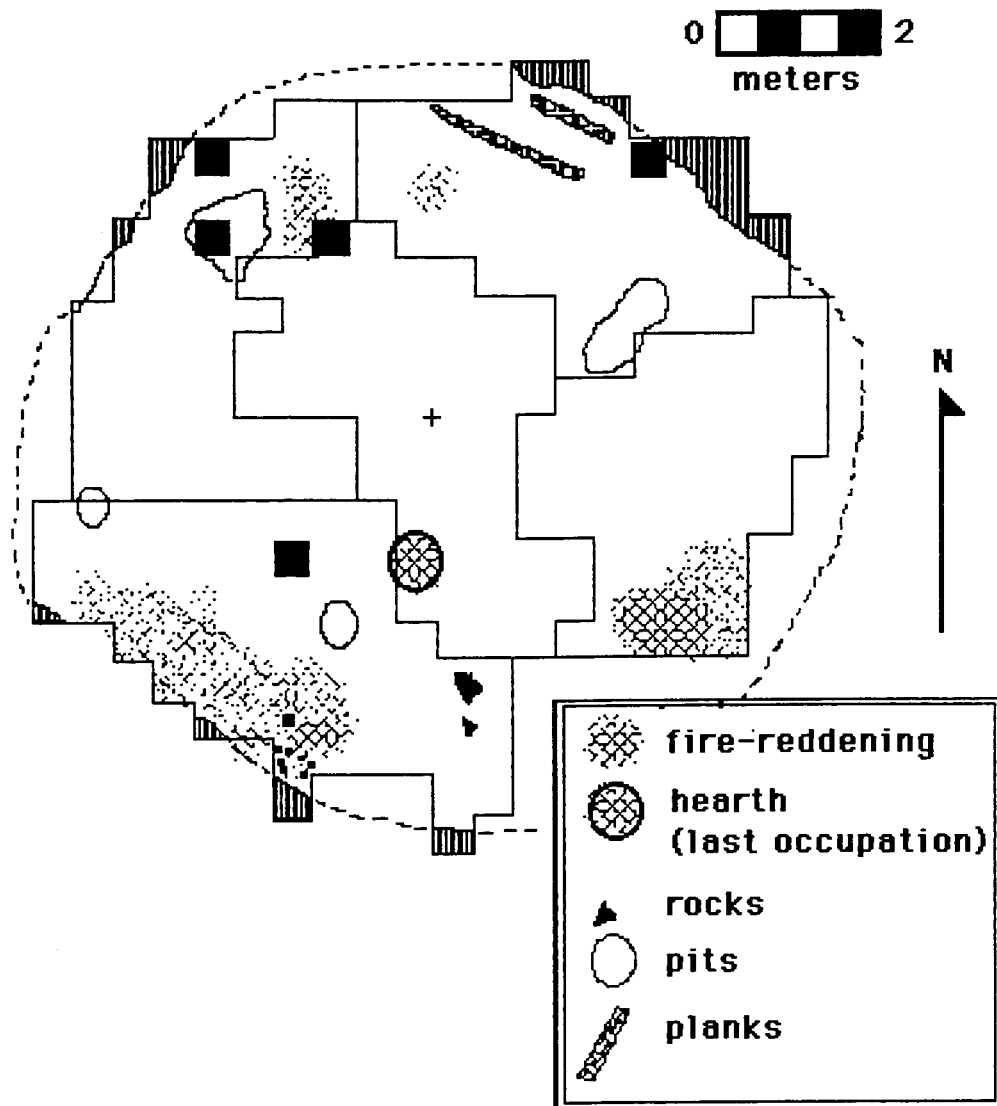


Figure 3.15. Distribution of small notches on the floor of Housepit 3.

They are more tightly grouped than the three bifacial knives in the SW sector but, because five small notches are distributed over three of the five sectors, they do not exhibit statistically significant variability in their distribution between sectors. Bifacial knives, which occur in only two of the five sectors, do exhibit variability in their distribution between sectors which is significant at the 0.10 level.

In other cases, artifacts types which appear to be quite clustered may not exhibit significant variability between sectors because a boundary between two sectors divides the apparent cluster. The distribution of cores illustrated in Figure 3.16 seems more clustered than the distribution of bifacial knives in Figure 3.12. However, one of the cores lies just north of the boundary between the SW and NW sectors and three cores distributed between two of five sectors does not represent statistically significant variability. Similarly, in the distribution of large notches shown in Figure 3.17, the majority of the large notches appear to be clustered near the center of the floor. However, the cluster is not confined within any of the sectors defined for this analysis.

On the whole, the distribution of the various types of modified artifacts indicates a general similarity between sectors. Only one type exhibits variability in its distribution between sectors which is significant at the prescribed probability level of 0.05. Only eight of the 25 types present on this floor exhibit variability which is significant even at the 0.10 level. Variability in the distribution of most types and of modified artifacts in general is more consistent with chance variation from an even distribution between sectors.

On the other hand, the analyses of the distributions of all debitage and of debitage types, did identify some significant differences between sectors. Artifact types whose distributions vary significantly between sectors at the $p=0.10$ level may not, of themselves, be sufficient evidence to support the claim that different activities occurred in different sectors. However, if the distributions of these types do correspond to the significant variability that has been identified in the distribution of debitage, this may be taken as further support for the idea that different sectors were used for

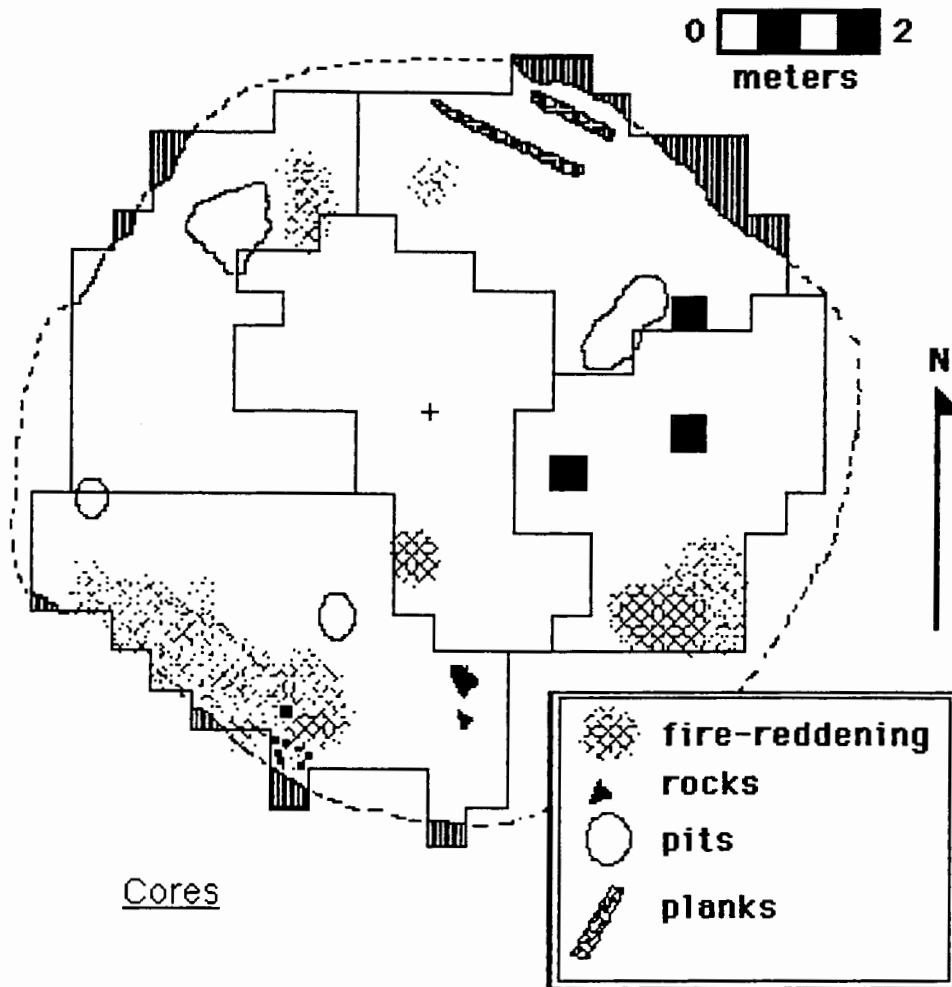


Figure 3.16. Distribution of cores on the floor of Housepit 3.

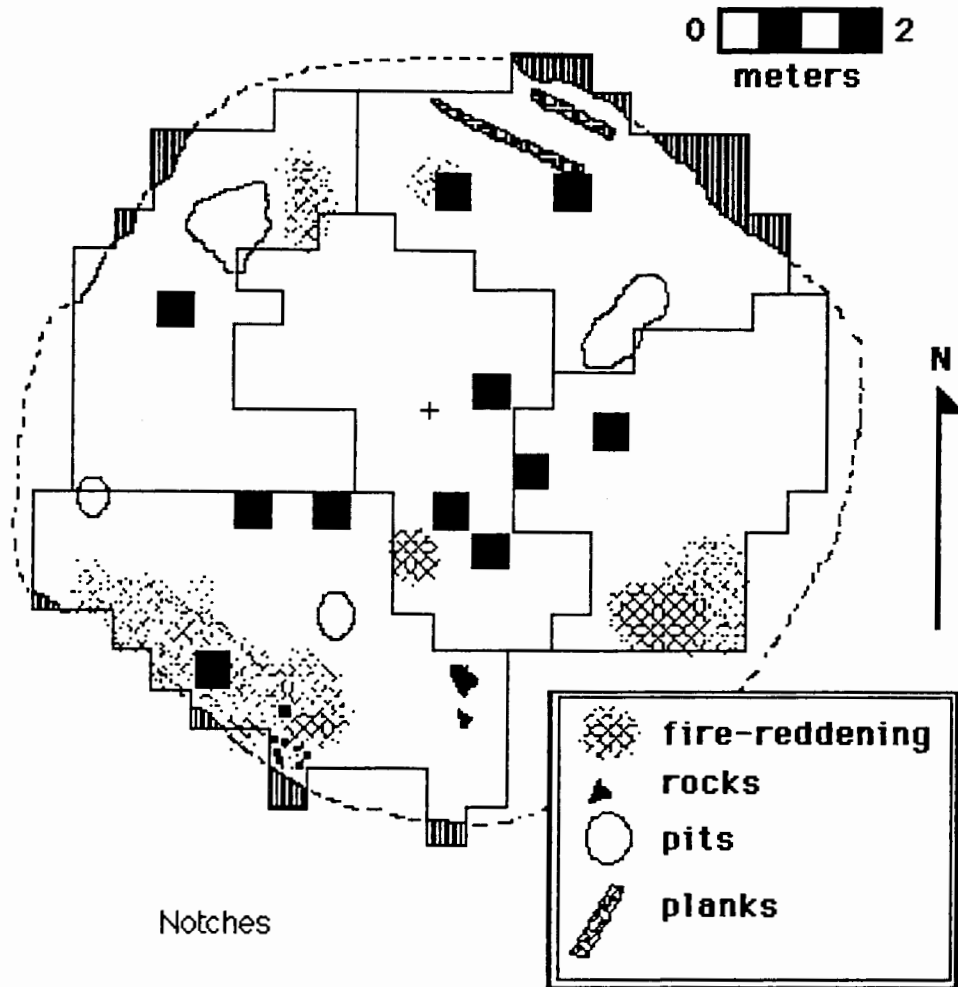


Figure 3.17. Distribution of large notches on the floor of Housepit 3.

different purposes. The distributions of modified artifact types will also be helpful in interpreting variability in the distribution of debitage.

In fact, utilized flakes, small piercers, and bifacial knives are most common in the SW sector where small billet flakes were most abundant. In contrast, hammerstones and heavily-retouched scrapers are most common in the NE sector which also contained significantly more debitage than would be expected in an even distribution. Cores, which appear to be clustered near the boundary between the SE and NE sectors can reasonably be associated with this debitage concentration. The unexpectedly high frequency of chert, chalcedony, and obsidian debitage in the NW sector is associated with Kamloops points. This is interesting, in that procurement of exotic lithic resources may have been imbedded in hunting forays. There also appears to be a cluster of three small notches in the NW sector, as was noted above. Thus, the NE, NW, and SW sectors do show signs of having been used for different sets of activities which were not regularly repeated in the other sectors of the floor or were of much less importance .

In addition, the distributions of several modified artifact types are complementary. There are few heavily-retouched scrapers and no cores or hammerstones in the SW sector where utilized flakes, bifacial knives, and small piercers are most abundant. In the NE sector, where heavily-retouched scrapers and hammerstones are most abundant, utilized flakes, small piercers, and bifacial knives are rare. These complementary distributions further strengthen the argument that quite different activities occurred on opposite sides of the floor.

The concentration of debitage in the NE sector, in association with hammerstones and cores, may indicate an area devoted to lithic reduction and, perhaps, the generation of flake blanks to be used as tools in other parts of the house. Alternatively, this sector may have been the locus of some activity or the domain of some group which used flake tools more intensively than they were used in other sectors. The abundance of heavily retouched scrapers in this sector is, perhaps, most consistent with the latter interpretation. Possibly

this area was used as a workshop for "gearing-up" (sensu Binford 1979) that is, for the maintenance and manufacture, during the comparatively idle winter months, of tools such as fishing gear for use in busier seasons. Such activities are likely to have involved more intensive working of relatively hard materials such as wood and bone than would have been required in food preparation, for example. Scraper edges would have been heavily used in working these materials and would have required frequent resharpening. The NE sector may have been especially well suited to detailed manufacturing work because it probably received more sunlight than other parts of the floor. The shadow of the hills to east would have excluded direct morning sunlight from the NW sector and the roof would have shaded the southern half of the floor. The smokehole would only have admitted the afternoon sun to the NE sector. The bench suggested by the remains of planks extending along the northeast wall of this housepit might have been a convenient location for careful handiwork.

The small billet flakes, utilized flakes, and small piercers which distinguish the SW sector tend to be acute-edged tools or by-products of the manufacture of acute-edges. Billet flakes of this size (< 2cm) are typically the products of biface thinning and the resharpening of bifacial edges or the manufacture of projectile points. The utilized flakes are generally thin flakes with acute edges. Small piercers are also formed on thin flakes and have sharp fragile points. Generally, bifacial edges and thin acute-edged flake tools are best suited to working relatively soft materials. Foodstuffs, birchbark, some fibers, and animal skins are all possible worked materials, though the probable lack of light in this sector suggests that this sector may not have been the ideal location for activities such as basketry and needlework. Food preparation would probably have required less light so this sector may, perhaps, be best interpreted as a kitchen area. The main hearth on the floor of Housepit 3 is just inside the Center sector at the edge of the SW sector. There is also an extensive fire-stained area along the wall in the SW sector.

It must be born in mind that these interpretations of the SW and NE sectors as special purpose activity areas are based primarily on statistically significant variability in the distributions of debitage types which are represented in all sectors and on distributions of modified artifact types that do not vary significantly between sectors according to the chosen criterion. Broad similarities between the four peripheral sectors have already been demonstrated in the discussion of the underlying tool distribution. It may be that most activities, including food preparation, "gearing-up", and lithic reduction, were conducted in all of these sectors. That is, the floor could have been organized into several domestic areas, each occupied by a group who specialized in some activity, rather than into specialized activity areas used by all residents of the pithouse. The group occupying the NE sector may have been more heavily involved in activities which required hammerstones and retouched scrapers than the residents of other sectors. A family residing in the SW sector may have specialized in some work involving small piercers and bifacial knives and presided over food preparation. The statistical analyses do not conclusively demonstrate that these activities were not also conducted, perhaps to a lesser extent, in other sectors. Even if it appeared that the residents of certain sectors were exclusive specialists in some activities, the underlying tool distribution might still be interpreted as evidence that other activities were common to all sectors of the floor.

On the whole, though, I believe that special-purpose activity areas provide the most reasonable interpretation for the most pronounced of these distributions. The distributions of several modified artifact types do seem to correspond, in a meaningful way, to the significant variability that was observed in the distribution of debitage. Several types which are abundant in one sector are rare or absent in others. The small piercers and bifacial knives which help to distinguish the SW sector are entirely absent in the NE which is the only sector containing hammerstones. While the frequencies of these types may be too low for their absence from some sectors to be statistically significant their distributions are certainly suggestive. Moreover evidence for cooking is present only in the SW sector. These

distributions reinforce the argument that the SW and NE sectors, at least, were used for two quite different sets of activities. This suggests that these two sectors were consistently designated as the loci of two distinct sets activities during the period when this pithouse was last occupied.

A floor divided into areas reserved for particular activities is most consistent with a model of the social organization of space which emphasizes cooperation rather than competition within the house. Groups using a common kitchen and a common workshop are more likely to have had equal access to the resources used in those areas than groups who maintained several separate kitchens and workshops.

The recurrence of the underlying tool distribution in all peripheral sectors is not necessarily inconsistent with an interpretation of these artifact distributions in which some activities are restricted to certain sectors of the floor. Most of the artifact types which make up the underlying tool distribution are tools with a broad range of applications. Acute-edged expedient flake tools, expedient and retouched scrapers, bipolar cores and even large notches might well have been used, to varying extents, in all of the activities suggested for both the SW and NE sectors and in other activities as well.

Of all the modified artifact types in the underlying tool distributions it is abraders whose distribution seems most consistent with multiple, redundant domestic spaces. As Figure 3.18 shows, these artifacts are quite evenly distributed around the edge of the floor. On the other hand, abraders, which are thought to have been used to wear away bone, antler, and other hard materials, could also have had applications in a variety of activities. All of the abraders in Housepit 3 were found near the edge of the floor, a location which suggests that these tools may have been put away in storage zones rather than left where they were last used. The abrader in the SE sector, near the east wall, was found in close association with a core, a hammerstone, and a spall tool which gives an even stronger indication of storage.

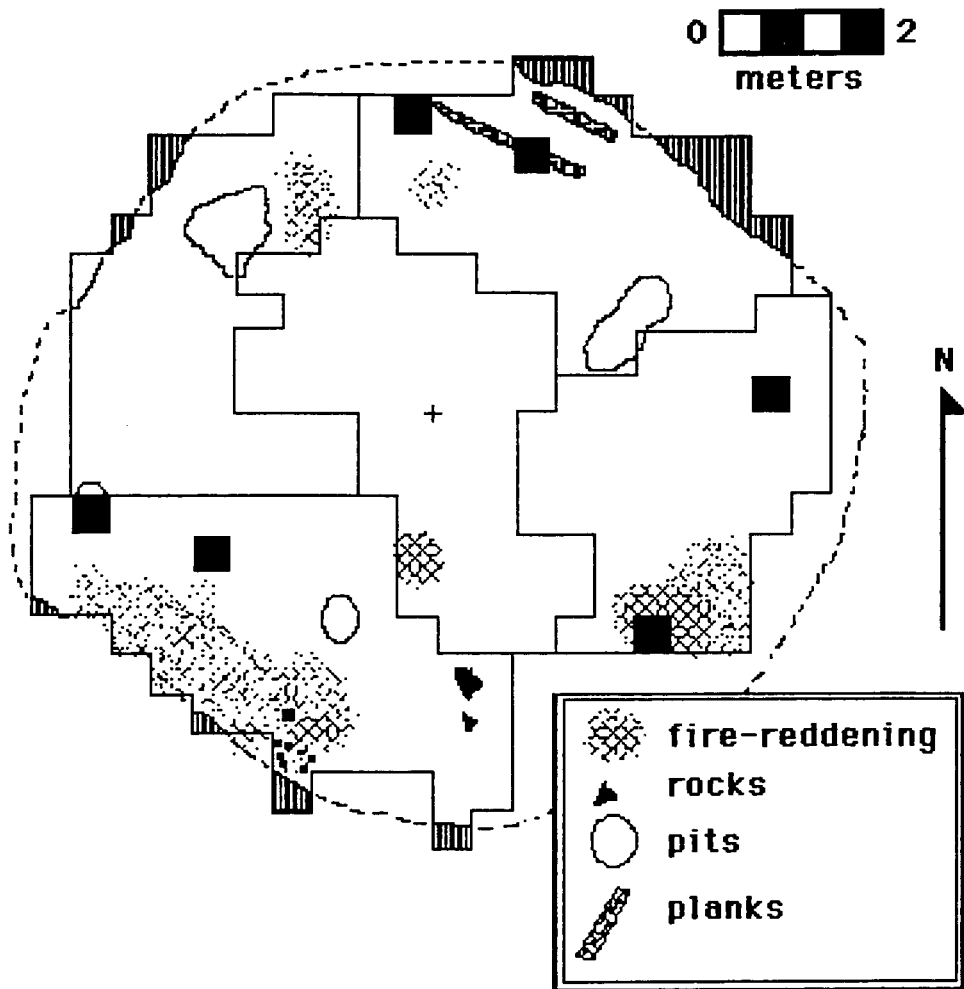


Figure 3.18. Distribution of abraders on the floor of Housepit 3.

Housepit 7

As in the case of Housepit 3, analysis of the distribution of lithic artifacts on the floor of Housepit 7 will proceed from a consideration of the distributions of fire-cracked rock, debitage, and modified artifacts in general to an examination of the distribution of specific types of debitage and modified artifacts.

Distribution of fire-cracked rocks

The distribution of fire-cracked rocks on the floor of Housepit 7 is illustrated in Figure 2.13. The boundaries of clusters of subsquares with unexpectedly high frequencies of fire-cracked rock were an important factor in the definition of sectors on this floor so it is expected that fire-cracked rocks will occur in significantly different frequencies in the different sectors. The observed frequencies are recorded in Table 3.15. along with predicted frequencies based on an even distribution among sectors in proportion to their area, again defined by the number of subsquares in each sector.

Sector	Observed frequency of FCR	Number of subsquares	Predicted frequency of FCR
S center	160	41	141.16
W center	123	27	92.96
E center	184	48	165.26
S	315	49	168.71
SW	70	43	148.05
W	210	50	172.15
NW	135	56	192.81
NE	58	37	127.39
E	94	51	175.59
SE	121	54	185.92

Chi-squared = 268.49 with 9 degrees of freedom.
p < .0001

Table 3.15. Distribution of fire-cracked rock in the ten sectors of the floor of Housepit 7.

With 9 degrees of freedom, any chi-squared value greater than 16.92 is significant at the .05 level. The differences between the observed and expected frequencies of fire-cracked rock yield a chi-squared value of 268.49 with $p < .0001$. The greatest difference

between observed and expected frequencies is in the South sector where there were 315 fire-cracked rocks, almost twice the expected frequency. All three of the Center sectors, as well as the SW and W sectors, have somewhat more fire-cracked rock than would be expected in an random distribution while the remaining peripheral sectors: NW, NE, E, and SE have considerably less than expected. The variability between sectors is quite apparent in Figure 2.13.

Even in peripheral sectors where fire-cracked rock does occur in high frequencies, it tends to be concentrated nearer the center than do debitage concentrations in the same sectors. This suggests that the periphery is more likely to have been used for sleeping than the center. Areas which are almost entirely free of fire-cracked rock can be seen along most of the eastern periphery, an area where hearths are also less strongly developed.

Despite a higher than expected fire-cracked rock frequency for the sector as a whole, Figure 2.13 shows a large area in the South Center sector which lacks fire-cracked rock. Most of the fire-cracked rock in this sector appears to be associated with clusters which extend across the borders of adjacent sectors. The lack of fire-cracked rock in most of the center of this sector is consistent with the earlier suggestion that this space, which also contains little debitage and few modified artifacts, may have been a special reserved area or a high traffic area near the foot of the entry ladder.

Figure 2.13 also shows a fairly close association between individual subsquares with high fire-cracked rock frequencies and fire-reddened areas on the floor which have been interpreted as hearths. This makes a marked contrast with the floor of Housepit 3 where fire-cracked rocks were concentrated in a single cluster in the eastern part of the floor, some distance from any evidence of a hearth. The model mentioned in Chapter 1 for multiple redundant domestic areas within the residences of large corporate groups predicts multiple hearths. The floor of Housepit 7 seems much more consistent with the model, in this respect, than does the floor of Housepit 3. Fire-reddened areas associated with concentrations of fire-cracked rock may be clearly observed in the South, Southwest, West, Northwest, and East Center sectors. The fire-reddened areas

shown in the Southeast sector and at the southern boundary of the Northeast sector were smaller and shallower than those in the other sectors and are not as clearly associated with concentrations of fire-cracked rock.

Distribution of all debitage

Predicted debitage frequencies for the ten sectors of the floor of Housepit 7 were also calculated on the basis of an even distribution in proportion to floor area. The observed and expected frequencies are recorded in Table 3.16.

Sector	Observed frequency of debitage	Number of subsquares	Predicted frequency of debitage
S center	150	41	465.30
W center	318	27	306.41
E center	560	48	544.74
S	481	49	556.09
SW	539	43	487.99
W	803	50	567.43
NW	677	56	635.53
NE	409	37	419.90
E	648	51	578.78
SE	590	54	612.83

Chi-squared = 339.90 with 9 degrees of freedom.
 $p < .0001$

Table 3.16. Distribution of all debitage in the ten sectors of the floor of Housepit 7.

The differences between observed and expected frequencies yield a chi-squared statistic of 339.90 which, with nine degrees of freedom, is significant well beyond the .0001 level. The greatest difference is seen in the South Center sector which was defined around an area containing a large cluster of subsquares with improbably low debitage densities for an random distribution. A second test was conducted to determine whether debitage frequencies also vary significantly among the remaining nine sectors when the extremely low value for the South Center sector is excluded. The observed and expected values for are presented in Table 3.17.

Sector	Observed debitage frequency	Number of subsquares	Predicted debitage frequency
W center	318	27	322.83
E center	560	48	573.92
S	481	49	585.87
SW	539	43	514.13
W	803	50	597.83
NW	677	56	669.57
NE	409	37	442.40
E	648	51	609.79
SE	590	54	645.66

Chi-squared = 100.59 with 8 degrees of freedom.
 $p < .0001$

Table 3.17. Distribution of all debitage in the nine sectors of the floor of Housepit 7 which contain clusters of subsquares with unexpectedly high debitage frequencies.

This test yielded a chi-squared statistic of 100.59 with 8 degrees of freedom which remains significant beyond the .0001 level. The greatest differences between observed debitage frequencies and those expected in a random distribution are found in the West sector, which has more debitage than expected, and the South sector, which has less.

The difference between these two sectors is apparent in Figure 3.19. On the floor of Housepit 7, debitage frequencies greater than 15 are improbably high ($p = 0.95$). In the figure, subsquares with debitage frequencies greater than 15 are shaded black. In the West sector, 21 of 50 subsquares (42.0%) contain more than 15 flakes. In the South sector the ratio is 9 to 49 (18.4%). Debitage frequencies in the West Center, East Center, Southwest, Northwest, Northeast, East, and Southeast sectors do not differ significantly ($p > .05$) from what would be expected given an even distribution of debitage between sectors. In these sectors, the ratio of subsquares with debitage frequencies greater than 15 to subsquares with debitage densities less than or equal to 15 is 86 to 314 (27.4%). This distribution suggests that, while some activities involving lithic reduction were performed in all sectors except the South Center sector, the West sector was used more intensely for such activities than the other sectors. Lithic reduction was less frequent or less intense in the

0  2
metres

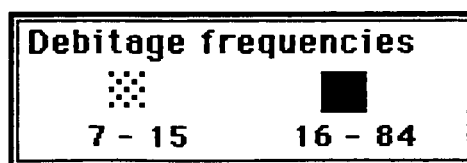
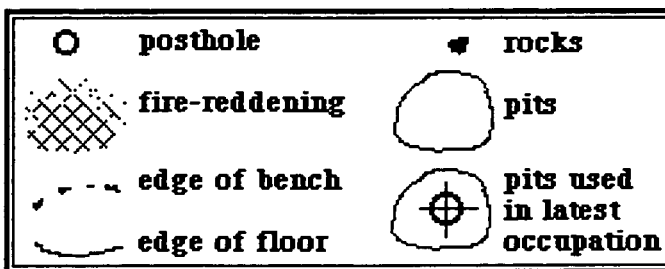
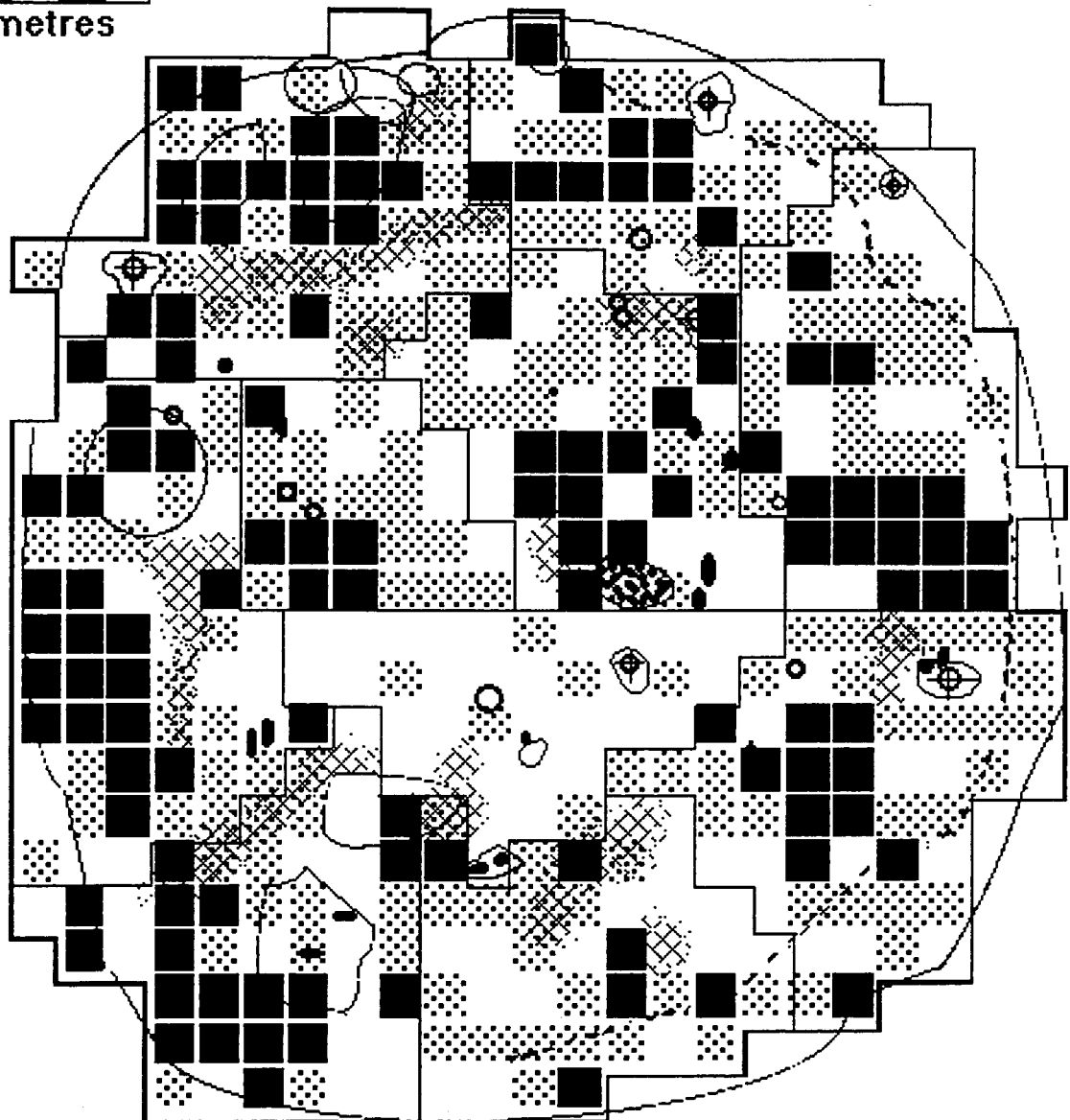


Figure 3.19. Distribution of debitage on the floor of Housepit 7.

South sector than in any sector except the South Center.

Given the distribution of hearths discussed in the preceding section, the difference between the South and West sectors may be provisionally interpreted as a result of differences between the activities of two social groups, each associated with an independent domestic area. The differences between these two sectors and the Southwest, Northwest, and East Center sectors, which also contain clearly defined hearths is open to the same interpretation. However, the presence of a hearth does not preclude the possibility that a sector was used for some purpose other than domestic activities. Analyses of the distributions of modified artifacts in general and of individual types of debitage and modified artifacts will shed further light on this question.

Distribution of debitage categories

Raw Material

Debitage was sorted into three lithic raw material categories: chert or chalcedony, which represents 8.8% of the debitage on this floor, obsidian, which accounts for less than 0.1%, and other. The latter category, representing 90.2% of the assemblage, consists almost entirely of vitreous trachydacite ("basalt"), though a few quartzite flakes are also included.

As was noted in Chapter 2, the technological properties of chert and chalcedony are quite different from those of vitreous trachydacite and even more different from those of obsidian. Chert and chalcedony are tough, durable lithic materials. Vitreous trachydacite, besides being the most abundant lithic raw material in the Upper Fraser River region, is probably easier to work than chert and chalcedony but wears comparatively quickly. Obsidian is very easily worked and provides an extremely sharp edge but is brittle and fragile. Significant differences in the distribution between sectors of obsidian versus chert or chalcedony flakes may indicate that these materials, were preferred for tools used different in tasks which tended to be performed in different sectors of the floor. Alternatively, variability in the distribution of these exotic raw

materials between sectors might be the result of differences in access to these materials for groups residing in different sectors.

To test for significant variability in the distribution between sectors of the two categories of exotic raw materials, expected frequencies are calculated as even proportions of the total debitage frequency in each sector. For example, in an even distribution, chert and chalcedony flakes are 'expected' to make-up the same percentage of the debitage in every sector of the floor; i.e., 8.8%. If the distribution departs significantly from this expectation ($p \leq 0.05$), it will be argued that chert and chalcedony flakes were preferentially deposited in some sectors as a result of some patterned cultural behavior. Where frequencies permit, chi-squared tests are employed to determine whether there are significant differences between observed and expected values. For debitage categories such as obsidian, with expected frequencies too low to allow valid chi-squared tests, the probability that the observed frequencies resulted from random processes were calculated from cumulative density functions of binomial distributions. The same procedures are employed in the subsequent analyses of the distributions of other debitage classifications including flake size, flake type, and presence of cortex. The observed and expected frequencies for the two categories of exotic flakes are presented in Table 3.18.

As the chi-squared value of 48.21 indicates, there is clearly significant variability in the distribution of chert or chalcedony flakes. Higher than expected frequencies were observed in all three of the southern peripheral sectors and in the West sector. Lower than expected frequencies occur in the East sector, the East Center sector, and, to a lesser extent, in the South Center and Northeast sectors. The most notable departures from the expected values are the low frequency for the East sector and the high value in the South.

None of the observed frequencies of obsidian flakes are improbable at the 0.05 level. However, the probability that the frequency of obsidian flakes in the East sector would be equal to or greater than the observed value of 6 is only 0.07 and the probability that 4 or more obsidian flakes would be found in the Northeast sector is 0.11.

Thus, obsidian flakes are most abundant where chert and chalcedony flakes are, proportionately, scarcest.

Sector	Observed frequency of chert or chalcedony flakes	Expected frequency of chert or chalcedony flakes	Observed frequency of obsidian flakes	Expected frequency of obsidian flakes
SC	8	13.19	0	0.67
WC	29	27.96	1	1.41
EC	30	49.24	2	2.49
S	63	42.39	2	2.14
SW	63	47.39	2	2.40
W	88	70.60	3	3.57
NW	53	59.52	1	3.01
NE	28	35.96	4	1.82
E	29	56.97	6	2.88
SE	64	51.87	2	2.62

Chi-squared = 48.21
with 9 degrees of freedom
 $p < 0.001$

Table 3.18. Observed and expected frequencies of chert or chalcedony flakes and obsidian flakes on the floor of Housepit 7. The chi-squared statistic for the distribution of chert or chalcedony flakes is included. Probabilities for the observed frequencies of obsidian flakes are discussed below.

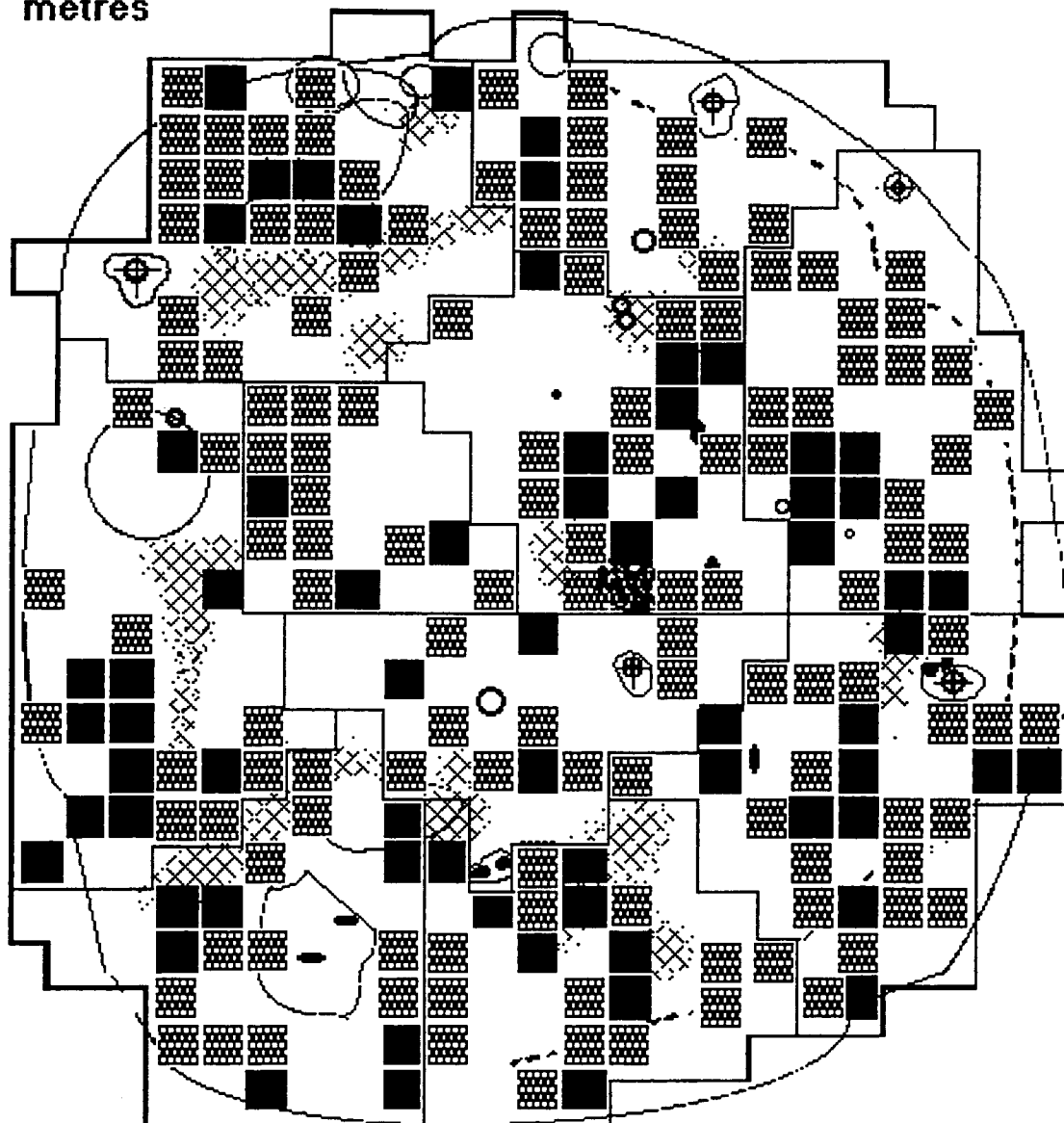
Size




In Chapter 2 it was argued that significant differences between sectors in the proportions of different sizes of debitage might reflect differences in the relative importance of different processes or stages of lithic reduction. Size sorting may also be interpreted as evidence of cleaning or storage activities.








Debitage was sorted into four size categories: <1 cm, > 1 cm and < 2 cm, > 2 cm and < 5 cm, and > 5 cm. The absolute and relative frequencies of each category for the floor as a whole are shown in Table 3.19. The distributions of the four size categories are plotted in Figures 3.20, 3.21, 3.22., and 3.23.

The observed and expected frequencies and the resulting chi-squared statistics for the distributions of the first three size categories are presented in Table 3.20. It should be noted here that many flakes in the < 1 cm category were undoubtedly lost through

0  2
metres



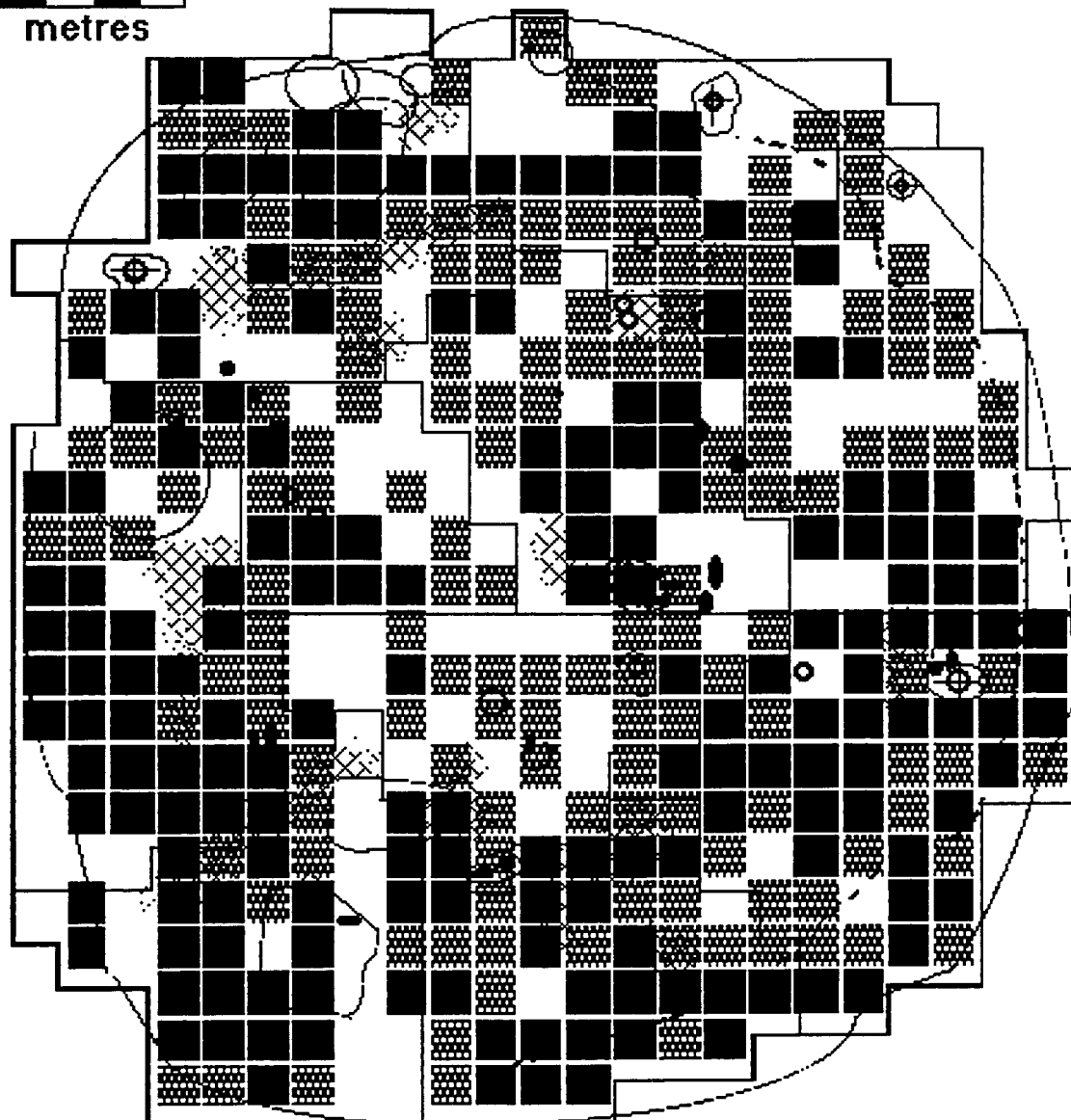
Size 1 debitage	
	3 - 14
	1 - 2
	0

	posthole		rocks
	fire-reddening		pits
	edge of bench		pits used in latest occupation
	edge of floor		

N
↑

Figure 3.20 Distribution of Size 1 ($\leq 1\text{cm}$) debitage on the floor of Housepit 7.

0 2
metres



**Number of
Size 3 flakes**

■ 10-58

▤ 5-9

□ 0-4

○ posthole ● rocks

▤ fire-reddening ○ pits

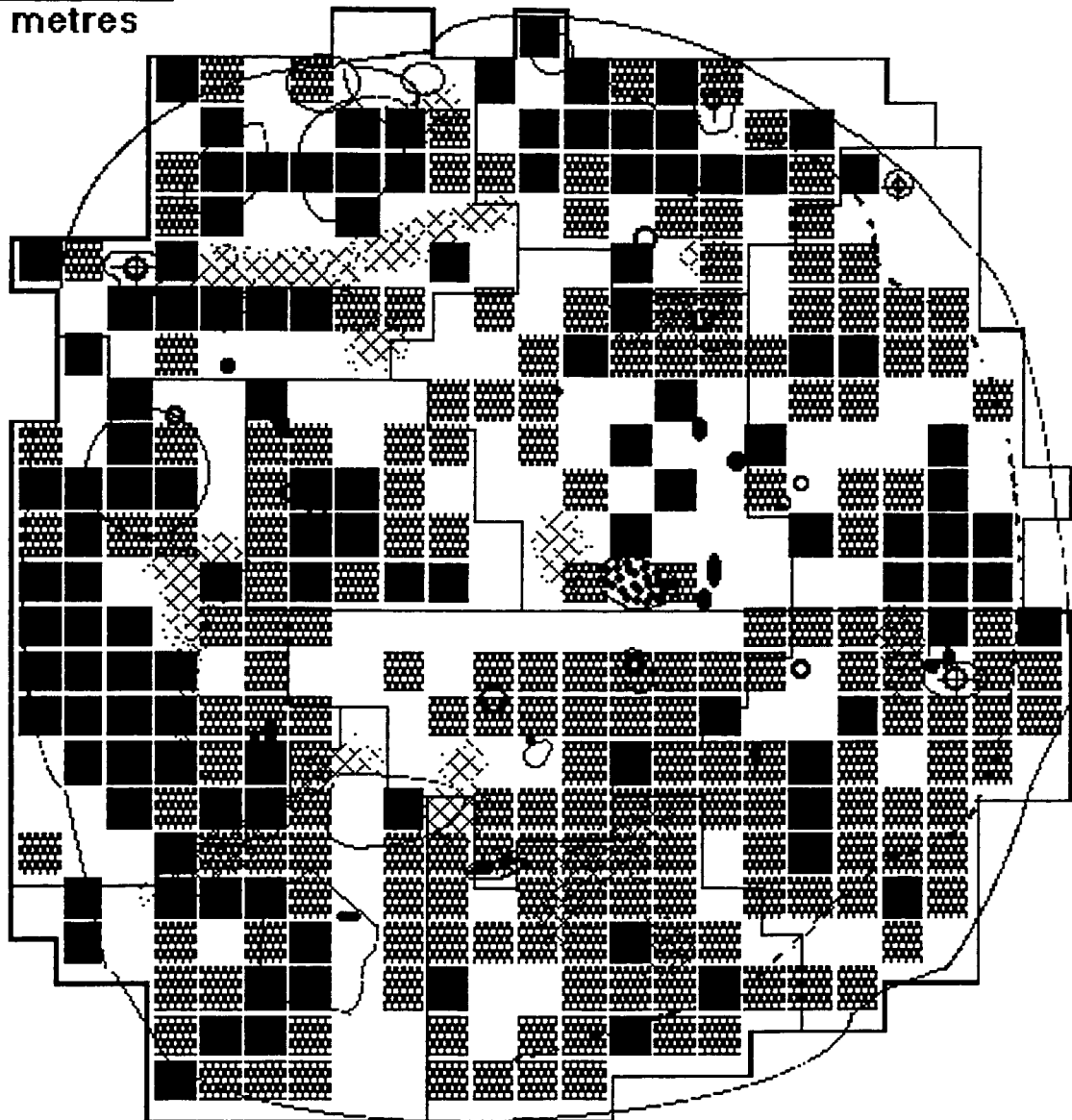
- - - edge of bench ⊕ pits used in latest occupation



— edge of floor








N
↑

Figure 3.21. Distribution of Size 2 (> 1cm ≤ 2cm) debitage on the floor of Housepit 7.

0  2
metres



Number of size 3 flakes	
	4 - 30
	1 - 3

	posthole		rocks
	fire-reddening		pits
	edge of bench		pits used in latest occupation
	edge of floor		

N
↑

Figure 3.22. Distribution of Size 3 (> 2cm ≤ 5cm) flakes on the floor of Housepit 7.

0  2
metres

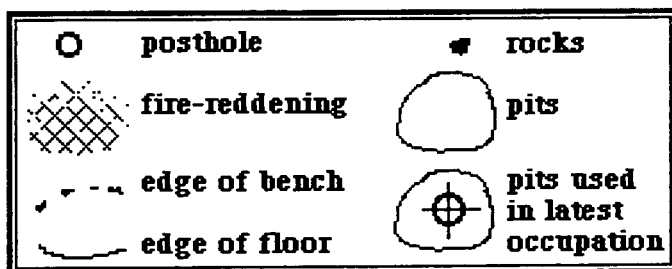
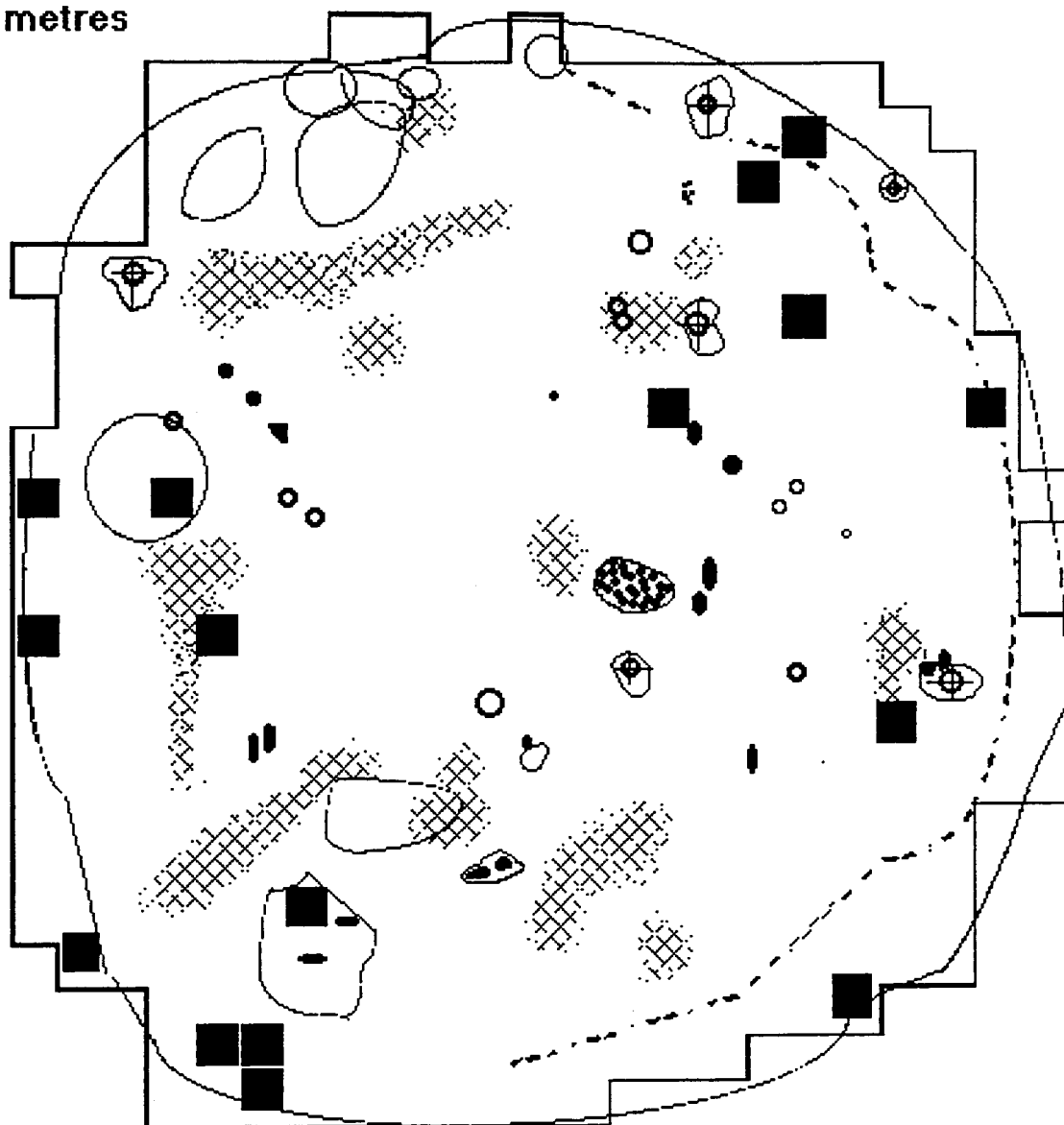


Figure 3.23. Distribution of Size 4 (> 5cm) debitage on the floor of Housepit 7.

the 1/4 inch (0.63 cm) mesh screens which were used in the excavation of this assemblage. So comparisons of the observed frequencies of flakes in this category may not be valid.

Size	Frequency	Percent
0 to 1 cm	499	9.6
> 1 cm < 2 cm	3265	63.1
> 2 cm < 5 cm	1396	27.0
> 5 cm	15	0.3
All Debitage	5175	100.0

Table 3.19. Absolute frequencies and percentage ofdebitage size categories on the floor of Housepit 7.

Sector	0 cm < 1 cm		> 1 cm < 2 cm		> 2 cm < 5 cm	
	Observed	Expected	Observed	Expected	Observed	Expected
SC	32	14.5	76	94.6	42	40.5
WC	26	30.7	193	200.6	99	85.8
EC	60	54.0	382	353.3	117	151.1
S	69	46.4	317	303.5	95	129.8
SW	33	52.0	333	340.1	169	145.4
W	61	77.4	496	506.6	242	216.6
NW	56	65.3	429	427.1	192	182.6
NE	24	39.4	239	258.1	144	110.3
E	52	62.5	425	408.8	169	174.8
SE	86	56.9	375	372.2	127	159.2
Chi-squared =	68.10			9.34		43.34
p <	0.001			0.500		0.001

Table 3.20. Observed and expected frequencies fordebitage in three size categories in the ten sectors of the floor of Housepit 7.

Expected frequencies fordebitage in the over 5cm category are too low to allow valid chi-squared tests so the probability of observed frequencies were determined using the binomial distribution. Table 3.20 lists the observed frequencies with the probabilities that equal or greater frequencies and equal or smaller frequencies would occur in a binomial distribution.

None of the observed frequencies in the > 5 cm category was improbably high at the 0.05 level though four large flakes in the Southwest sector is an improbably high frequency at the 0.10 level.

Sector	Observed frequency	Probability $k > \text{observed}$	Probability $k < \text{observed}$
South center	0	1.00	0.65
West center	0	1.00	0.40
East center	1	0.80	0.52
South	0	1.00	0.25
Southwest	4	0.07	0.99
West	4	0.21	0.91
Northwest	0	1.00	0.14
Northeast	2	0.33	0.88
East	2	0.56	0.71
Southeast	2	0.51	0.76

Table 3.21. Frequency of debitage with maximum dimension greater than 5 cm in the 10 sectors of the floor of Housepit 7 with probabilities based on an even distribution between sectors in proportion to the total debitage frequency in each sector.

Variability between sectors which is significant at the 0.05 level was found in the $> 2 \text{ cm} < 5 \text{ cm}$ category. Unexpectedly high frequencies of flakes in this size category were observed in the Southwest sector, the West sector, and, most notably, in the Northeast sector. The South, Southeast, and East Center sectors all have significantly fewer flakes than expected in this size category.

In the $< 1 \text{ cm}$ category, the South, Southeast, and, most notably, the South Center sectors have higher frequencies than expected. The Northeast and the Southwest have less debitage than expected in this category. While the observed frequencies of flakes in this category may not be reliable, due to the bias resulting from screen size, they do seem to exhibit a distribution complementary to the distribution of the $> 2 \text{ cm} < 5 \text{ cm}$ category. That is, the smaller flakes tend to be proportionately most abundant in sectors where large flakes are proportionately rare and vice versa. Mesodebitage frequencies in 109 one litre samples from the floor of Housepit 7 (Handly pers. comm.) indicate that small flakes seem to be relatively abundant in the South, Southeast, and Southwest sectors.

The $> 1 \text{ cm} < 2 \text{ cm}$ category does not exhibit significant variability even at the 0.25 level.

In general, the Northeast, Southwest, and West sectors, all of which are peripheral sectors, have more large flakes and fewer small flakes

than expected. The South and Southeast sectors have more small flakes and fewer large flakes. Apart from the heavy concentration of small flakes in the South Center and the scarcity of large flakes in the East Center, the three Center sectors, as well as the Northwest and East sectors, conform fairly closely to the expected frequencies.

In the West and Southwest sectors the high frequencies of large flakes occur in the context of high concentrations of debitage in general and are associated with higher than expected frequencies of fire-cracked rock. The Northeast sector, on the other hand, has more large flakes than expected but is poor in both debitage in general and fire-cracked rock.

Higher than expected frequencies of small flakes are associated with lower than expected frequencies of debitage in general in the South, South Center, and Southeast sectors. The South and Southeast are also considerably poorer than expected in large flakes. Fire-cracked rock is scarce in the Southeast but abundant in the South.

Overall, the association of high frequencies of debitage in general with high frequencies of large flakes and low frequencies of small flakes in the southern part and, to some extent, the central part of the floor suggests that cleaning and storage played an important role in creating this distribution. The South, South Center, and Southeast sectors appear to have been cleaned of debitage in general and large flakes in particular leaving higher than expected proportions of small flakes. Possible dumps or storage areas may be observed near the edge of the floor in the West and Southwest sectors (Figures 3.20, 3.21, 3.22, 3.23). Debitage concentrations in these areas are poor in small flakes and rich in large flakes which may have been culled from other areas of the floor.

Reviewing the earlier interpretation of the distribution of fire-cracked rock in the light of these concentrations, it seems less likely that periphery of the floor was reserved as a sleeping area in the West and Southwest sectors unless sleeping benches or platforms were used. The eastern periphery and the periphery of the South sector remain open to this interpretation.

The Northeast sector also has a higher than expected frequency of large flakes and a lower than expected frequency of small flakes but

its frequency of debitage in general is somewhat less than expected. Whether this indicates dumping and/or storage of debitage in this sector or some other process of lithic manufacturing or utilization may be revealed in the analyses of other categories of debitage.

Cortex-bearing flakes

Flakes with cortex on more than 30% of their dorsal surfaces were classified as cortex-bearing flakes. Five percent (5%) of the lithic assemblage from the floor of Housepit 7 falls into this category.

Cortex on flakes has been interpreted as an indicator of the earlier stages of lithic reduction. Unexpectedly high frequencies of flakes with cortex may indicate that some sectors were preferentially used for primary reduction of cobble cores or they may be associated bipolar reduction of cortex-bearing pebbles.

Analyses of the distributions of flake types, as well as those of debitage size categories, will be important in understanding the distribution of cortex-bearing flakes so interpretations of this distribution will be considered in the context of the interpretations of flake type distributions, to be presented below. Table 3.22 shows the observed and expected frequencies for cortex-bearing flakes

Sector	Observed frequency of cortex-bearing flakes	Expected frequency of cortex bearing flakes
South Center	7	7.42
West Center	10	15.73
East Center	22	27.70
South	23	23.79
Southwest	22	26.66
West	43	39.72
Northwest	46	33.49
Northeast	33	20.23
East	28	32.06
Southeast	22	29.19

Chi-squared with 9 degrees of freedom = 19.41 $p < 0.025$

Table 3.22 Observed and expected frequencies of cortex bearing flakes in the ten sectors of the floor of Housepit 7.

Proportionately, the greatest discrepancies between the observed

and expected values are in the Northeast and Northwest sectors, where there are more cortex-bearing flakes than expected. The value for the Southwest is slightly greater than expected, as well. All of the remaining sectors have observed values which are less than expected.

Flake type

In Housepit 7, as in Housepit 3, debitage from the floor deposits was sorted into the following six flake type categories: primary flakes, secondary flakes, large billet flakes, small billet flakes bipolar flakes, and shatter. The absolute and relative frequencies of each of these types in the lithic assemblage from the floor of Housepit 7 is shown in Table 3.23.

Flake Type	Frequency	Proportion
Secondary flakes	3974	0.77
Primary flakes	549	0.11
Small billet flakes	402	0.08
Shatter	115	0.02
Large billet flakes	127	0.02
Bipolar flakes	55	0.01

Table 3.23 Absolute and relative frequencies of flake types on the floor of Housepit 7.

The recognition of significant variability between sectors in the distributions of these flake types will be helpful in identifying areas which were preferentially used for particular processes of lithic reduction, technological processes employing particular types of stone tools, or storage of potentially useful flakes.

Observed and expected frequencies for the six flake types are presented in Table 3.24

All of the flake types except large billet flakes exhibit variability in their distribution between sectors which is significant beyond the 0.05 level.

Primary flakes are much more abundant than expected in the Northeast sector and, to a lesser extent, in the Northwest, West, Southwest, and West Center sectors. They are unexpectedly rare in the South sector, the Southeast sector, and to a lesser extent in the

the East Center sector. Generally, sectors with unexpectedly high frequencies of primary flakes also have unexpectedly high

Sector	Primary flakes		Large billet flakes		Small billet flakes	
	Observed	Expected	Observed	Expected	Observed	Expected
SC	9	15.91	3	3.68	13	11.65
WC	44	33.74	11	7.80	52	24.70
EC	41	59.41	15	13.74	47	43.50
S	28	51.03	3	11.80	28	37.36
SW	71	57.18	21	13.23	57	41.87
W	101	85.19	18	19.71	45	62.38
NW	90	71.82	20	16.61	49	52.59
NE	67	43.39	5	10.04	6	31.77
E	61	68.74	22	15.90	56	50.34
SE	37	62.59	9	14.48	49	45.83
Chi-squared = 57.26			20.46		65.26	
with 9 degrees of freedom						
p < 0.001			0.025		0.001	

Sector	Bipolar flakes		Shatter		Secondary flakes	
	Observed	Expected	Observed	Expected	Observed	Expected
SC	4	1.59	10	3.33	111	115.19
WC	3	3.38	9	7.07	199	244.20
EC	0	5.95	14	12.44	443	430.04
S	2	5.11	16	10.69	404	369.37
SW	4	5.73	13	11.98	373	413.91
W	3	8.53	13	17.84	621	616.64
NW	21	7.20	18	15.04	528	519.88
NE	4	4.35	5	9.09	322	314.08
E	5	6.89	7	14.40	497	497.61
SE	9	6.27	10	13.11	476	453.07
Chi-squared = 43.85			19.41		17.72	
with 9 degrees of freedom						
p < 0.001			0.050		0.050	

Table 3.24 Observed and expected frequencies of flake types on the floor of Housepit 7.

frequencies of flakes in the > 2 cm < 5 cm size category. Frequencies of chert and chalcedony flakes are also unexpectedly high in the W, SW, and WC sectors and close to the expected value in the NW sector. Debitage in general tends to be at least as abundant as expected in the same sectors. The Northeast sector is an exception to this pattern in that it is relatively poor in debitage in general and in chert and chalcedony flakes in particular yet exceptionally rich in primary

flakes.

These observations are reasonably consistent with the preceding discussion of size category distributions, which interpreted concentrations of debitage with disproportionate frequencies of large flakes, along the western periphery of the floor, as evidence that debitage was stored or dumped in this area. Very probably, an area near the western edge of the floor was also an important locus for lithic reduction. The disproportionately high frequencies of chert and chalcedony flakes in several of the western peripheral sectors suggests that these materials, in particular, were frequently worked in these sectors. In the same section, it was suggested that flakes selected for utility in some activity were imported into the Northeast sector, which was seen to be relatively poor in debitage and fire-cracked rock but rich in large flakes. The unexpectedly high frequency of primary flakes in this sector is also consistent with this interpretation. Cortex bearing flakes are excluded from the primary flake category but the high value for cortex-bearing flakes in the Northeast sector may simply reflect the high value for flakes in the $2 \text{ cm} \leq 5 \text{ cm}$ size category.

For small billet flakes, the greatest proportionate discrepancy between observed and expected frequencies is in the West Center sector, which has more than expected. The observed frequency of small billet flakes in the West sector is also unexpectedly high. Unexpectedly low frequencies of small billet flakes were observed in the Northeast sector and, to a lesser extent, the Northwest sector. There is no obvious association of small billet flakes with any of the size categories or raw material types.

Bipolar flakes are clearly concentrated in the Northwest sector where they are associated with a higher than expected frequency of cortex-bearing flakes.

Shatter is unexpectedly abundant in the South Center sector and, to some extent, in the South sector. It is correspondingly rare in the East sector. This distribution is difficult to interpret given the relative scarcity of debitage in the sectors where shatter is most abundant. It may be that most of the shatter in this assemblage is small enough that it was left *in situ* in sectors which were cleared of

larger debitage.

Secondary flakes, the most common category, tend to be relatively scarce where the next most important categories (primary flakes and small billet flakes) are relatively abundant. That is, in the West Center and Southwest sectors. Conversely, in the South sector and the East Center sector, secondary flakes are relatively abundant while the observed frequencies of primary flakes and small billet flakes are below or, at most, near the the expected values.

Each of these distributions suggests that certain sectors were preferentially used for certain processes of lithic reduction; bifacial retouch in the West and West Center sectors and bipolar reduction in the Northwest sector, for example. Analyses of the distributions of modified artifact types will help to identify the contexts in which these methods of reduction were employed.

Modified Artifacts

As in the case of debitage, expected frequencies of all modified artifacts in each of the ten sectors of the floor of Housepit 7 are based on an even distribution by area.

Sector	Number of subsquares	Observed number of modified artifacts	Expected number of modified artifacts	$(O-E)^2/E$
SC	41	28	71.57	26.52
WC	27	74	47.13	15.32
EC	48	100	83.79	3.14
S	49	32	85.54	33.51
SW	43	83	75.06	0.84
W	50	108	87.28	4.92
NW	56	91	97.75	0.47
NE	37	70	64.59	0.45
E	51	107	89.03	3.63
SE	54	103	94.26	0.81
Total	456	796		

Chi-squared = 89.60
 with 9 degrees of freedom
 p < 0.001

Table 3.25 Observed and expected frequencies of modified artifacts in the ten sectors of the floor of Housepit 7.

The observed and expected frequencies are presented in Table 3.25.

While the chi-squared statistic indicates that the sectors do vary significantly, much of this variability seems to be attributable to the very low frequencies in the South and South Center sectors. In fact, as Table 3.26 shows, the remaining sectors exhibit variability which is not significant at the 0.05 level.

If either the lower than expected frequency for the Northwest sector or the higher than expected frequency for the West Center sector is excluded from this distribution the probability of the observed variability between the remaining seven sectors increases to more than 0.25.

The general pattern, then, is one of similarity between most sectors in terms of total number of modified artifacts. This pattern is apparent in Figure 3.24. Subsquares with unexpectedly high modified artifact frequencies are present in all of the sectors except the South and South Center sectors.

Sector	Number of subsquares	Observed number of modified artifacts	Expected number of modified artifacts	(O-E) ² /E
WC	27	74	54.30	7.15
EC	48	100	96.52	0.13
SW	43	83	86.47	0.14
W	50	108	100.55	0.55
NW	56	91	112.61	4.15
NE	37	70	74.40	0.26
E	51	107	102.56	0.19
SE	54	103	108.59	0.29
Total	366	736		

Chi-squared = 12.86
 with 7 degrees of freedom
 p = 0.0755

Table 3.26 Observed and expected modified artifact frequencies in seven of the ten sectors of the floor of Housepit 7. The South and South Center sectors, which have very low modified artifact frequencies in proportion to their areas, have been excluded in this analysis.

0  2
metres

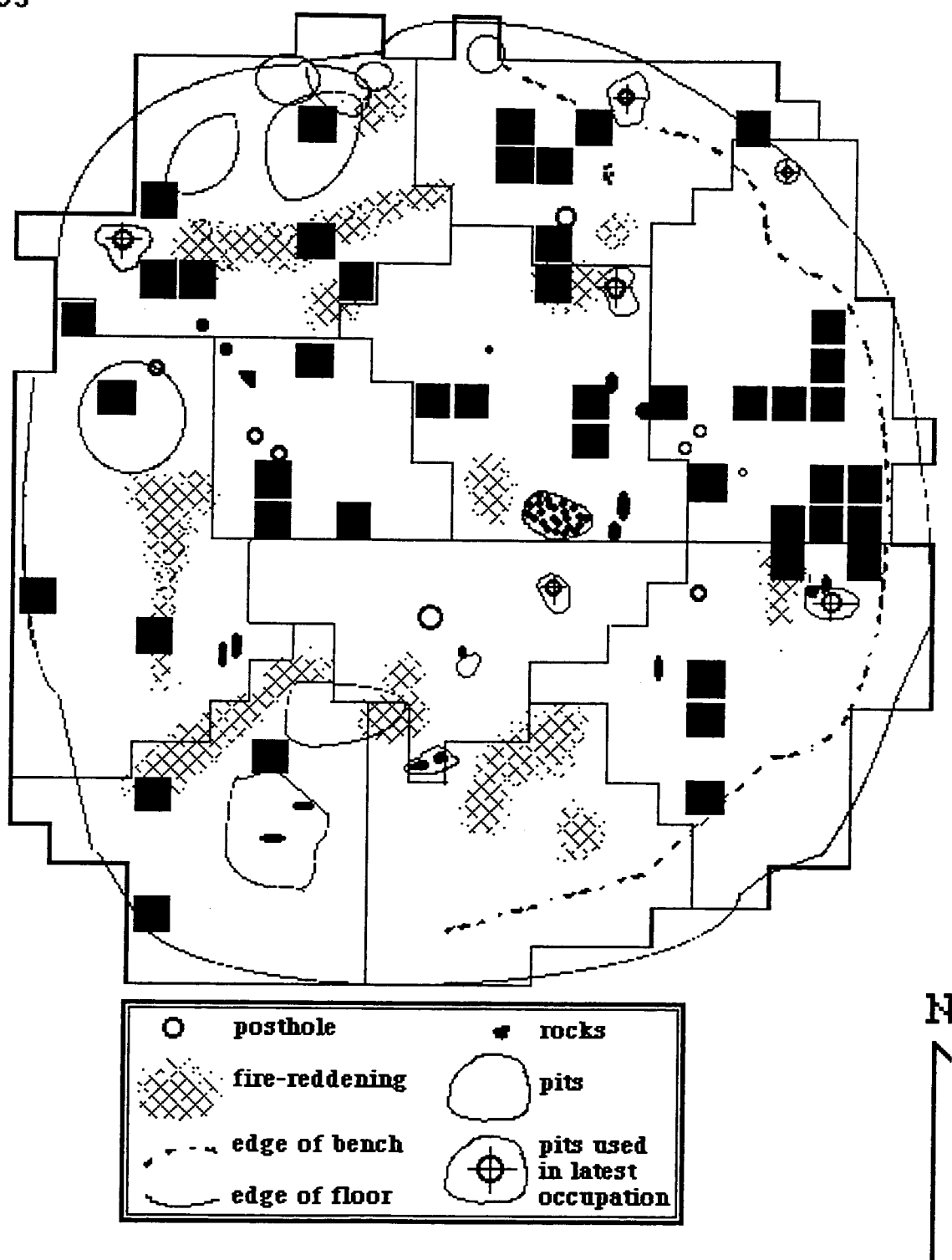


Figure 3.24. Distribution, on the floor of Housepit 7, of subsquares with artifact frequencies > 7 . The probability of these frequencies in a random distribution is less than 0.05.

The South and South Center sectors, which depart most from the overall pattern of similarity between sectors, are distinctive in terms of other distributions, as well. Both have much less debitage and much more fire-cracked rock than would be expected in an even distribution by area. Both have considerably lower than expected frequencies of primary flakes and higher than expected frequencies of shatter. Flakes with a maximum dimension less than or equal to 1 cm are also unexpectedly abundant, though these data are suspect, as was noted above.

The South sector is distinguished from the South Center, and from several other sectors, by an unexpected abundance of chert or chalcedony flakes (see Table 3.18) and lower than expected frequencies of both sizes of billet flakes (see Table 3.24).

In fact, despite the general similarity of the remaining eight sectors in terms of the distribution of the total number of modified artifacts, all of the ten sectors exhibit considerable variability in the distributions of fire-cracked rock and/or the various categories of debitage which were analyzed in preceding sections. Some of the observed differences were interpreted as evidence that certain sectors may have been preferentially selected for certain activities. If this were the case, some the modified artifact types which were categorized as functionally distinctive in Chapter 2 could be expected to be unevenly distributed between the ten sectors.

Distributions of functional types

While the South and South Center sectors do differ significantly from the remainder of the floor in terms of the frequency of modified artifacts in general, this does not preclude the possibility that all of the sectors were used for essentially similar purposes. The observed differences in overall artifact frequencies may reflect differences in the intensity with which different sectors were used or may simply indicate which areas of the floor were cleaned most recently. Even the significant variability observed in the distribution of most debitage categories is not a conclusive indication of regularly patterned behavior. A large proportion of flakes in any sector could

have been deposited during the manufacture of a single biface or the reduction of a single core. Variability in the distribution of debitage and fire-cracked rock may also be the result of different stages of a clean-up process in different sectors of the floor.

On the other hand, the lack of variability in total modified artifact frequencies between most sectors is not inconsistent with the proposition that some sectors were preferentially selected for certain activities. As in the preceding analysis of Housepit 3, it is argued here that sectors used for different activities should contain functionally distinct types of modified artifacts in significantly different proportions, relative to the number of modified artifacts in each sector. If all of the functional artifact types occur in every sector in proportions which are not significantly different from the proportions in which they occur on the floor as a whole, there will no grounds to argue that different areas of the floor were used for different purposes. This is the null hypothesis. Confirmation of the null hypothesis may mean that there were no discernible differences between different areas of the floor in terms of the activities which occurred there. Alternatively, it may simply mean that the sectors and/or the artifact types which were defined for this study have little meaning in the context of different activities which occurred in different areas of this floor.

Thus, it is 'expected', under the null hypothesis, that functionally distinct types of modified artifacts will be evenly distributed in proportion to the number of artifacts in each sector. Statistically significant departures from this expectation will be interpreted as evidence that different sectors were preferred for different activities.

Examples of twenty-five functionally distinct artifact types were identified on the floor of Housepit 7. The frequency of each type in each of the five sectors is listed in Table 3.27.

As in the analysis of Housepit 3, an "underlying tool distribution" was identified. In Housepit 7, the underlying tool distribution consists of those modified artifact types which are common to all sectors except sectors with significantly fewer modified artifacts than expected, that is, the South and South Center sectors.

Artifact type	Sector										Total
	SC	WC	EC	S	SW	W	NW	NE	E	SE	
Utilized flakes	6	29	35	9	24	23	31	12	30	29	228
Acute expedient	2	9	8	6	9	16	9	15	21	10	105
Heavy scrapers	0	7	10	3	5	30	6	12	13	14	100
Expedient scrapers	3	8	7	2	10	4	13	7	3	10	67
Miscellaneous	3	5	9	1	7	7	5	5	9	5	56
Bipolar cores	0	4	3	1	3	1	3	4	6	5	30
Bifaces	2	2	4	0	5	4	4	3	1	5	30
Kamloops points	2	1	4	0	2	5	6	1	5	3	29
Endscrapers	2	1	3	0	4	3	3	5	3	3	27
Notches	2	1	3	0	3	3	0	1	1	4	18
Sm notches	0	2	7	1	3	0	0	0	1	3	17
Cores	2	1	0	2	2	2	3	2	0	0	14
Other points	0	1	0	1	0	2	1	1	5	2	13
Small piercers	0	0	3	0	0	2	4	0	1	2	12
Spall tools	0	2	1	0	0	0	0	0	2	5	10
Borers&perforators	2	0	1	1	0	1	1	1	1	0	8
Abraders	1	0	2	0	1	1	0	0	0	3	8
Hammerstones	0	1	0	1	1	2	1	0	1	0	7
Key-shaped	0	0	0	2	0	0	0	1	2	0	5
Pieces esquillee	0	0	0	0	1	1	0	0	1	0	3
Bifacial knives	0	0	0	1	1	0	0	0	1	0	3
Core rejuvenation	1	0	0	0	0	0	1	0	0	0	2
Pounding stone	0	0	0	0	1	0	0	0	0	0	1
Jade ornament	0	0	0	0	1	0	0	0	0	0	1
Bead	0	0	0	1	0	0	0	0	0	0	1
Abraded cobble	0	0	0	0	0	1	0	0	0	0	1
Total	28	74	100	32	83	108	91	70	107	103	796

Table 3.27. Frequencies of functionally distinct modified artifact types in the ten sectors of the floor of Housepit 7.

The areas of the remaining eight sectors are quite variable. Despite containing similar frequencies of modified artifacts in proportion to their areas, these sectors vary considerably in terms of the absolute frequencies of all modified artifacts. In Housepit 7, the underlying tool distribution is, therefore, quantified in terms of percentages rather than absolute frequencies. For example, the minimum percentage of utilized flakes among the modified artifacts in any sector other than the South and South Center sectors, is 17.14%. Thus, in each sector, the number of utilized flakes which constitutes 17.14% of the artifacts in that sector is attributed to the underlying distribution. Any remaining utilized flakes in the sector are attributed to the overlying distribution. One hundred (100) modified lithic artifacts were found in the East Center sector, including 35 utilized flakes. Any fractional values greater than or equal to 0.01

artifacts were rounded-up so 18 (the smallest whole number which represents at least 17.14% of 100) of the utilized flakes in the Southeast sector were attributed to the underlying tool distribution.

<u>Artifact type</u>	<u>% of tools on entire floor</u>	<u>% attributed to the underlying distribution</u>
Utilized flakes	22.61	17.14
Acute expedient	12.94	8.00
Heavy scrapers	12.56	6.02 absent in South Center
Miscellaneous	7.03	3.12
Expedient scrapers	8.42	2.80
Endscrapers	3.27	1.35
Kamloops points	3.64	1.35
Bifaces	3.77	0.93
Bipolar cores	3.77	0.93
<u>Notches</u>	<u>4.40</u>	<u>1.43 absent in NW</u>
Totals	82.41	43.07

Table 3.28 Percentage of all modified artifacts on the floor of Housepit 7 represented by the modified artifact types which occur in the underlying distribution and the percentage of the artifacts in each which is represented by the artifacts of each type which are attributed to the underlying distribution .

Not surprisingly, the modified artifact types included in the underlying distribution are those which are most abundant in the assemblage as a whole. As was suggested in the analysis of modified artifact distributions for the floor of Housepit 3, most of these types are expedient flake tools with applications in a variety of tasks including day-to-day domestic activities. Other more specialized tool types are also represented in the underlying tool distribution, specifically bifaces, endscrapers and Kamloops points. The percentage of both the underlying tool distribution and the entire assemblage which are represented by each of the included modified artifact types is recorded in Table 3.28. (Notches have been included in the underlying tool distribution despite their absence in the Northwest sector because they represent more than one percent of the modified lithic artifacts in all of the nine remaining sectors.)

As it turns out, the underlying tool distribution is almost fully represented in all ten sectors, including the South and the South

Center. The only exceptions are: the South Center sector, which lacks two heavy scrapers and the Northwest sector which lacks one notch.

While the underlying tool distribution described in Table 3.28 accounts for only 44.35% of the assemblage, artifacts attributed to the underlying tool distribution account for between 45.7% and 53.2% of the modified lithic artifacts in any given sector. This is due to rounding-up of the artifact counts as discussed on the preceding page. The actual percentage of all modified lithic artifacts in each sector attributed to the underlying tool distribution (with rounding-up) is shown in Table 3.29.

Sector	SC	WC	EC	S	SW	W	NW	NE	E	SE
% of artifacts in sector attributed to underlying distribution	50.0	48.6	50.0	48.4	53.2	48.2	45.7	48.6	45.7	49.0

Table 3.29 Percentages of modified artifacts in each sector attributed to underlying distribution.

To summarize, as in Housepit 3, roughly half of the modified artifacts in each of the ten sectors and on the floor as whole are accounted for in the underlying distribution. Most of these are expedient flake tools with applications in many activities including domestic activities. Bifaces, which have been interpreted as portable tools likely to be curated, Kamloops points, which have been associated with hunting, and endscrapers, which have been associated with hide-working, are also present in most sectors. The ubiquitous distribution of certain types of both expedient and specialized tools strongly suggests that some activities were common to all sectors of the floor and, presumably, to groups residing in them.

On the other hand, roughly 50% of the modified artifacts in every sector represent ways in which that sector differs from other sectors. The modified artifacts not accounted for in the underlying tool distribution are shown in Table 3.30. and represented graphically in Figure.3.25.

The frequencies of several of the more common artifact types which are not accounted for in the underlying tool distribution vary considerably from sector to sector. Many specialized types of modified artifacts are not represented in the underlying tool distribution at all. While many of these artifact types are too rare to have occurred in every sector, some types may have been preferentially deposited in certain sectors in the course of activities which involved their use. To assess this possibility it is necessary to determine whether the distributions of some types of modified artifacts do, in fact, differ significantly from what would be expected if artifacts of each type were deposited at random with an equal probability of occurring in any sector.

Of all the modified artifact types identified as functionally distinct, only utilized flakes were sufficiently abundant to allow valid chi-squared comparisons between the frequencies in the ten sectors. In the interests of comparability and consistency, the probabilities of the total observed frequencies of utilized flakes, as well as those for the other functional categories, were, therefore, determined from the binomial distribution. The results of these tests are summarized in Table 3.31.

Improbable ($p < 0.05$) frequencies were recognized for utilized flakes, acute-edged expedient flake tools, expedient scrapers, heavily retouched scrapers, notches, drills and perforators, key-shaped scrapers, small piercers, spall tools, and early projectile point types. At the 0.10 significance level, abraders, cores and bipolar cores also occur in unexpected frequencies in some sectors.

The distributions of these artifact types are mapped in Figures 3.26 through 3.40. Visually, these distributions suggest that this floor may be divided into three zones. The first zone, which I will call the Outer zone, extends two to three meters from the wall along roughly

	SC	EC	WC	S	SW	W	NW	NE	E	SE
utilized flakes	9	29	35	9	24	(23)	31	(12)	30	29
"early" projectile point types	0	1	0	1	0	2	1	1	<u>5</u>	2
acute-edged expedient flake tools	2	9	(8)	6	9	16	9	<u>15</u>	<u>21</u>	10
expedient scrapers	3	8	7	2	10	(4)	<u>13</u>	7	(3)	10
heavily retouched scrapers	0	7	10	3	(5)	<u>30</u>	(6)	12	13	14
spall tools	0	2	1	0	0	0	0	0	2	<u>5</u>
small piercers	0	0	3	0	0	2	<u>4</u>	0	1	2
notches	2	3	<u>10</u>	1	6	3	(0)	1	2	7
drills and perforators	<u>2</u>	0	1	1	0	1	1	1	0	0
key-shaped scrapers	0	0	0	<u>2</u>	0	0	0	1	2	0
cores	<u>2</u>	1	0	<u>2</u>	2	2	3	2	0	0
bipolar cores	0	4	3	1	3	(1)	3	4	6	5
endscrapers	1	1	3	0	4	3	3	<u>5</u>	3	3
abraders	1	0	2	0	1	1	0	0	0	<u>3</u>
bifaces	2	1	3	0	3	4	3	2	(1)	4

Table 3.31 Frequencies by sector of modified artifact types which occur in improbable frequencies in at least one sector of the floor of Housepit 7. Frequencies with a probability less than or equal to 0.05 are underlined and printed in bold type. Frequencies with a probability greater than 0.05 but less than or equal to 0.10 are underlined but are printed in plain type. Improbably low frequencies at either level are enclosed in parentheses.

	SE	E	NE	NW	W	SW	S	EC	WC	SC
Utilized flakes
Acute expedient
Retouched scraper
Expedient scraper
Miscellaneous
Bipolar cores
Bifaces
Kamloops points
Notches
Indscrappers
Cores
Other points
Small piercers
Spall tools
Abraders
Hammerstones
Perforators
Key-shapes
Bifacial knives
Pieces esquillees
Core rejuvenation
Pounding stone
Abraded cobble
Jade ornament
Bead

Figure 3.25 Frequency distribution by sector for modified artifact types on the floor of Housepit 7. Each complete point (*) represents three artifacts. Partial points (-) represent one or two artifacts.

0  2
metres

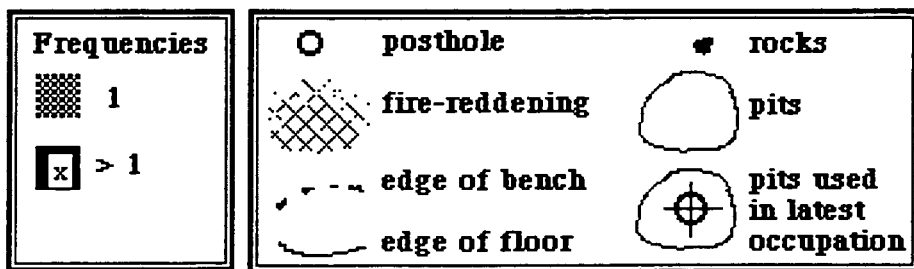
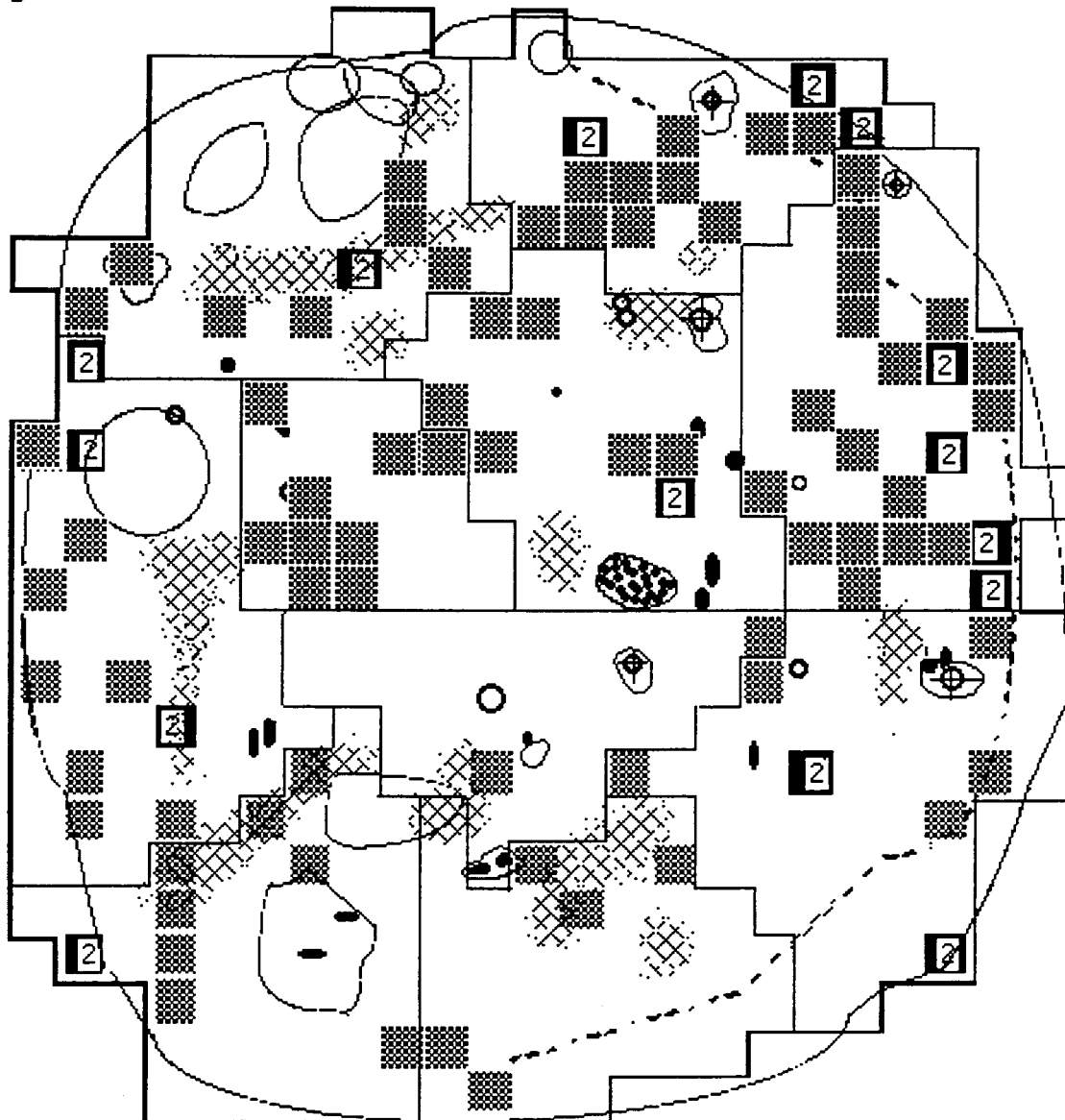


Figure 3.26. Distribution of acute-edged expedient flake tools the floor on the floor of Housepit 7.

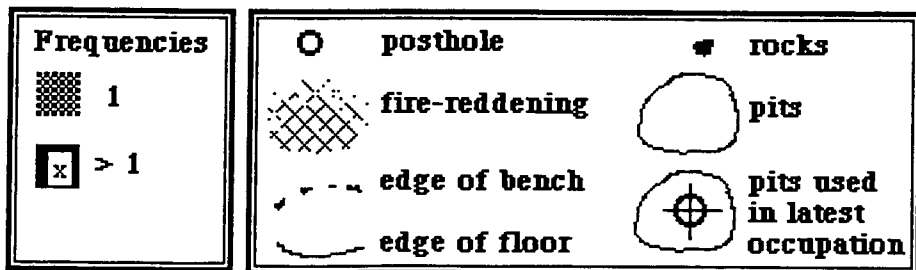
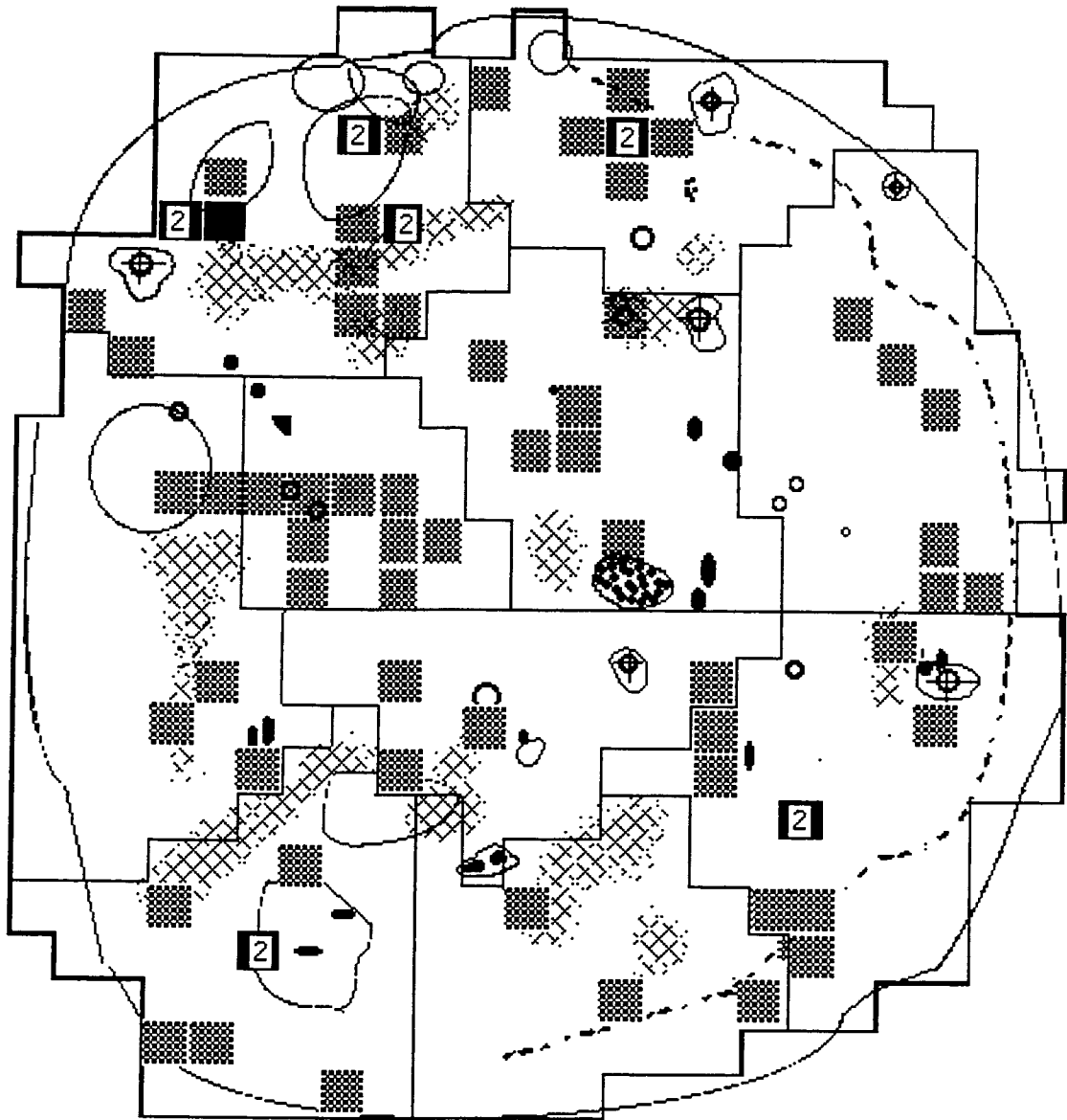


Figure 3.27. Distribution of expedient scrapers on the floor of Housepit 7.

0  2
metres

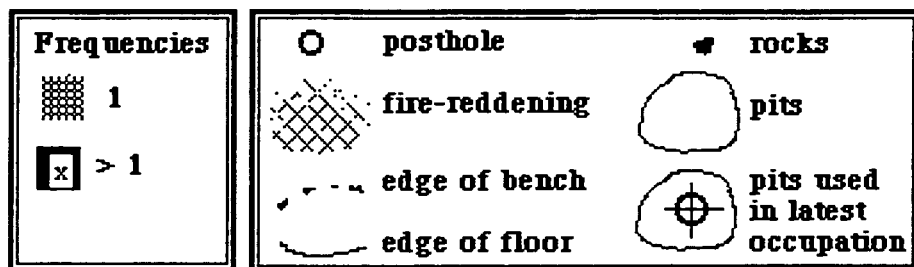
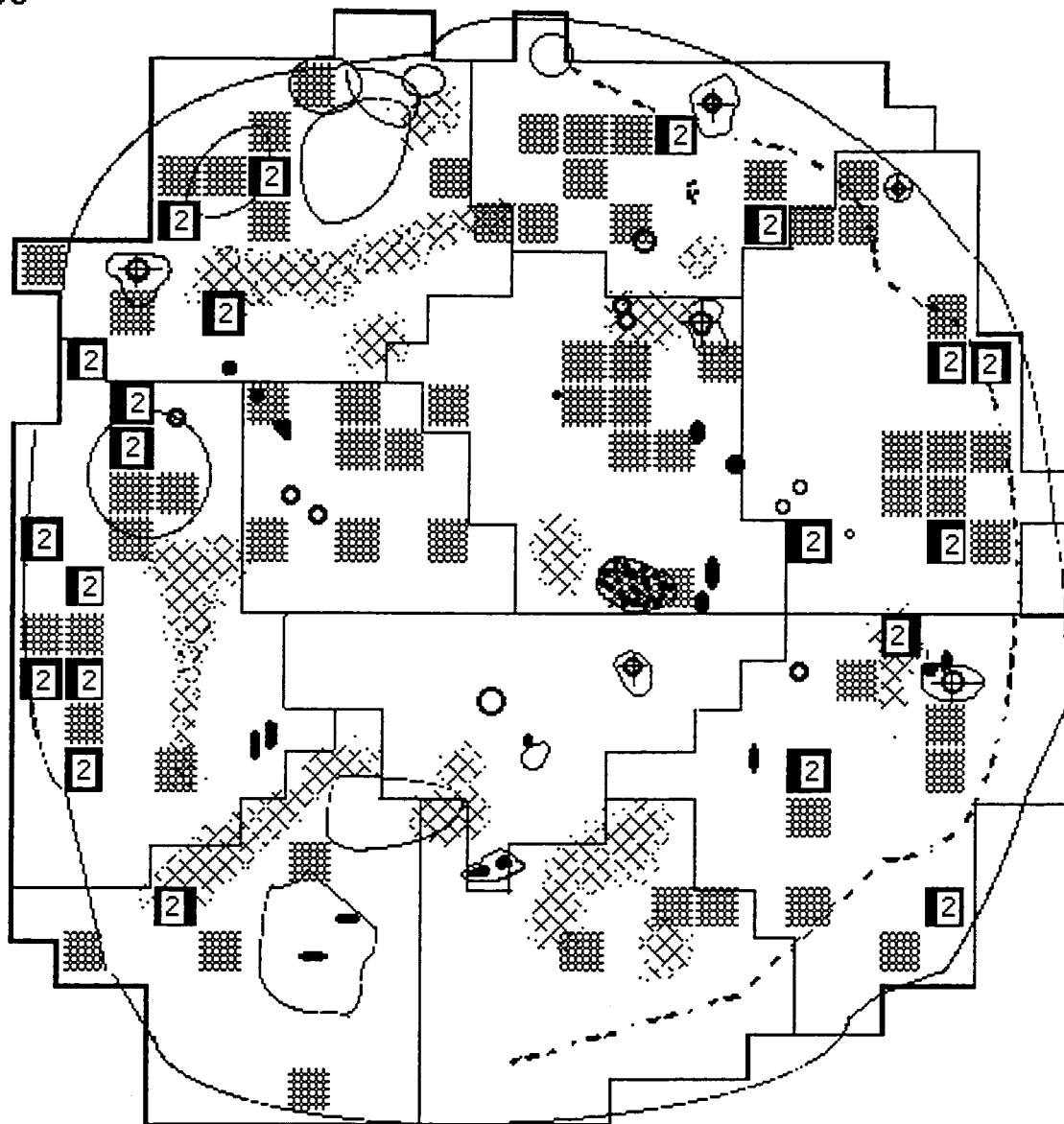


Figure 3.28. Distribution of heavily-retouched scrapers on the floor of Housepit 7.

0  2
metres

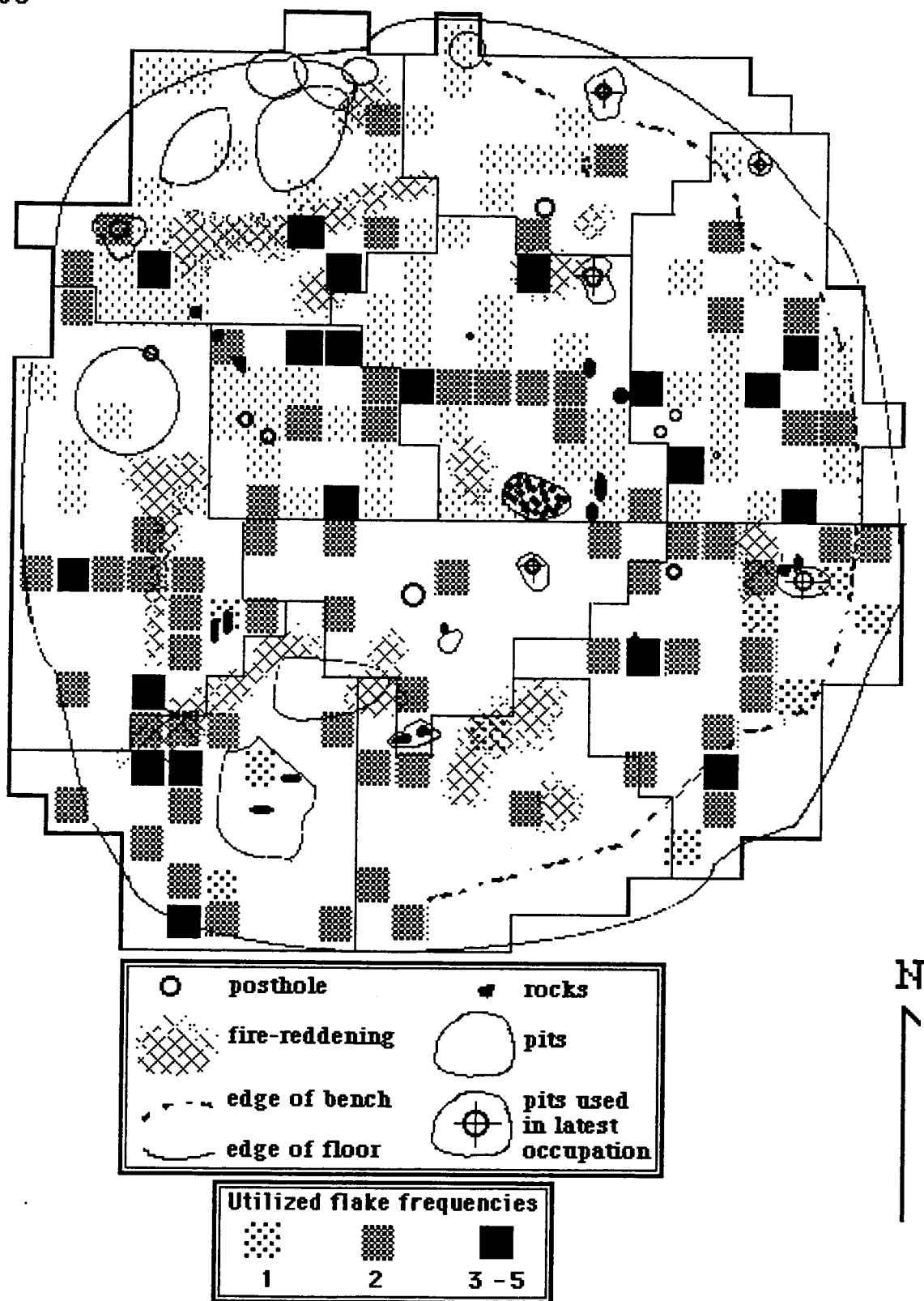


Figure 3.29. Distribution of utilized flakes on the floor of Housepit 7.

0  2
metres

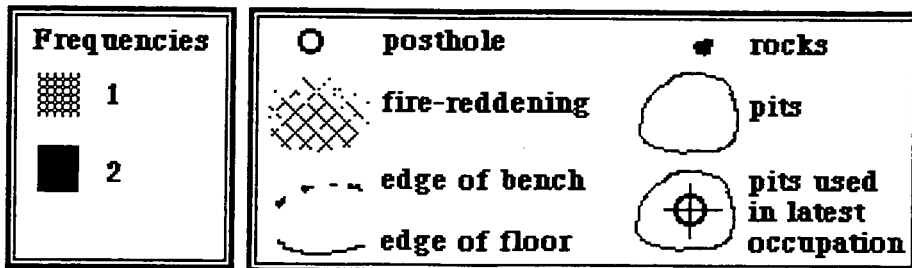
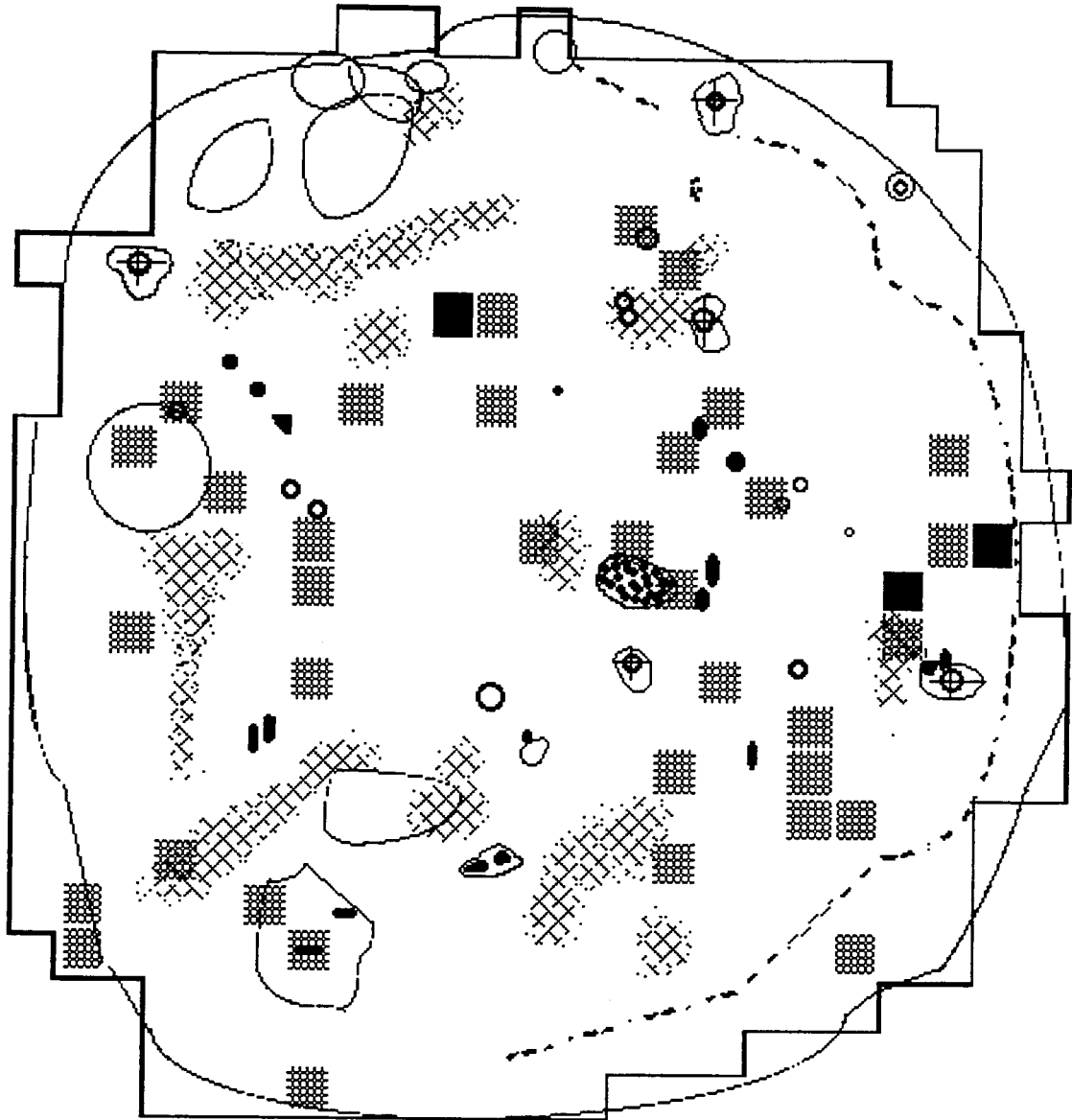


Figure 3.30. Distribution of notches on the floor of Housepit 7.

0  2
metres

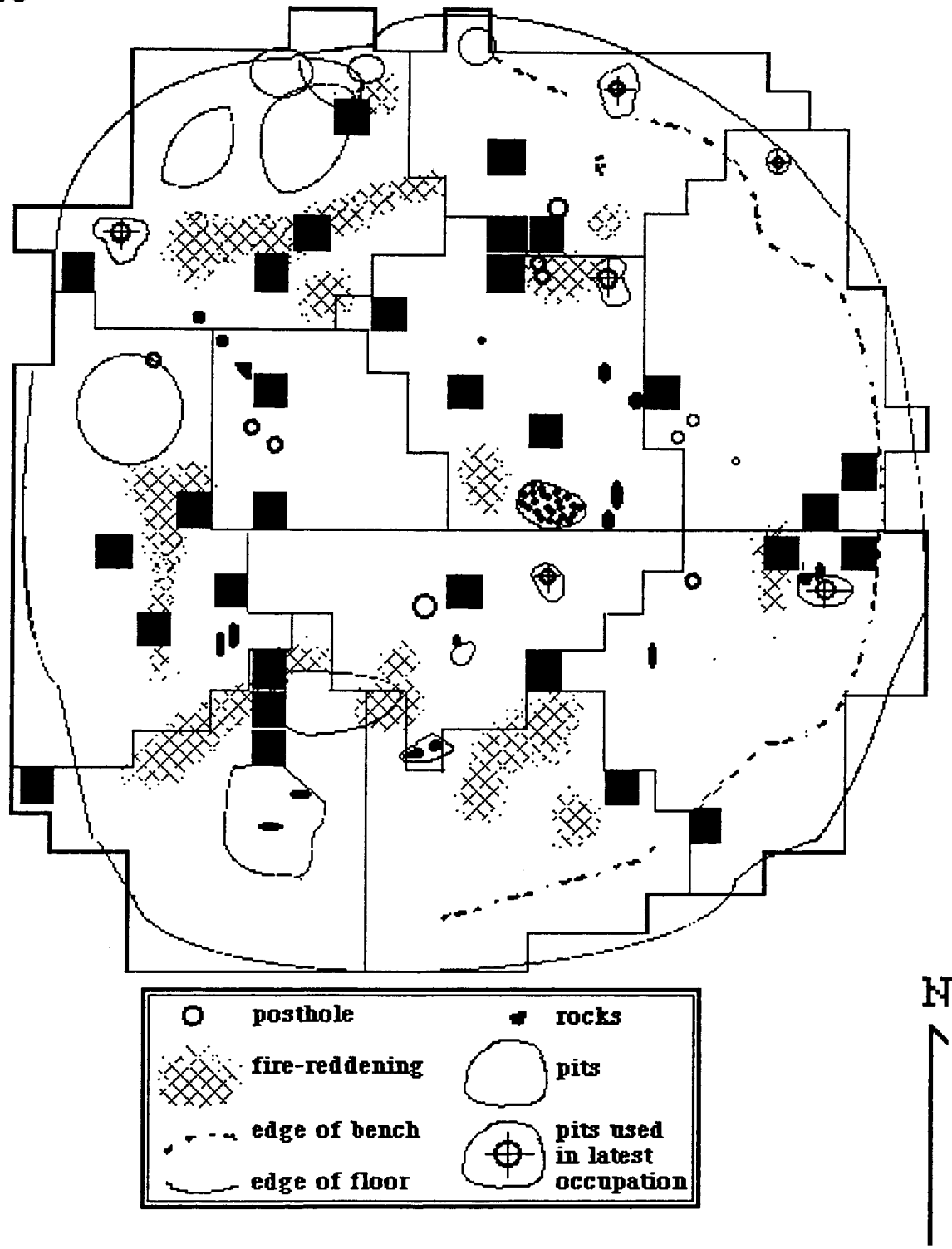


Figure 3.31. Distribution of bifaces on the floor of Housepit 7.

0  2
metres

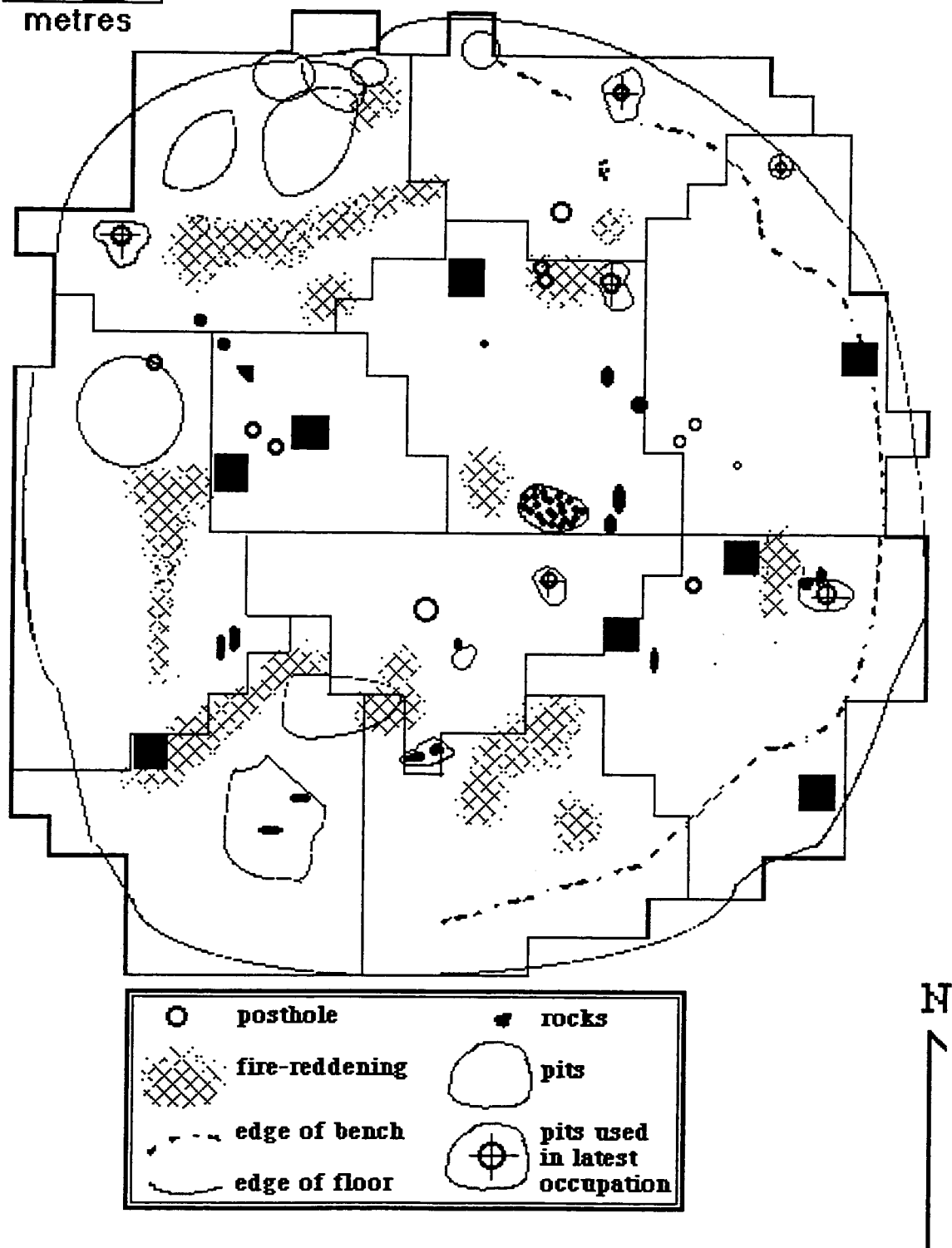


Figure 3.32. Distribution of spall tools on the floor of Housepit 7.

0 2
metres

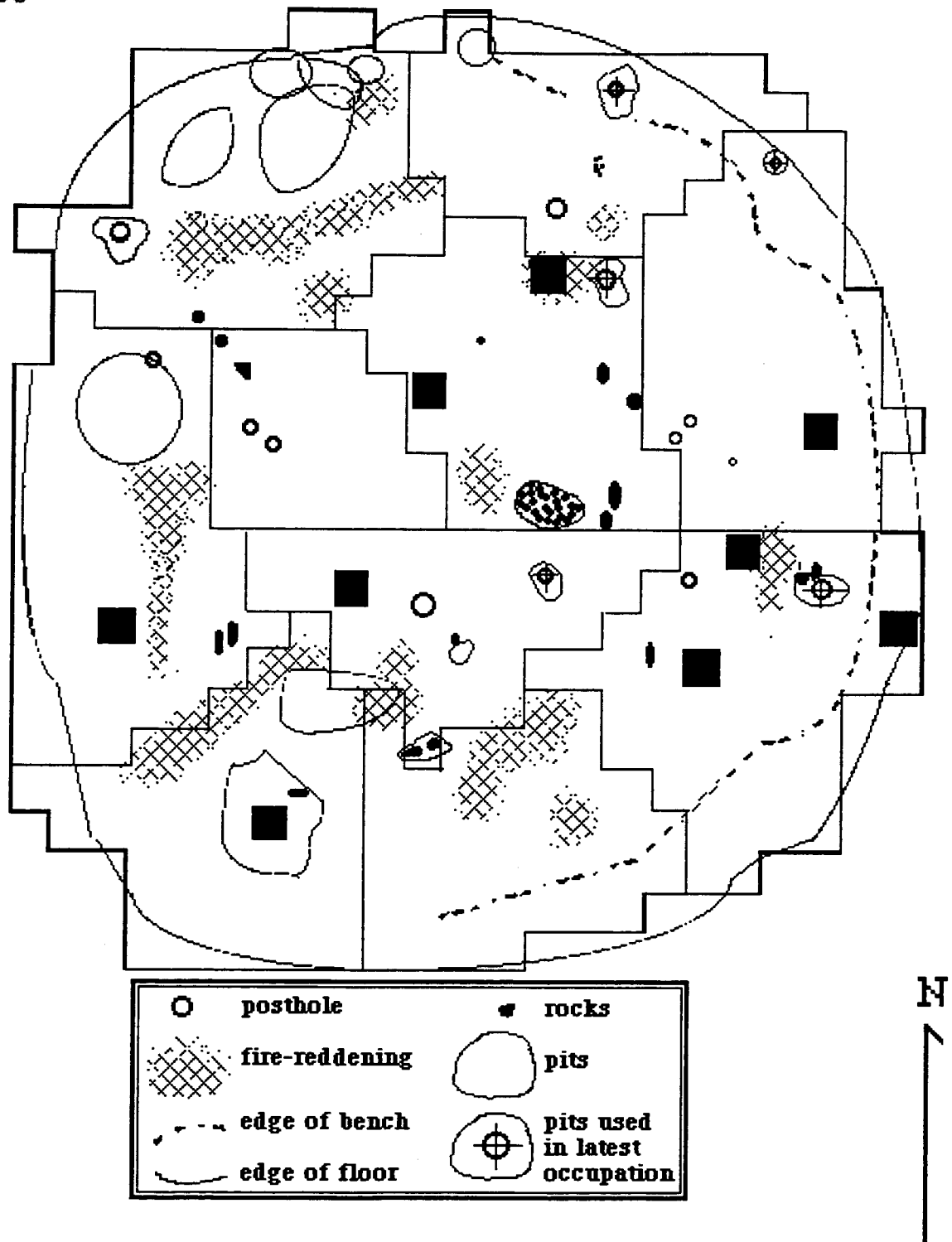


Figure 3.33. Distribution of abraders on the floor of Housepit 7.

0  2
metres

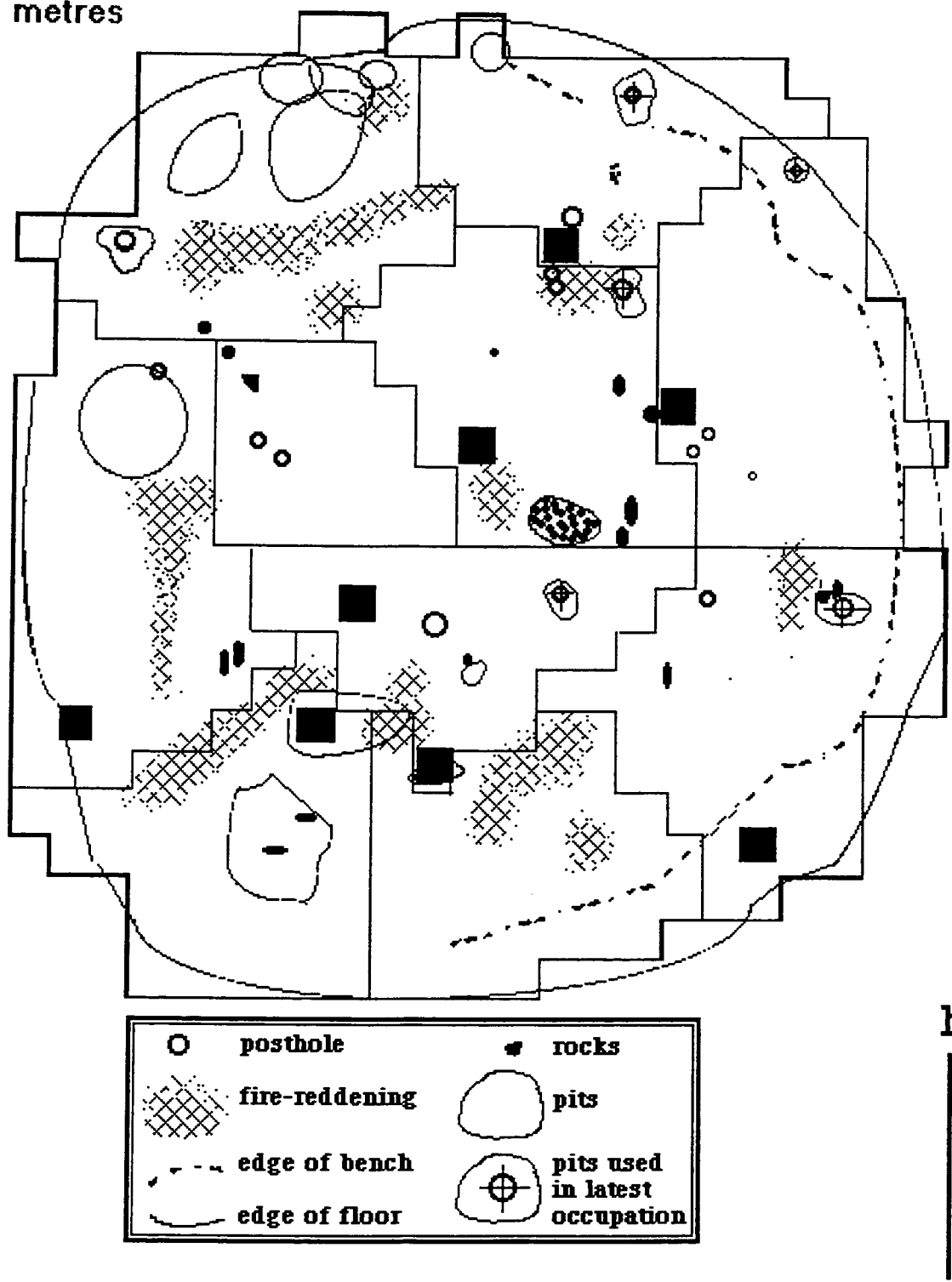
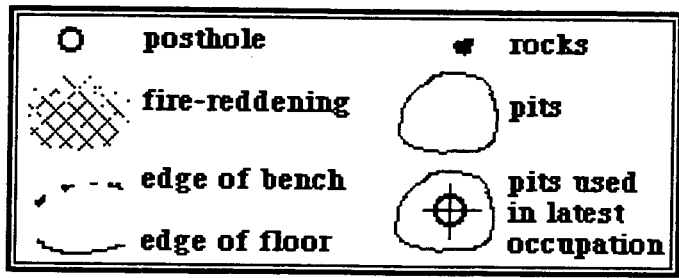
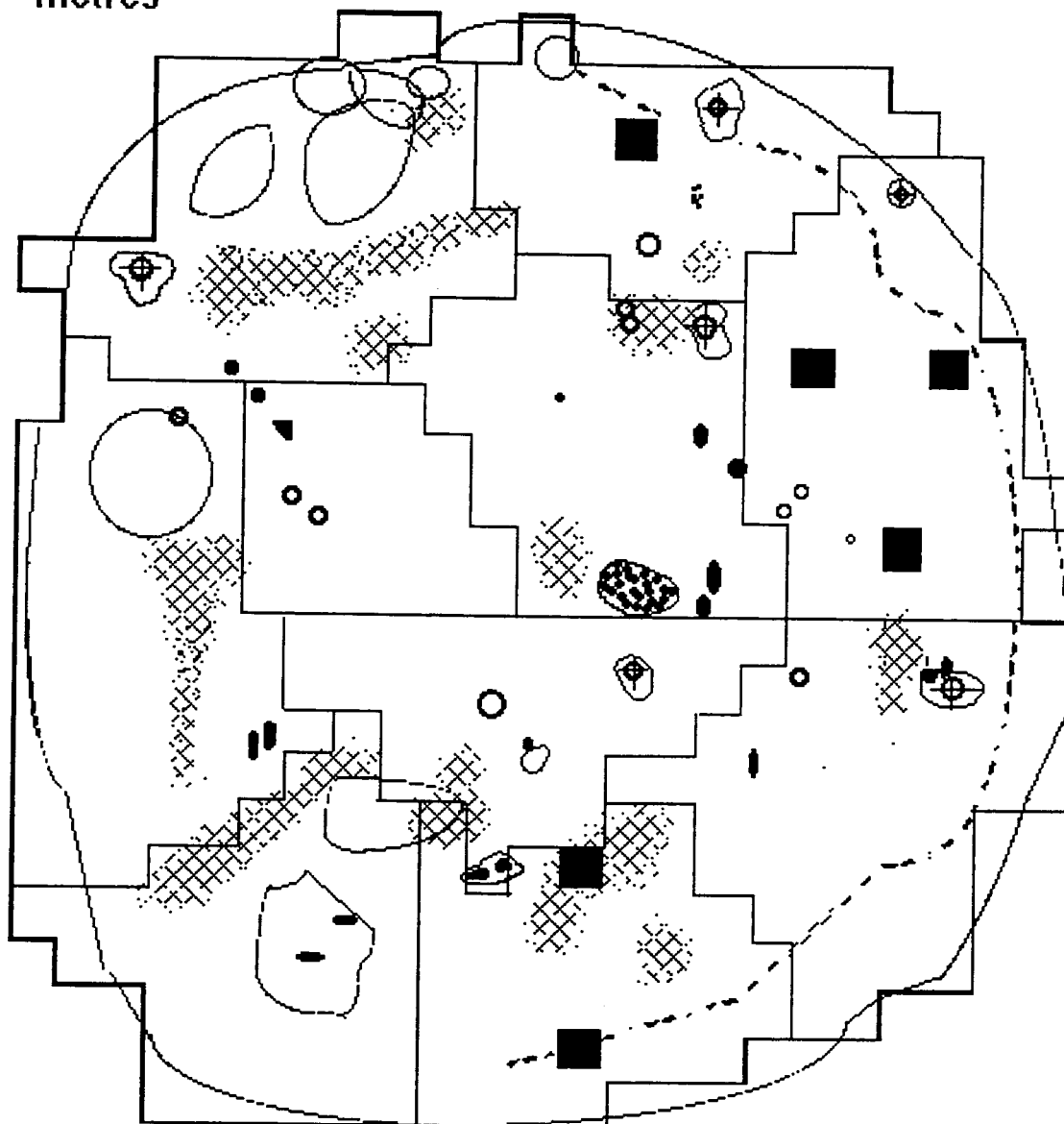


Figure 3.34. Distribution of drills and perforators on the floor of Housepit 7.

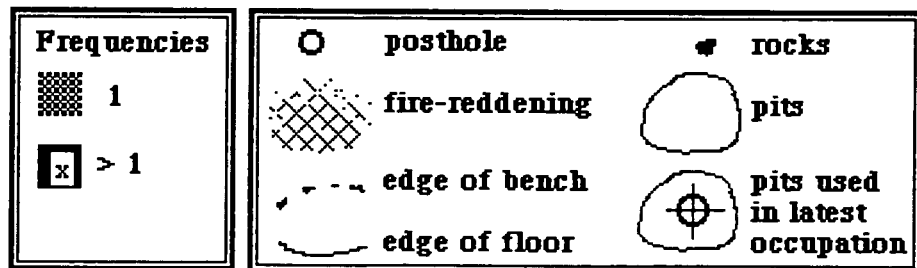
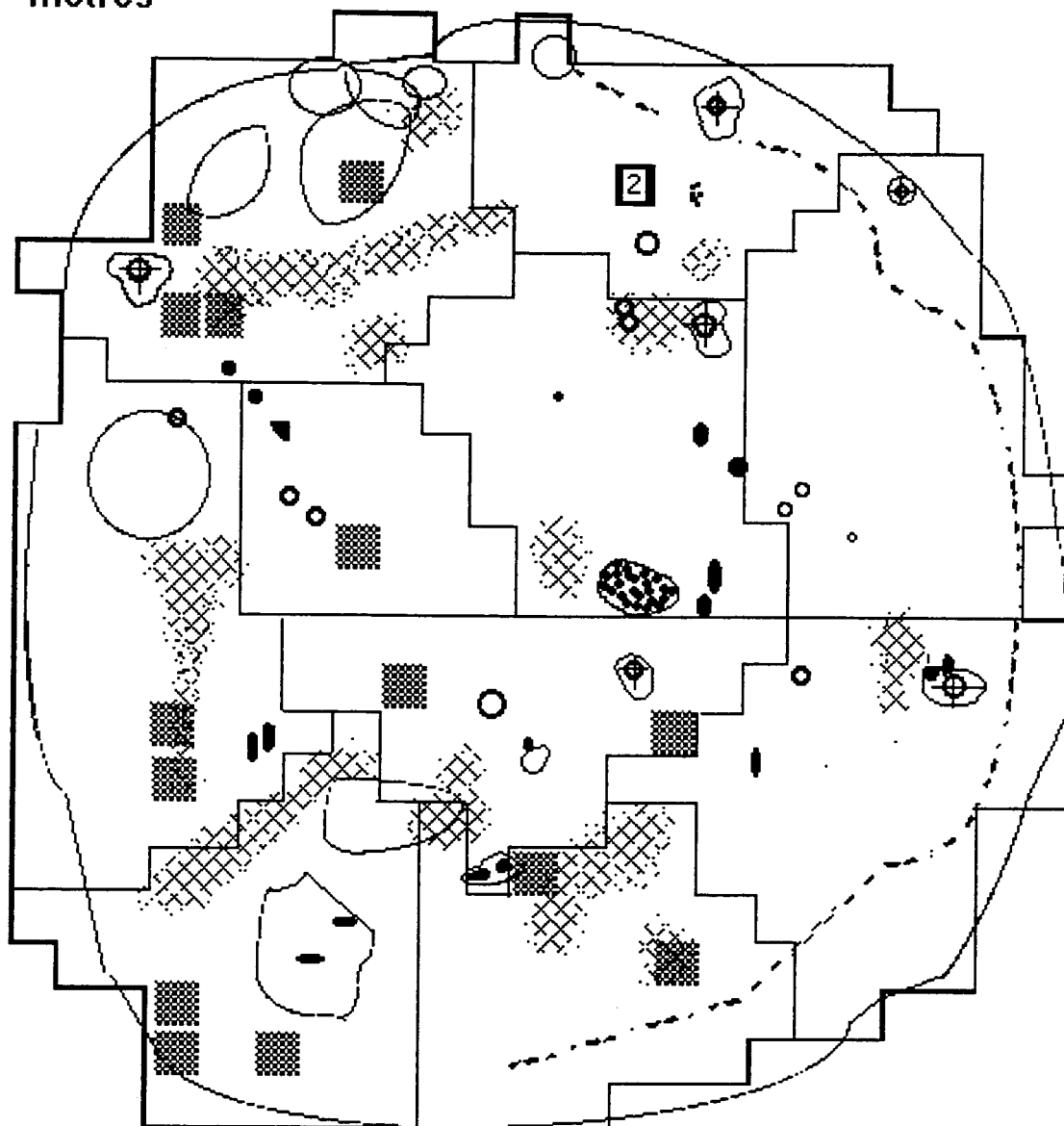
0  2
metres



N
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Figure 3.35. Distribution of key-shaped scrapers on the floor of Housepit 7.

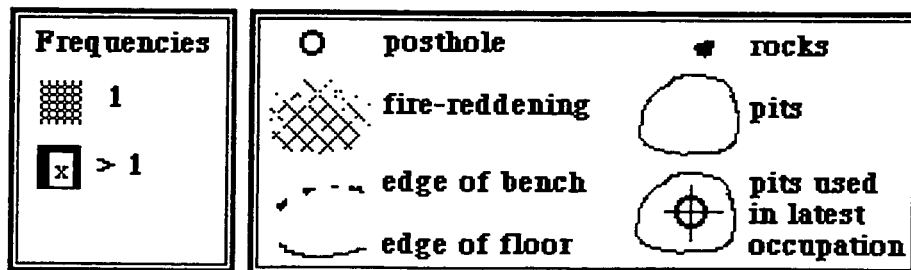
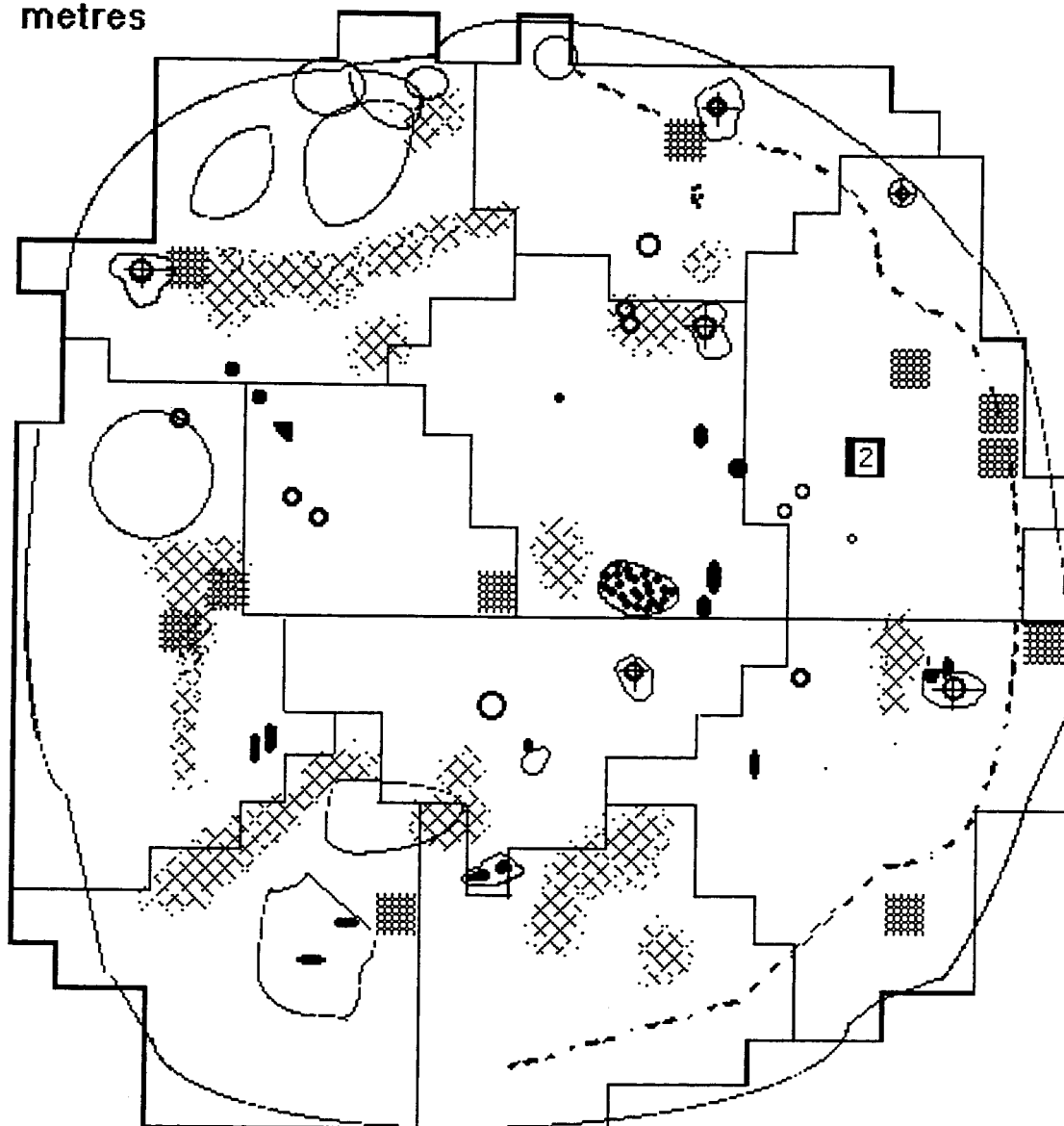
0  2
metres



N
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Figure 3.36. Distribution of cores on the floor of Housepit 7.

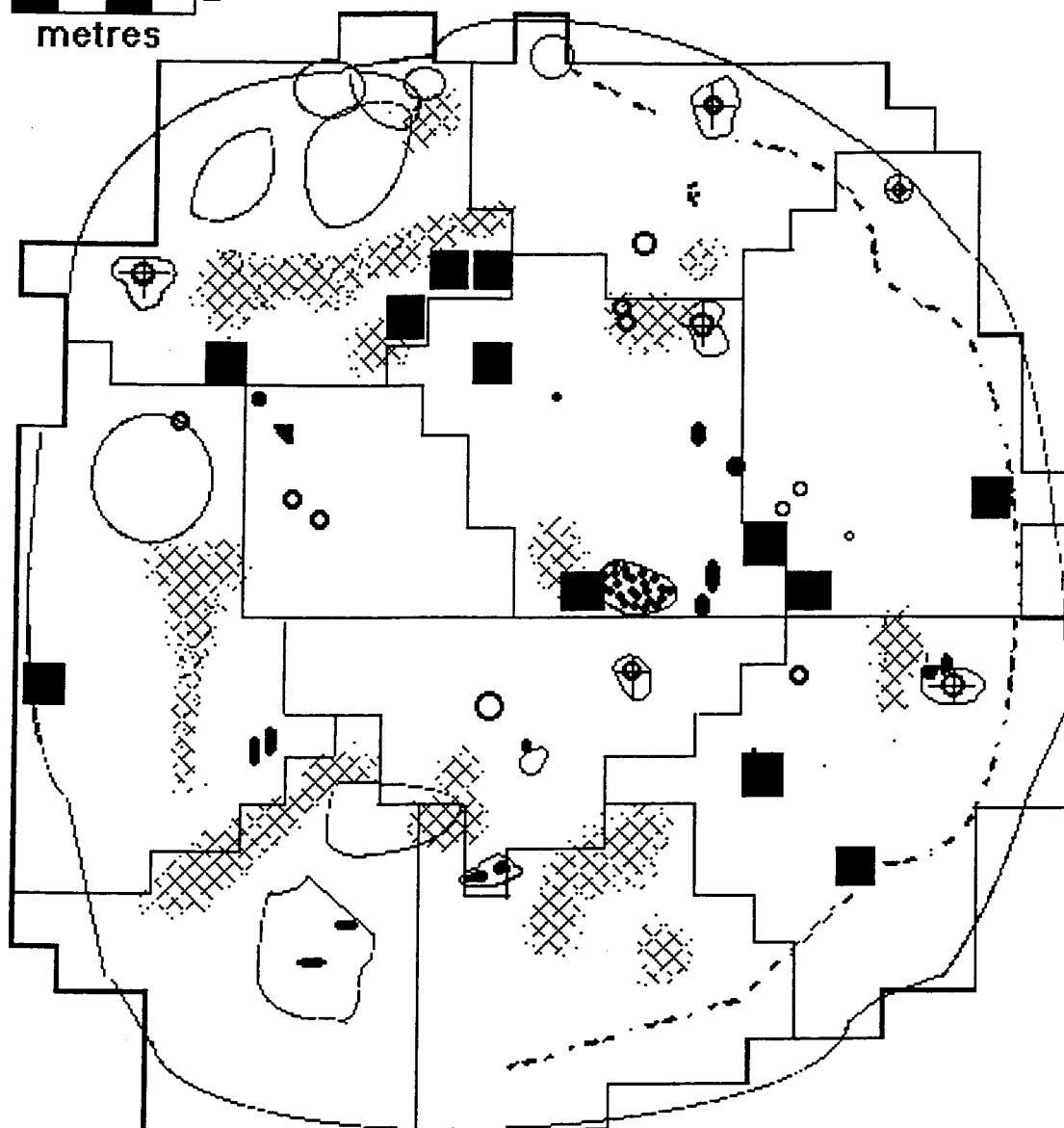
0  2
metres



N
↑

Figure 3.37. Distribution of projectile points other than Kamloops points on the floor of Housepit 7.

0 2
metres



	posthole		rocks
	fire-reddening		pits
	edge of bench		pits used in latest occupation
	edge of floor		



Figure 3.38. Distribution of small piercers on the floor of Housepit 7.

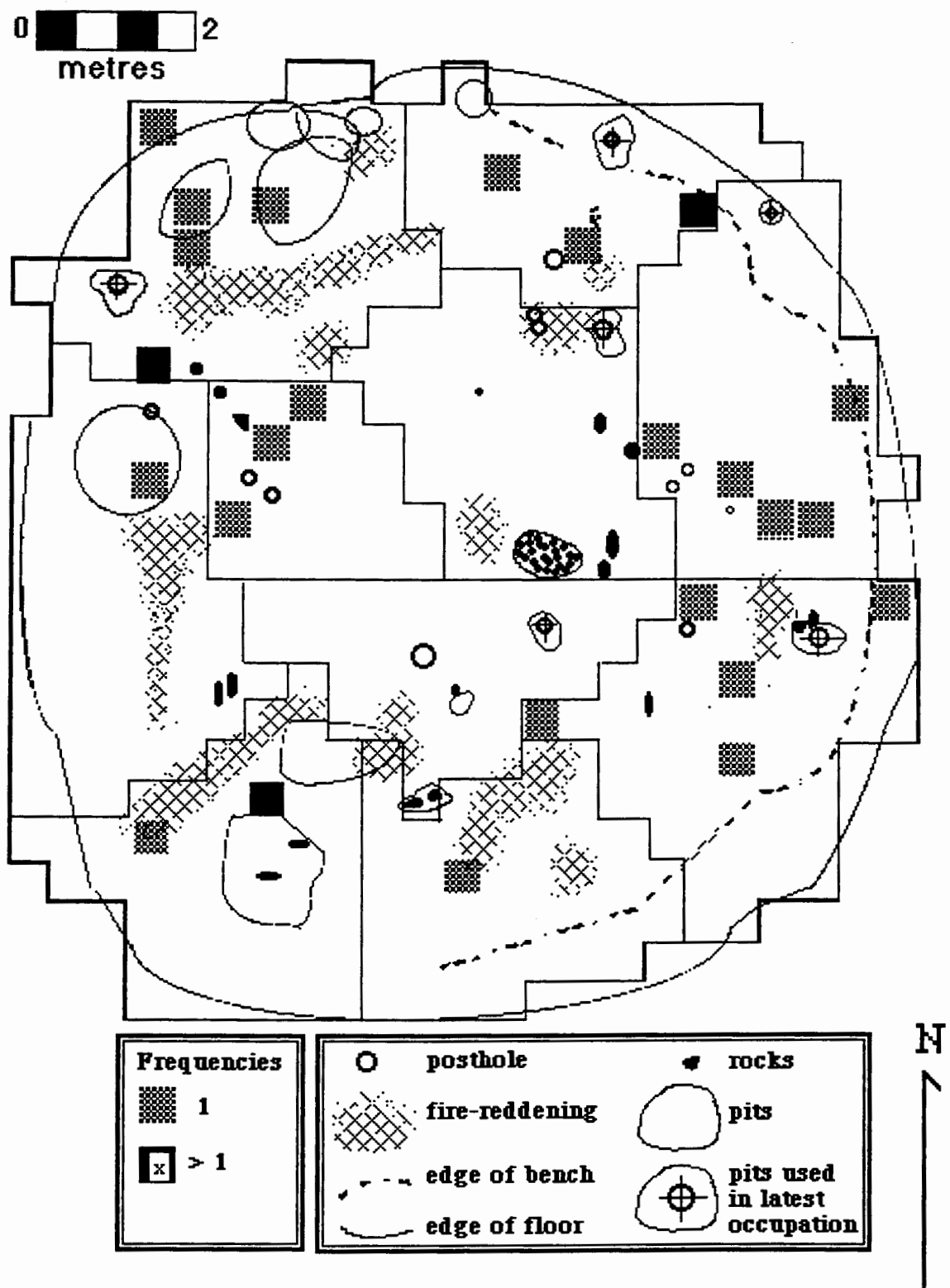
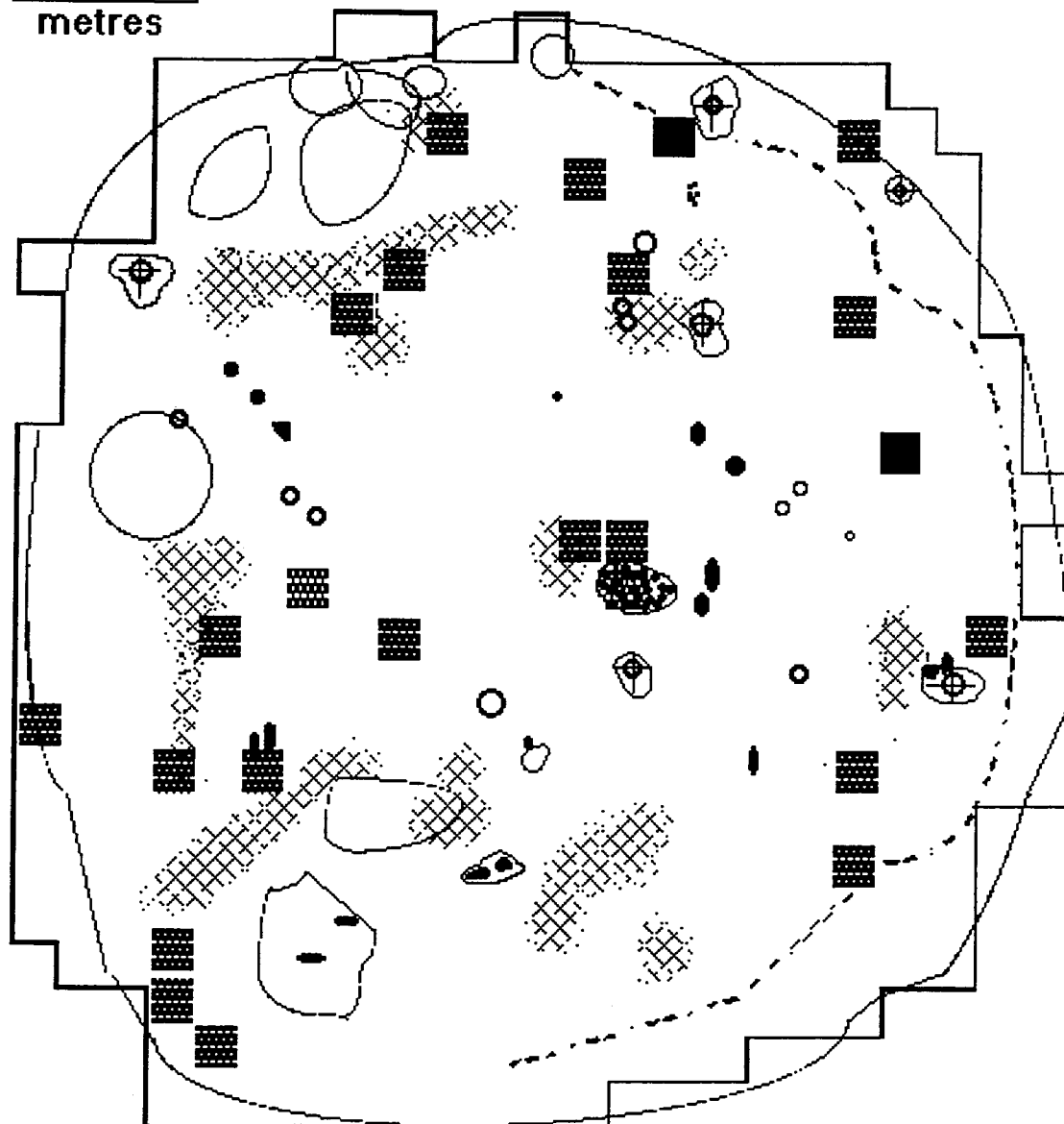











Figure 3.39. Distribution of bipolar cores on the floor of Housepit 7.

0  2
metres



Endscrapers	
1	
2	

	posthole		rocks
	fire-reddening		pits
	edge of bench		pits used in latest occupation
	edge of floor		

N
↑

Figure 3.40. Distribution of endscrapers on the floor of Housepit 7.

two thirds of the perimeter of the floor, from the east counterclockwise to the southwest. This zone is rich in retouched flake tools (acute-edged expedient flake tools, expedient scrapers, and heavily retouched scrapers) but generally poor in utilized flakes. Acute-edged expedient flake tools (Figure 3.26) seem to be fairly evenly distributed throughout this zone though they are improbably abundant only in the East and Northeast sectors. Expedient scrapers (Figure 3.27) are concentrated in the northwestern part of the floor as indicated by their improbably high frequency in the Northwest sector. Heavily-retouched scrapers (Figure 3.28) are concentrated near the wall in this zone, especially in the west, as reflected in the improbably high frequency of this type in the West sector. This distribution suggests that heavily retouched scrapers may have been set aside in storage locations near the wall for later re-use or recycling while more expedient flake tools tended to be left around activity areas on the floor.

A second zone extends in an crescent from an area slightly north of the center of the floor into the southwest and southeast corners. This zone, which I will call the Central zone, is distinguished by utilized flakes (Figure 3.29), which are unexpectedly abundant in both the East Center and West Center sectors, and by notches (Figure 3.30), which are unexpectedly abundant in the West Center sector. Bifaces, (Figure 3.31) also seem to be associated with this zone, as do spall tools (Figure 3.32) and abraders (Figure 3.33). Spall tools are unexpectedly concentrated in the Southeast sector ($p \times \geq 5 = 0.01$) and the frequency of abraders in this sector is also significant at the 0.10 level ($p \times \geq 3 = 0.06$). It should be noted here that an apparent cache of five spall tools was discovered at the periphery of the Northwest sector (see Figure 3.32) in a deposit which may or may not have been associated with the most recent occupation of this housepit. Since these artifacts were found together in a single depression and were probably in storage rather than in active use, they may not have been directly involved in the activities which produced the distribution of the remaining spall tools which were often left near hearth areas.

The third zone, which I will call the Inner zone, represents the area

inside the crescent, extending from the center of the floor to the southern perimeter. The boundaries of this zone conform fairly closely to those of the South and South Center sectors. This zone is, therefore, distinguished by the characteristics already identified with this sector, notably a relative scarcity of modified artifacts, especially the more abundant types. Note, however, that in neither the South sector nor the South Center sector is any modified artifact type improbably infrequent, at the prescribed significance level, in proportion to the number of artifacts in that sector.

Artifact types which occur in improbably high frequencies in the South and South Center sectors include key-shaped scrapers, in the South, and drills and perforators, in the South Center. In addition, the frequencies of cores in both the South and South Center sectors are unexpectedly high at the 0.10 significance level. The maps illustrating the distributions of drills and perforators, of key-shaped scrapers, and of cores suggest that the unexpectedly high frequencies of these types in the South and South Center sectors are more a function of the low frequencies of artifacts in general in these sectors than true indicators of concentrations there. Drills and perforators (Figure 3.34) occur as frequently in the second zone as in the third. Key-shaped scrapers (Figure 3.35) seem to be associated with eastern periphery of the floor and are most frequent in the northeast. Cores (Figure 3.36) tend to occur in the western part of the floor but are not so clearly associated with the south. Nevertheless, the distributions of modified artifact types do suggest that the third zone was at least as likely as any other area of the floor to be chosen for activities involving cores and drills or perforators.

Interpretations

The Outer Zone

The zones described above conform to the physical structure of the pithouse itself as well as to the distributions of the various modified artifact types. The Outer zone is the most secluded part of the floor, furthest from the entrance and, presumably, out of the way of traffic. It is also the zone furthest from the smokehole and may, therefore, have been the least suitable location for hearths. Yet it may have

been protected from drafts and, so, have been the warmest zone in the house. The low ceiling in this zone would also have helped in retaining warmth and reducing traffic. All in all, this would seem to be the most comfortable zone for sleeping and for the maintenance of any semi-private living spaces.

If the Outer zone was used in this way, it seems likely that it might also have been used for the storage and the maintenance of personal gear. It is not unreasonable to suppose that, in the Outer zone, the most common activities involving lithic artifacts might have been the manufacture, maintenance, and repair of the tools and equipment which would be required for fishing and other seasonal subsistence pursuits. These are tasks involving the working of relatively hard materials like wood and bone which may have required relatively intensive use of the retouched edges associated with this zone. Such activities may have involved a greater degree of specialization than would the preparation of food.

The concentration of expedient scrapers and small piercers in the Northwest sector may indicate that this part of the Outer zone served as a workshop devoted to a particular type of manufacturing activity. This sector was also distinguished from the remainder of the Outer zone in the preceding analysis of the distribution of debitage categories which identified a statistically significant concentration of bipolar flakes. The Northwest sector also has an unusually varied faunal assemblage (Kusmer 1991:14), a well-defined hearth with fire-cracked rock, and at least one storage pit associated with the last occupation.

The distributions which distinguish the Northwest sector from the rest of the Outer zone should, however, be viewed in the context of the distributions of fire-cracked rock (Figure 2.13), debitage (Figure 3.19), utilized flakes (Figure 3.29), and heavily-retouched scrapers (Figure 3.28), all of which identify it with that zone. In this light, the Northwest sector can best be interpreted as the workshop of a specialized individual or family, within a domestic space, rather than as a specialized activity area, accessible to all residents of the house.

The distributions of debitage size categories also support the distinction between the Central and Outer zones. All of the sectors

with subsquares in the Outer zone, which includes most of the Northwest, and Northeast sectors and much of the West and East sectors, tend to be rich in large flakes. In the analysis of the distributions of debitage categories on this floor these were identified as either primary flakes or large billet flakes and/or simply as flakes with a maximum dimension of greater than 2 cm (see Figures 3.22, 3.23, 3.41 and 3.42). In the discussion of the debitage distributions it was suggested that large flakes might have been imported into and stored in this area because of their utility for some specific activity. If the concentration of retouched flake tools in the Outer zone is an indication that this zone was preferentially selected for activities which involved the working of hard materials then large flake tool blanks should have been especially useful here.

Initially, the more obscure Outer zone may seem an unlikely location for working hard materials. However, warmth and comfort may have been overriding factors. Certainly the distributions of tool types and debitage leave little doubt that core reduction and the working of hard materials occurred preferentially in the Outer rather than the Central or Inner zones. Recovery of a series of lines of small debitage flakes in the NE sector "as though flaking debris had fallen through the spaces between the planks of a bench platform" (Prentiss pers. comm.), strongly supports these inferences.

The Outer zone apparently does not extend into the southern part of this floor where the lighting would have been comparatively poor due to the position of the sun. The manufacturing tasks most represented in the Outer zone assemblage may have required more detailed work and more light than the hide-processing tasks, which the distribution of spall tools (Figure 3.32) suggests may preferentially have been performed in the southeastern part of the floor.

The Central Zone

In contrast with the Outer zone, the Central zone clearly includes a high proportion of the hearths on this floor, as indicated by the distributions of fire-reddened areas and fire-cracked rocks (Figures 2.12 and 2.13). This is as might be expected given the arguments put

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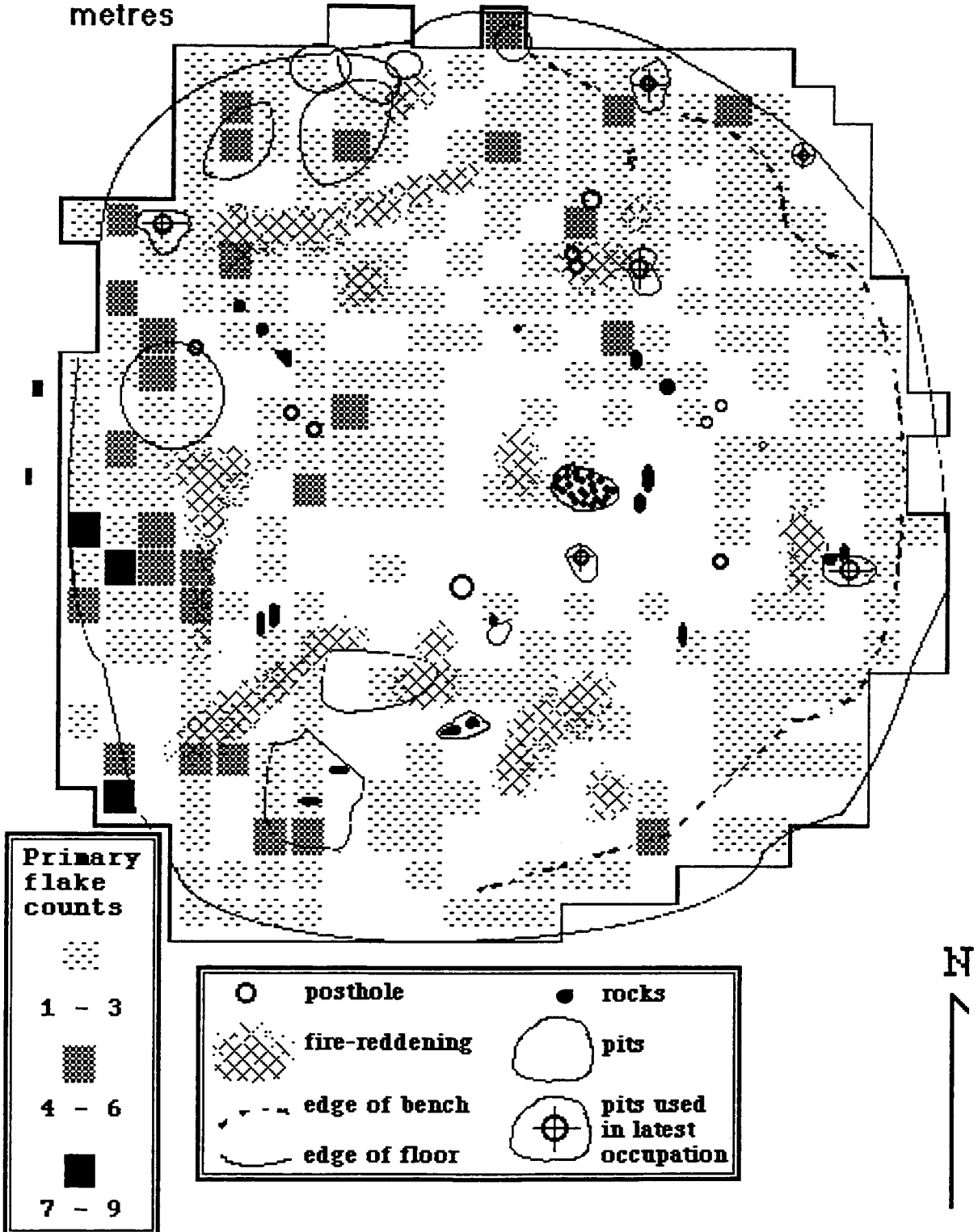
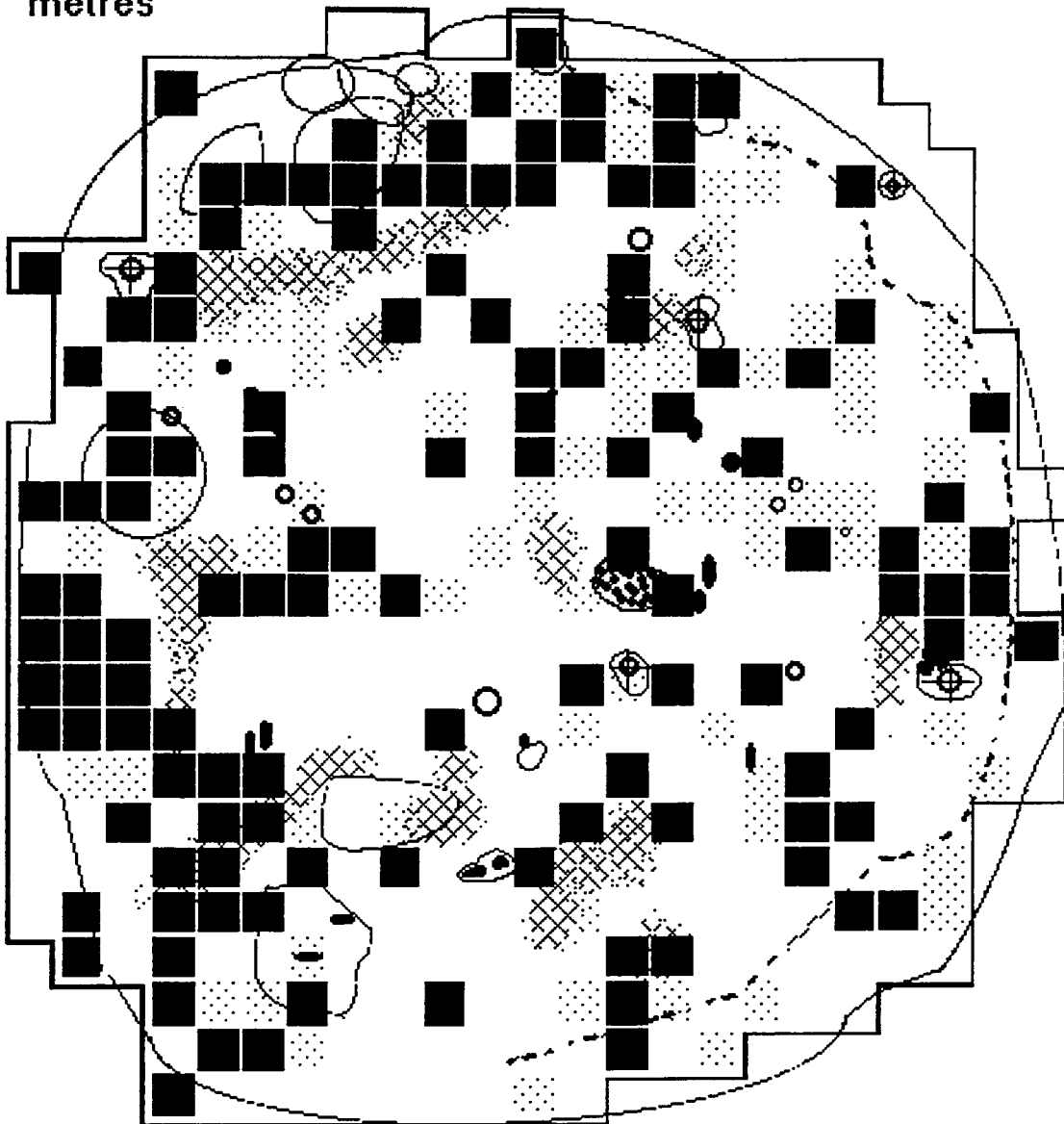


Figure 3.41. Distribution of primary flakes on the floor of Housepit 7.

0  2
metres



N
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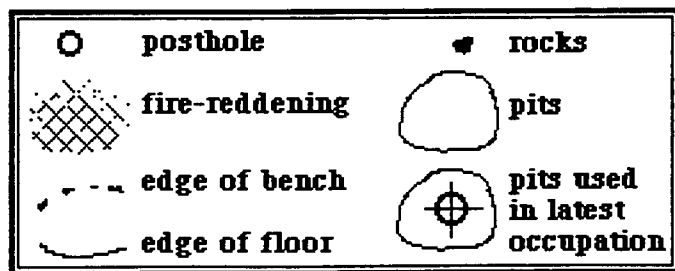
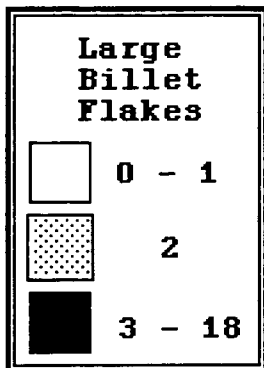


Figure 3.42. Distribution of large billet flakes on the floor of Housepit 7.

forward above. This zone is also strongly associated with utilized flakes. The zone may have been well suited for food preparation not only because it was a good location for hearths but also because any fresh meat brought in by hunters could have been conveniently butchered and distributed here, away from sleeping areas and personal gear. The fact that spall tools, which are presumed to be indicators of hide-working, are also associated with the Central zone provides further evidence that this zone may have been preferred for work requiring large areas or producing considerable quantities of debris. If tasks were divided along sexual lines in the manner suggested by the ethnographic record (see Chapter 2), it may be that the Central zone was in some sense the "women's area" on this floor while the Outer zone was the "men's area". The concentration of fire-cracked rock in the Central zone supports this notion.

If several independent social groups maintained distinct domestic economies in separate areas of the floor, it seems likely that the floor would be divided so that each independent domestic area would include a portion of both the Outer and the Central zones. Since both of these zones extend around most of the circle which represents the floor, we may at least admit the possibility that these zones were divided radially into independent domestic areas. Such divisions are, in fact, indicated by the boundaries between distinct clusters of artifacts in these zones and the distribution of series of hearths along the interface between the two zones.

A living floor organized into concentric zones, like those suggested by the distributions of modified lithic artifact types described above, is compatible with a model for the social organization of space in pithouses which predicts distinct groups within the coresidential group using separate spaces for similar tasks. The patterns observed in the distribution of lithic artifacts on floor of Housepit 3 are less compatible with such a model.

Housepit 3 seemed, instead to have been divided into zones which roughly corresponded to quadrants of the circle which defined the floor. In the discussion of the patterns observed in the distribution of lithic artifacts on the floor of Housepit 3, it was suggested that these patterns seemed most consistent with a model of spatial organization

which divides a house floor into separate "rooms" each preferred for a different activity and each accessible to all members of the household.

If the Central and Outer zones of the floor of Housepit 7 were divided radially into independent domestic areas in the manner suggested above, we might expect that each of these domestic areas would: 1) include portions of both the Outer zone and the Central zone, and 2) include at least one well defined hearth in the Central zone. Independent domestic areas might also be distinguished by the distributions of certain artifact types which might reflect the specializations or preferences of individual social units within the corporate group or differences in their access to different resources. Ethnographically, individual hunter-gatherers are known to vary widely in involvement in lithic manufacturing activities (Hayden 1979:14,75,142) simply due to personal likes and dislikes.

Four of the seven well defined hearths identified on the floor of Housepit 7 by concentrations of fire-cracked rock and/or fire-reddened areas occur in the Outer and Central zones. (There are also two more superficial fire-reddened areas with relatively little fire-cracked rock in the Central and Outer zones on the east side of the floor and three well defined hearths in the Inner zone). Of these four, only the hearth in the West sector (the West hearth), the hearth at the south end of the East Center sector (the East Center hearth), and the hearth in the Northwest sector (the Northwest hearth) can easily be associated with the Outer zone. The West hearth isolates the hearth in the Southwest sector (the Southwest hearth) from the Outer zone.

The fire-reddened area at the boundary between the East Center and Northeast sectors (the Northeast hearth) is directly behind the hearth at the south end of the East Center sector in relation to the center of the floor. The hearth in the Northwest sector (the Northwest hearth) is not so clearly separated from the center of the floor but is further from the center than the East Center and West hearths.. The concentration of fire-cracked rock around the Northwest hearth is less dense than that around the East Center and West hearths, as well.

On the basis of the forgoing observations, I would argue that the Outer and Central zones were most probably divided into two independent domestic areas: one associated with the West hearth and roughly contiguous with the West, Northwest, and West Center sectors, the other associated with the East Center hearth and roughly contiguous with the East, Northeast, and East Center sectors. In this interpretation, the Northwest and Northeast hearths might have served some function other than food preparation. Perhaps they were necessary to some manufacturing process or they may have served to warm the sleeping area.

Alternatively, a third independent domestic area could be defined around the Northwest hearth. This independent domestic area might have included most of the Northwest sector and the northeast half of the West Center sector. The independent domestic area associated with the West hearth would have been correspondingly reduced.

Possible boundaries for the independent domestic areas defined in the two alternative interpretations presented above are sketched in Figure 3.43. On the whole, I prefer the first interpretation, largely because it seems the more symmetrical arrangement.

In Figure 3.43, the Southwest and Southeast sectors, which have been attributed to the Central zone, are almost entirely excluded from the independent domestic areas so far defined, for reasons which will be explained when the Inner zone is discussed below.

The distributions of several modified artifacts types indicate a distinction between the eastern and western sides of the floor. These include cores, which tend to occur west of the center of the floor (Figure 3.36), drills and perforators, which occur in the southern and eastern areas (Figure 3.34), and key-shaped perforators, which are confined to the eastern half of the floor (Figure 3.35). (All of these types tend to occur either in the Central zone and the Inner zone or in the Outer zone and the Inner zone. So their distributions are, more or less, consistent with the distinction between the Outer and Central zones) Also, obsidian flakes are most abundant in the East and Northeast sectors while flakes with a maximum dimension greater than 5 cm are concentrated in the West and Southwest sectors. These differences may indicate that social groups occupying independent

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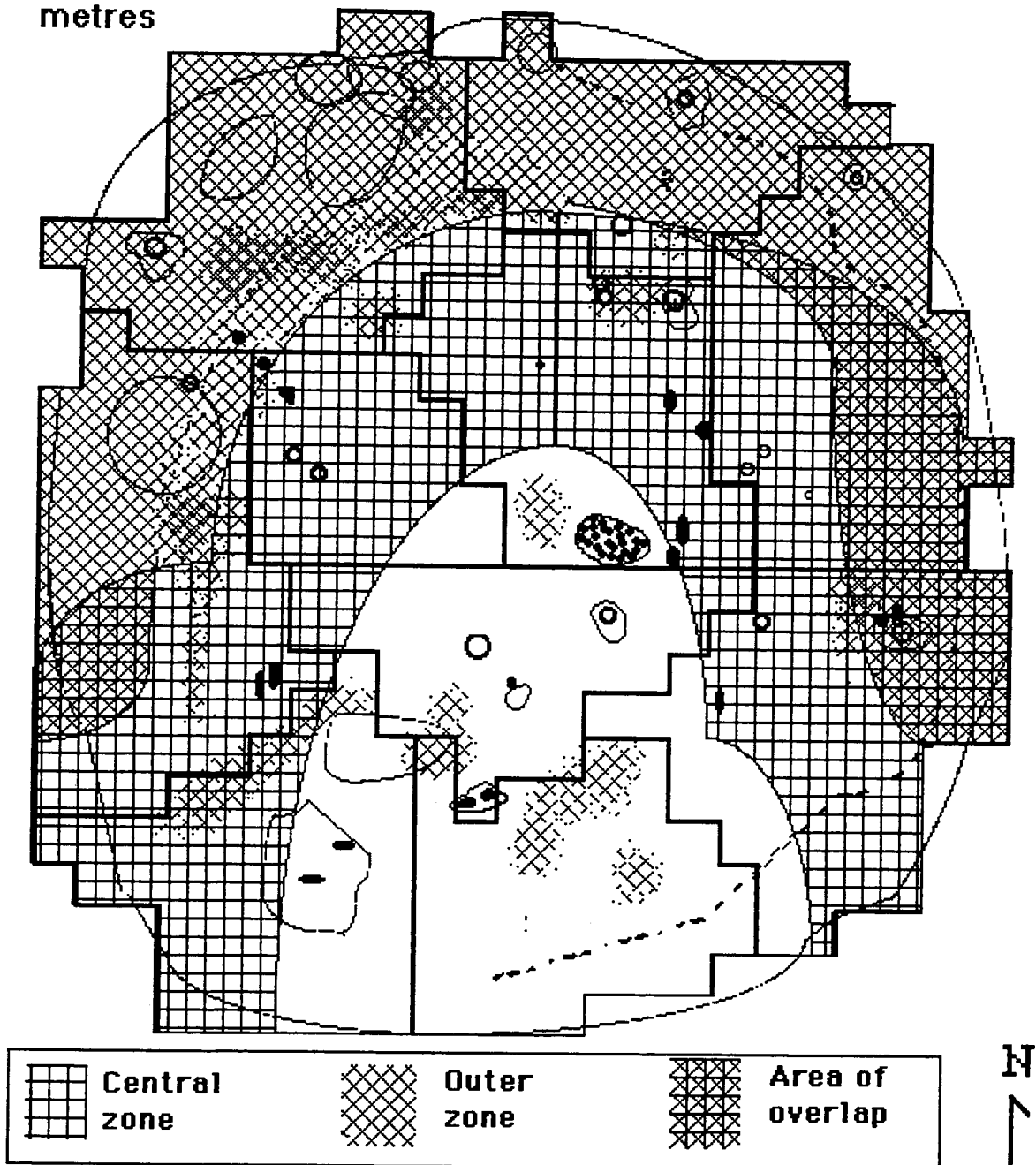


Figure 3.43. Sketch showing the boundaries of the Inner, Central, and Outer zones identified on the floor of Housepit 7.

domestic areas associated with the West and East Center hearths specialized in different activities and/or had differing degrees access to different resources, obsidian, for example. Differences in wealth and status between families residing on the east and west sides of this floor may well be reflected in these distributions.

As was shown above, the distributions of expedient scrapers (Figure 3.27) and small piercers (Figure 3.38) specifically distinguish the Northwest sector. The distribution of expedient scrapers is quite consistent with the proposed distinction between eastern and western domestic areas but small piercers are evenly distributed between the two sides of the floor. If we accept the proposition that there were three independent domestic areas in the Outer and Central zones both distributions might be taken as evidence of specialization and/or differential access to resources within the independent domestic area associated with the Northwest hearth.

If the Outer and Central zones are supposed to have been divided into two or three independent domestic areas, how is the Inner zone to be interpreted? In earlier sections of this analysis it has been suggested that the South Center sector in particular may have been a common area, kept relatively clear to allow easy passage about the house and sometimes used for feasting and ceremonial purposes. Perhaps this common area extended into the South sector which so closely resembles the South Center sector in terms of the distributions of most classes of lithic artifacts. The distributions of cores, key-shaped scrapers, drills, and perforators, all of which are unexpectedly abundant in the sectors of the Inner Zone, might indicate that members of the social groups residing in any of the independent domestic areas dividing the Outer and Central zones frequently chose the Inner zone for tasks involving these artifact types. Some tasks involving the use of key-shaped scrapers, drills and perforators may have required the manipulation of long pieces of wood and could have been so disruptive in areas devoted to food preparation, privacy, and rest that a separate workshop was required. The Inner zone might have been preferred for core reduction for similar reasons. The distribution of debitage might indicate that most flakes and especially the largest ones were

removed from the Inner zone for use in other areas. Large open spaces might also have been set aside for the preparation of hides, a task which almost certainly involved the use of spall tools, several of which are concentrated in the Southeast sector.

The relative scarcity, in the Inner zone, of debitage and most classes of modified artifacts, including utilized and retouched flake tools, might indicate that this zone was rarely chosen for the activities which used these artifact types most intensely. Those activities could have included food preparation and a variety of manufacturing tasks.

There are, however, several possible arguments against this interpretation of the Inner zone. First, while there are relatively few lithic artifacts in the sectors which make up the Inner zone, most types of modified artifacts occur in frequencies not significantly different from the frequencies which would be expected if the types were evenly distributed among the sectors in proportion to the number of modified artifacts in each sector. If assemblages which include similar proportions of most artifact types are indicators of similar activities then most of the activities which occurred in other parts of the floor would seem to have occurred in the Inner zone as well, though perhaps less frequently or with less intensity.

In contrast, some of the modified artifact types which occur in unexpectedly high frequencies in some of the sectors in the Central zone do occur in unexpectedly low frequencies in the Outer zone and vice versa. These types include utilized flakes and notches, which are unexpectedly abundant in some sectors of the Central zone, and acute-edged expedient flake tools which are unexpectedly abundant in some sectors in the Outer zone. These differences between sectors in the Central and Outer zones in terms of the proportions of various artifact types suggest that these two zones were preferentially used for some different activities. This suggests that the Inner zone was used for most of the activities which occurred in both the Outer and Central zones, albeit less intensely.

Second, the few modified artifact types which do distinguish the sectors in the Inner zone from the remainder of the floor, in statistical terms, actually indicate a more meaningful distinction

between the eastern and western sides of the floor when their distributions are examined visually. Cores, key-shaped scrapers, drills, and perforators may be unexpectedly abundant in the Inner zone but they are by no means confined to it. As was shown earlier, cores are fairly evenly distributed over the western half of the floor (see Figure 3.36) while key-shaped scrapers, drills, and perforators occur at least as frequently in the independent domestic area defined around the East Center hearth as they do in the Inner zone (see Figures 3.34 and 3.35).

To summarize, while the Inner zone has fewer modified artifacts than the rest of the floor it has almost every type of modified artifact in at least the expected proportions. In a word, the collection of artifact types in each of the sectors in the Inner zone is nearly complete. On the other hand, the Outer zone and the Central zone are distinguished from one another by the proportions of different artifact types which they contain and the eastern and western sides of the floor each have artifact types which the other lacks.

The completeness of the collection of artifacts in the Inner zone is particularly interesting in light of the distribution of hearths on this floor. Figure 2.13 gives a strong impression of several hearths grouped around an empty space just south of the center of the floor. This suggests that all of these hearths may have served similar functions. That is, food preparation and, perhaps, 'women's' tasks. In that case, it might be expected that the collection of modified artifacts associated with the hearth in the South sector (the South hearth) would be proportionally similar to that associated with the hearths in the Central zone.

On the other hand, the South hearth is roughly the same distance from the wall as the Northwest hearth. If this hearth were associated with an additional independent domestic area, that area should include some space equivalent to the Outer zone and, therefore, should contain a collection of modified artifacts which is proportionally similar to that associated with Outer zone. In fact, the sectors in the Inner zone contain collections of artifacts which are proportionally similar, in a statistical sense, to the remainder of the floor. That is, to the combined collections of both the Inner and

Central zones.

Interpreting the Inner zone as an additional independent domestic area raises questions about the function of the Southwest and Southeast sectors. Both can be associated with the Central zone on the basis of visual analyses of the distributions of several artifact types including utilized flakes, notches, and spall tools. The Southwest sector includes a well defined hearth (the Southwest hearth) which is in a similar location to that of the South hearth in relation to the wall and to the ring of hearths described above. Apart from a significant shortage of heavily retouched scrapers in the Southwest sector both sectors have, statistically speaking, "complete" collections of the modified artifact types found on the remainder of the floor. On these grounds, the Southwest sector and the Southeast sector might both be interpreted as small independent domestic areas. Given the small size of these domestic areas and the apparent scarcity of lithic resources there, the three southern independent domestic areas might have been occupied by low status social groups, probably dependants of the dominant families residing elsewhere in the house.

There is a third possible interpretation of the southern sectors of this floor, one which I prefer. All four may have been included in a single independent domestic area which was probably occupied by the dominant family in the house. The evidence for this proposition is as follows:

1) The Southwest, South, and Southeast sectors all have unexpectedly high frequencies of chert and chalcedony flakes. In the remainder of the floor, only the West sector has more chert and chalcedony flakes than expected and these are concentrated in the southernmost portion of this sector. Cherts and chalcedonies are a much rarer lithic raw materials than vitreous trachidacyte in this assemblage and are presumed to have been harder to obtain. So, besides reinforcing the integrity of the southern part of the floor, a high frequency of chert flakes is also an indicator of high status for any social group which may have resided there. Cherts and chalcedonies are among the most wear resistant of the available raw materials and may well have been preferred for some hide-working tasks.

2) The densest concentrations of fire-cracked rock and fire-reddening are found in the proposed southern independent domestic area. If fire-cracked rock is taken as an indicator of fuel consumption this might be further evidence of high status for a group residing in the south.

3) Portions of the Central zone which do not appear to be associated with domestic areas in the northern part of the floor border the Inner zone to both the east and the west. There is a well defined hearth in the southwest part of the Central zone and the Inner zone also includes two well-defined hearths. High status is expected to be associated with polygyny and/or slave-holding and individual wives or groups of slaves may have organized their domestic activities around separate hearths. So the area in which a high-status group resided could be expected to be associated with several hearths and several "women's work areas" which might differ according to the rank and activities of the people who used them. The relationship between the Inner zone and portions of the Central zone and the presence of two hearths in the Inner zone are more consistent with such an arrangement than are any patterns identified elsewhere on the floor of Housepit 7.

4) The combined area of the four southern sectors is comparable to that of the two areas in the Outer and Central zones which have been interpreted as the likeliest independent domestic areas in that part of the floor. There are 187 subsquares in the the four southern sectors, a total of 133 in the West, West Center, and Northwest sectors, and a total of 136 in the East, East Center, and Northeast sectors. So an independent domestic area in the southern part of the floor would about 1.4 times the size of the two independent domestic areas proposed for the northern part of the floor. While it is not impossible that independent domestic areas might vary considerably in size, there are probably some practical limits. Independent domestic areas that differ in size by a factor of 1.4 seem more probable than areas that differ in size by a factor of three. The social group with the highest status in the house might have acquired a larger living space as an indicator of its rank or simply because it was a larger group with more dependants.

5) The number of modified artifacts in the southern part of the floor (including the SW and SE sectors as well as the Inner zone) is comparable to that in each of the two independent domestic areas proposed for the northern part of the floor. The four southern sectors contain 246 modified artifacts. The three northwestern sectors contain 273 modified artifacts and the three northeastern sectors contain 277. In contrast, the largest collection of artifacts in any of the three southern independent domestic areas proposed in the previous interpretation is 103, in the Southeast sector. Again, in this context, it seems most reasonable to attribute similar functions to collections of artifacts which are at least roughly the same size

The smaller artifact collection in the proposed southern independent domestic area coupled with its larger size yields a modified artifact density of only 1.32 artifacts per subsquare as compared with 2.04 artifacts per subsquare in the northwest and 2.05 in the northeast. If this is taken as evidence of less human activity in the south it might mean that the south was less densely populated than remainder of the floor or that the residents of this sector engaged in fewer mundane activities. It has already been suggested that high status groups may have been allotted more space per person than other groups and may have been less involved in mundane chores. High status males, in particular, are often engaged more in political activities than in direct production activities.

6) The Southwest sector, in particular, has very little space which might serve the purposes attributed to the Outer zone. Yet the artifact distributions indicate that it is part of the Central zone and it has a clearly defined hearth. The South sector, on the other hand, does have some space between the wall and the hearth. This suggests that the South and Southwest sectors could have been related in a similar manner to that suggested for the Outer and Central zones.

7) The Southeast sector resembles the Central zone in terms of most artifact distributions but it lacks a well defined hearth. Also, it is distinguished from the rest of the floor by an improbably high frequency of spall tools which are presumed indicators of hide-working. Spall tools are found throughout the Central zone which suggests that hide-working was one of the activities common to that

zone. So some of the modified artifact types which are associated with that zone may well be part of a hide-working 'tool-kit'. Finally, the Southeast sector contains a high proportion of relatively 'empty' space and has access to more empty space in the South Center sector. As was suggested above, space was probably required for hide-working.

All of this is consistent with an interpretation of the Southeast sector as a hide-working area. If, as its location suggests, this sector was associated with an independent domestic area in the southern part of the floor, the occupants of that domestic area may have specialized in hide-processing and may have had better access to hides than other groups in the house. In Chapter 2 it was argued that access to hides could be a strong indicator of high status.

Summary

Analyses of the distributions of features and various classes of lithic artifacts on the floor of Housepit 7 revealed several levels of patterning:

First, clustered distributions of hearths, fire-cracked rock, debitage, and to some extent modified artifacts defined borders between ten distinct sectors on the floor. It was suggested that these borders separated areas used for different activities and/or areas used by different groups.

Second, comparisons of the frequencies of fire-cracked and debitage in each of the ten sectors showed that there were significant differences between sectors in terms of the quantities of these classes of lithic artifacts which were found in them. This statistical variability, combined with visual comparison of the distribution of debitage and fire-cracked rock, first suggested the distinction between the Outer zone and the Central and Inner zones. These distributions and the distribution of all modified artifacts also distinguished the South Center sector as an area containing very few artifacts.

Third, comparisons of the modified artifact types found in each sector identified an "underlying tool distribution" indicating that about 50% of the modified artifacts in every sector consisted of the

same types in similar proportions. This was interpreted as evidence that some activities, probably domestic activities, occurred in most sectors and/or that the 10 modified artifact types in the underlying distribution were used in a wide variety of activities.

Fourth, it was demonstrated that, despite the similarities between sectors suggested by the underlying tool distribution, 15 modified artifact types and most of debitage classes defined for this analysis occurred in improbable frequencies in at least one sector. Visual examination and comparison of the distributions of several of these artifact classes confirmed the distinction between the Outer and Central zones, initially suggested by the distributions of debitage, hearths, and fire-cracked rock, and also distinguished a third zone, the Inner zone. Each of these zones was interpreted as an area used for a distinct set of activities. Several possible activities were suggested for each zone but the preferred interpretation was that the Outer zone was used for men's work and the Central zone was used for women's work and/or for activities requiring large areas of open space, while the Inner zone was distinguished by the high status of the group which resided in it.

Fifth, some of the boundaries previously defined around hearths and artifact clusters were interpreted as boundaries between two or three domestic areas each of which included portions of both the Outer and Central zones. Portions of the Central zone which did not appear to be associated with any of these domestic areas were interpreted as women's work areas and/or specialized activity areas associated with Inner zone. Visual examination of the distributions of some modified artifact types which occurred in improbable frequencies in some sectors suggests that domestic groups occupying areas on opposite sides of the floor may have specialized in some activities in the context of their respective domestic areas.

The most important conclusion of this analysis is that the floor of Housepit 7 was organized in a way that is much more consistent with a space divided into distinct areas occupied by socially distinct domestic groups than is the organization of space in either of Housepit 3 or Housepit 12.

Housepit 12

The floor of Housepit 12 was divided into six sectors according to the criteria outlined in Chapter 3. The sectors are shown in Figure 2.17. Note that the Center sector includes both the northern section of the 50 cm wide test trench and the northern 50 cm of the southern section. While the recorded provenience of artifacts in these trenches is less precise than in the 50 cm by 50 cm subsquares on the remainder of the floor, the excavators' notes indicate that most of the artifacts in the southern section of the trench were found near the north end of that section. These artifacts were, therefore, attributed to the Center sector and are plotted accordingly in the figures showing their distributions.

Housepit 12 has only half the floor area of Housepit 3 and the sectors on this floor are considerably smaller than those defined in the larger houses. It is assumed that Housepit 12 also housed a smaller population than the larger houses. So areas reserved for particular activities or for the use of certain members of the co-residential group could also have been smaller.

Distribution of fire-cracked rock

The distribution of fire-cracked rock on the floor of Housepit 12 is illustrated in Figure 3.01. There are only twenty-nine (29) fire-cracked rocks on this floor and twenty-three (23) of these are attributed to the Center sector. Even if the four fire-cracked rocks in southern section of the test trench were actually found nearer the perimeter of the floor than the figure indicates, fire-cracked rock would still be strongly associated with the Center sector.

This association is clearly demonstrated in the chi-squared analysis presented in Table 3.32. The frequency of fire-cracked rock on this floor is too low to allow valid chi-squared tests of more than one sector with an excavated area of less than 19 subsquares. So, for the purposes of this analysis the six sectors of the floor have been grouped into three areas. The East area includes the Northeast, East, and Southeast sectors. The West area includes the Northwest and Southwest sectors. The Center area includes only the Center sector.

The exact provenience of the fire cracked rock in the northern

section of the test trench is unknown but at least 15 and possibly 18 of the 29 fire-cracked rocks found in the floor stratum are concentrated around a circular pit just to the north of the center of the floor (Feature 6 in Figure 2.17). This pit, which contains some additional fire-cracked rock, is described in the excavator's report (Handly 1991) as being capped by the floor stratum. While this suggests that the fire-cracked rock associated with this pit was deposited some time before the house was finally abandoned, this concentration of fire-cracked rock is the strongest indication of a hearth on this floor. Presumably, this hearth was located somewhere

Sector	Squares	FCR	E	(O-E)^2/E
E	48	0	12.43	12.43
W	37	6	9.58	1.34
CENTER	27	23	6.99	36.66
Total	112	29		50.43

Chi-squared = 50.43 p (k >= 50.43) < 0.001

Table 3.32 Chi-squared analysis of the distribution of fire-cracked rock in three areas of the floor of Housepit 12.

near the center of the floor. There is some fire-reddening of the floor in the Northwest sector, less than a meter from the concentration of fire-cracked rock (see Figure 2.17). Elsewhere on the floor, fire-reddening occurs only in a few isolated patches less than 20 cm across. Even in these patches fire-reddening is superficial. Since these patches are located near the edge of the floor, they probably resulted from the burning of the structure. Certainly, there is no evidence of multiple hearths on this floor.

Distribution of debitage

The analysis of the distribution of debitage on this floor is also complicated by the importance of the test trench in the excavation. While the excavators notes indicate that relatively large numbers of flakes were found in the northern section of the trench, most of the debitage collected from the test trench was not available for analysis. The test trenches have, therefore, been excluded from the statistical analyses of debitage distributions.

The distribution of all debitage on the floor of Housepit 12 is illustrated in Figure 3.44. Clearly, debitage on this floor is concentrated into a few tight clusters. In the Center sector four adjacent subsquares along the west side of the test trench contain a total of 100 flakes. The flakes found in the test trench were probably associated with this cluster. In the East sector three adjacent subsquares contain a total of 140 flakes. Two adjacent subsquares in the Northeast sector contain an additional 35 flakes. Thus, of the 589 flakes found on this floor outside the test trench, 275 flakes, or 47%, were found in 9 subsquares, which represent only 9% of the excavated floor area.

A chi-squared analysis of the distribution of debitage among the six sectors of the floor of Housepit 12 is presented in Table 3.33. This analysis shows that debitage frequencies differ between the sectors much more than would be expected if the flakes had been randomly distributed. In fact, every sector is significantly different from the remainder of the floor at the 0.05 level.

Sector	Squares	Flakes	E	(O-E) ² /E	chi-squared sector vs. floor
CENTER	18	130	102.93	7.12	8.62
SE	16	54	91.50	15.37	18.19
E	16	181	91.50	87.56	103.66
NE	16	134	91.50	19.75	23.38
NW	15	22	85.78	47.42	55.50
SW	22	68	125.81	26.56	33.77
Totals	103	589		203.77	

Chi-squared = 203.77 p < 0.001

Table 3.33. Chi-squared analysis of the distribution by sector of all debitage on the floor of Housepit 12. None of the chi-squared values for each sector compared with the remainder of the floor has a probability greater than 0.005

The densest concentration of flakes is in the East sector. The Northeast and Center sectors also have relatively high debitage frequencies while the Southeast, the Southwest, and, especially, the Northwest sectors have much less debitage than expected.

Thus, the distribution of all debitage suggests that the floor of

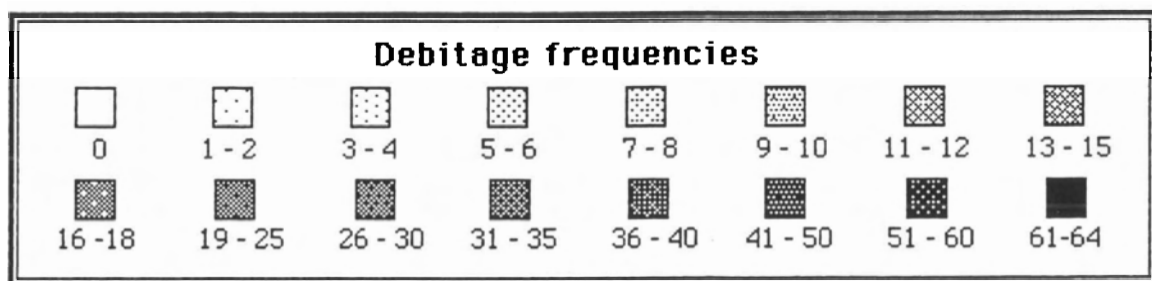
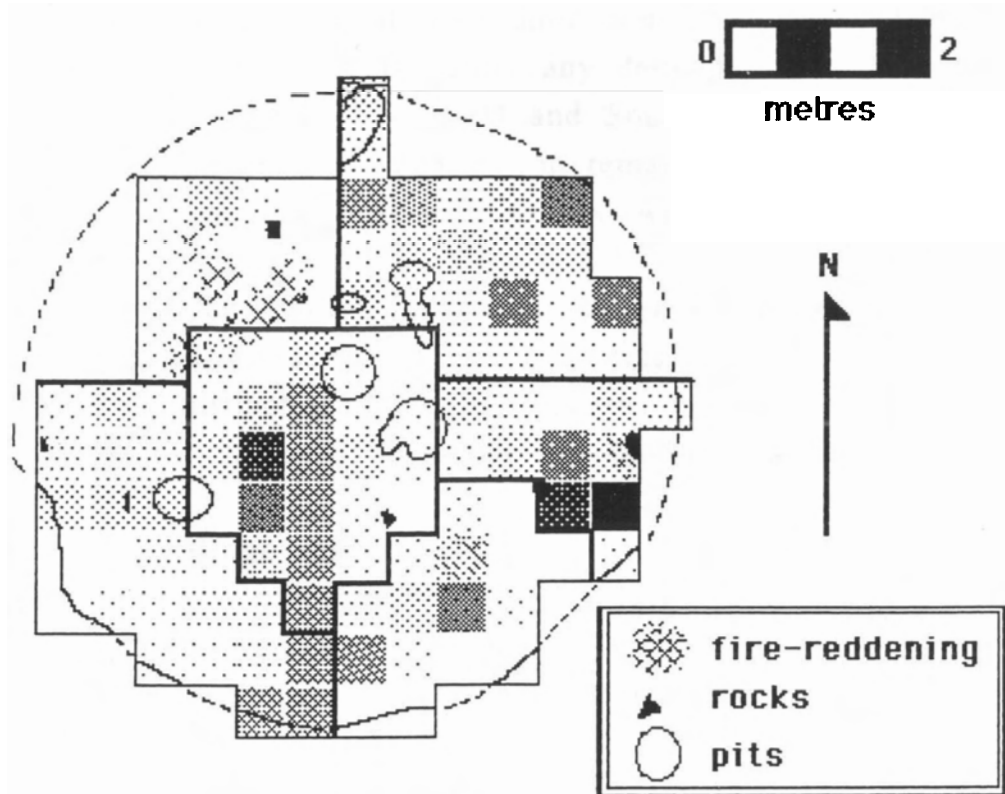


Figure 3.44. Distribution of debitage on the floor of Housepit 12.

Housepit 12 may be divided into at least three distinctive areas: 1) the Northwest sector, where there is hardly any debitage, 2) a southern area, consisting of the Southwest and Southeast sectors, where there is very little debitage, and 3) the remainder of the floor, including the Center, East, and Northeast sectors, where debitage is relatively abundant.

Within the third of these areas, the Center sector was distinguished from the East and Northeast sectors by a concentration of fire-cracked rock. Further distinctions may be apparent in the distributions of various classes of debitage and modified artifacts.

Distributions of debitage classes

Flake type

Seven types of flakes were identified among the debitage on the floor of Housepit 12: secondary flakes, primary flakes, small billet flakes, large billet flakes, unmodified spalls, shatter, and a microblade. The distributions of these types in the six sectors of the floor are shown in Table 3.34.

Flake type	Sector					
	Center	SE	E	NE	NW	SW
Secondary	102	44	154	108	20	51
Primary	12	5	21	23	2	<u>15</u>
Sm Billet	<u>13</u>	2	(2)	2	0	2
Lg Billet	1	1	3	1	0	0
Spalls	<u>2</u>	0	0	0	0	0
Shatter	0	<u>1</u>	1	0	0	0
Microblades	0	1	0	0	0	0

Table 3.34. Distribution by sector of flake types on the floor of Housepit 12. Frequencies which are improbably high at the 0.05 level are underlined and printed in bold type. Frequencies which are improbable at the 0.10 level but not at the 0.05 level are underlined but are printed in plain type. Improbably low frequencies at either level are enclosed in parentheses.

These frequencies were compared with those which would have been expected if each flake type made up the same proportion of the debitage in each sector. In Table 3.34, frequencies with a probability less than or equal to .05 in a binomial distribution are underlined

and printed in bold type. Frequencies with a probability greater than 0.05 but less than or equal to 0.10 are underlined. Improbably low frequencies at either probability level are enclosed in parentheses.

The Southwest sector is distinguished from the remainder floor by an unexpectedly high frequency of primary flakes. The Center sector is characterized by an unexpected abundance of small billet flakes which are unexpectedly rare in the East sector. At the 0.10 significance level, the Center sector is further distinguished by the presence of two unmodified spalls.

Flake size

The distributions of the of the four flake size classes among the six sectors of the floor of Housepit 12 are shown in Table 3.35.

Improbable frequencies were identified and labeled in the manner described for Table 3.34.

Size	Center	SE	E	NE	NW	SW	Total	
≤ 1cm	8	<u>10</u>	16	7	2	(2)	45	
> 1cm ≤ 2cm	88	(29)	122	84	17	44	384	
> 2cm ≤ 5cm	34	15	43	40	3	22	157	
≤ 5cm	4	0	0	0	<u>3</u>	0	0	3
All debitage	130	54	181	134	22	68	589	

Table 3.35. Distribution of debitage size classes by sector on the floor of Housepit 12. Frequencies which are improbable at the 0.05 level are underlined. Frequencies which are improbable at the 0.10 level but not at the 0.05 level are underlined but are printed in plain type. Improbably low frequencies at either level are enclosed in parentheses.

Flakes with a maximum dimension less than or equal to 1 cm are improbably abundant in the Southeast sector and improbably scarce, at the 0.10 probability level in the Southwest sector. Unfortunately, the observed frequencies are somewhat unreliable because the screens used in this excavation had a mesh size large enough (1/4 inch) to pass flakes of this size. Data obtained by screening 1 litre samples of the floor matrix through a much finer mesh (Handly pers.

comm.) do suggest that debitage in the less than or equal to 1 cm size class was relatively rare in the Southwest sector. These data also indicate that debitage in this size category may have made up a greater proportion of the debitage in the Northwest sector than in any other sector. However, the Southeast sector is represented by only a single sampled subsquare in Handy's analysis.

All three of the flakes in the over 5 cm size class which were found on this floor were located in the Northeast sector. This represents an improbably high frequency at the 0.05 probability level.

Raw Material

Ninety-eight percent of the flakes on the floor of Housepit 12 were of vitreous trachydacite. The remaining 14 flakes were of chert or chalcedony. No obsidian flakes were found on this floor. The distribution of the chert and chalcedony flakes among the six sectors of the floor is shown in Table 3.36. Improbable frequencies were identified and labeled in the same manner as in Table 3.34.

	Center	SE	Sector E	NE	NW	SW
Chert or chalcedony flakes	1	0	(<u>1</u>)	<u>7</u>	1	4

Table 3.36 Distribution by sector of chert or chalcedony flakes on the floor of Housepit 12. Frequencies which are improbable at the 0.05 level are underlined. Frequencies which are improbable at the 0.10 level but not at the 0.05 level are underlined but are printed in plain type. Improbably low frequencies at either level are enclosed in parentheses.

In this distribution, an unexpected abundance of chert or chalcedony flakes distinguishes the Northeast sector from the remainder of the floor and, especially, from the East sector where chert and chalcedony flakes are unexpectedly rare.

Cortex bearing flakes

Thirty (30) cortex bearing flakes were identified on the floor of Housepit 12 but none of the six sectors contained cortex-bearing

flakes in frequencies which were improbable even at the 0.10 level.

Distribution of modified artifacts

Thirty-eight (38) modified artifacts were found on the floor of Housepit 12. The distribution of these artifacts is plotted in Figure 3.45. Modified artifact frequencies for each of the six sectors of this floor are shown in Table 3.37.

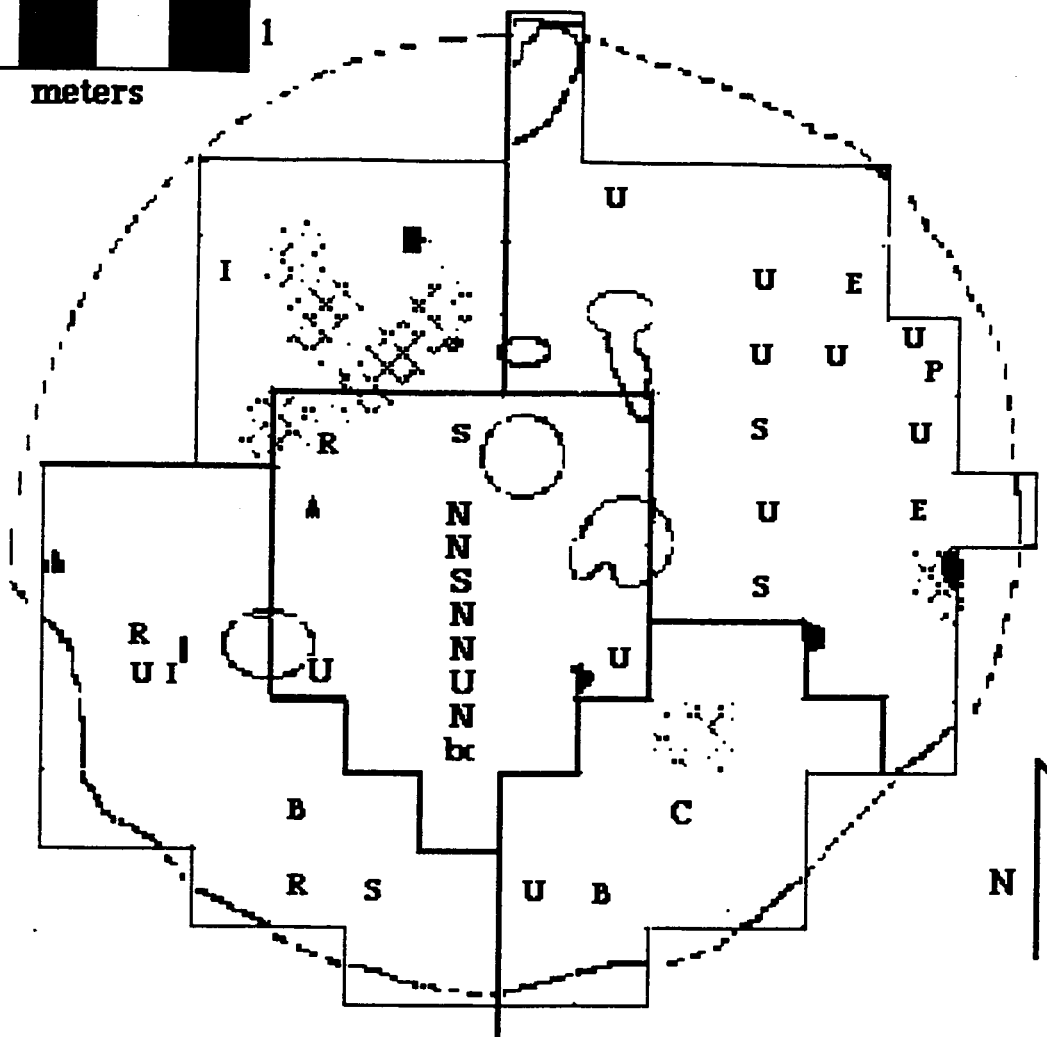
Sector	Squares	Modified artifacts	E	chi-squared	Probability chi-squared > k
CENTER	18	15	6.64	12.75	.0004
SE	16	3	5.90	1.69	.1936
E	16	5	5.90	0.16	.6892
NE	16	8	5.90	0.88	.3482
NW	15	1	5.53	4.35	.0370
SW	22	6	8.12	0.70	.4028
Totals	103	38		17.10	

Table 3.37. Distribution of modified artifacts by sector on the floor of Housepit 12. Expected values (E) are calculated based on an even distribution in relation to the number of subsquares in each sector. The chi-squared values and probabilities are calculated for the frequency in each sector compared with the frequency in the remainder of the floor. The probabilities which were interpreted as significant are printed in bold type.

Chi-squared analyses comparing individual sectors with the remainder of the floor show that both the Center sector, which has more modified artifacts than expected, and the Northwest sector, which has less, are significantly different from the remainder of the floor in terms of the distribution of all modified artifacts.

Modified artifact types

Thirteen distinct artifact types were identified among 38 modified lithic artifacts found on the floor of Housepit 12. As in the analysis of Housepits 3 and 7, some of these types have been grouped into broader categories. Retouched flakes, inverse retouched flakes, and bifacially retouched flakes have been grouped into the category: "acute-edged expedient flake tools". The inverse scraper and the four single scrapers are all classed as heavily-retouched scrapers. The



Artifact types

- | | |
|-------------------------------------|------------------------------------|
| R retouched flake | S heavily-retouched scraper |
| I inversely retouched flake | N notch |
| B bifacially retouched flake | C core |
| U utilized flake | E endscraper |
| P piece esquillee | ▲ projectile point |
| bc bipolar core | |

- | | | |
|----------------|------|-------|
| fire-reddening | pits | rocks |
|----------------|------|-------|

Figure 3.44. Distribution of modified artifact types on the floor of Housepit 12.

distribution by sector of each of the individual artifact types and each of the two grouped categories is shown in Table 3.38.

	Center	SE	SECTOR			
			E	NE	NW	SW
Utilized flakes	3	1	1	6	0	1
Notches	5	0	0	0	0	0
Single scrapers	1	0	1	2	1	0
Retouched flakes	1	0	0	0	0	2
Inverse retouched flakes	0	0	0	0	1	1
Bifacially retouched flakes	0	1	0	0	0	1
Inverse scrapers	1	0	0	0	0	1
Endscrapers	0	0	1	1	0	0
Projectile points	2	0	0	0	0	0
Bipolar cores	1	0	0	1	0	0
Cores	0	1	0	0	0	0

Table 3.38. Distribution of artifact types by sector on the floor of Housepit 12.

Since there are so few artifacts in Housepit 12, even a type of which there are only two examples can occur in an improbably high frequency relative to the number of artifacts in a single sector. The frequency of every individual type in each sector was, therefore, compared with a binomial distribution to determine its probability in a random distribution. The distributions of the two grouped categories of types were analyzed in the same manner.

Artifact types and categories which occur in at least one sector in frequencies which are improbable at the **0.05** level include: **single scrapers** which are improbably abundant in the **East** sector, **acute-edged expedient flake tools** which are improbably abundant in the **Southwest** sector, and **notches** are improbably abundant in the **Center** sector.

At the **0.10** probability level, **utilized flakes** are improbably abundant in the **Northeast** sector.

Interpretation

Table 3.39 summarizes the results of the analyses of the distributions of the various classes of lithic artifacts on the floor of Housepit 12.

	Sector					
	Center	SE	E	NE	NW	SW
Fire-cracked rock	H	L	L	L		
All debitage	HM	LM	H	HM	L	LM
Modified artifacts	H	LM	LM	HM	L	LM
Primary flakes						H
Billet flakes	H			l		
Unmodified spalls	h					
Shatter			h			
Flakes over 5cm				H		
Chert flakes				H		
Notches	H					
Single scrapers				H		
Acute-edged expedient flake tools						H
Utilized flakes					h	

Table 3.39. Lithic artifact classes which occurred in improbable frequencies in at least one sector are identified as follows:

Capital letters indicate frequencies which are improbable at the 0.05 level. Lower case letters indicate frequencies which are improbable at the 0.10 level but not at the 0.05 level. "H" or "h" indicates an improbably high frequency. "L" or "l" indicates an improbably low frequency. For all debitage and all modified artifacts where the frequency for every sector is significantly different from the remainder of the floor the frequencies are classified ordinally as high (H), high medium, low medium (LM), and low (L). High (H) and low (L) were assigned to the sectors with the greatest positive and negative differences between observed and expected values. The remaining sectors were classified as high medium (HM) or low medium (LM) according to the sign (+ or -) of the difference between the observed and expected values.

Modified artifacts, like debitage and fire-cracked rock, are unexpectedly abundant in the Center and Northeast sectors and unexpectedly scarce in the remainder of the floor, especially in the Northwest sector. Flakes in the less than or equal to 1 cm size category probably make-up a higher than average proportion of what debitage is found in the Northwest sector. The Northwest sector contains little fire-cracked rock but does include the only significant fire-reddened area on this floor.

All of this suggests an area which was little used for activities involving the use of stone tools. Alternatively, lithic reduction may have occurred there at some time during the final period of

occupation but most of the resulting debitage appears to have been removed leaving a relatively high proportion of small flakes. On the basis of these data, the Northwest sector seems the likeliest location for a sleeping area on this floor. The fire-reddened area may represent a hearth which served, perhaps among other functions, to warm the sleeping area.

Unfortunately, due to the presence of a tree in the Northwest sector of the floor, a fairly high proportion of this sector was not excavated, particularly in the area near the wall. Debitage concentrations in the Northeast and East sectors occur quite close to the wall so it may be that some concentrations in the Northwest sector were missed. However, the figures showing the distributions of debitage and modified artifacts indicate that lithic artifacts are sparsely distributed in the Northwest sector even in comparison with the portions of other sectors which are nearest to the Center of the floor. So I am inclined to accept the interpretations based on a general scarcity of lithic artifacts in the Northwest sector.

The Center sector is distinguished from the Northwest, Southwest, and Southeast sectors by a higher than expected frequency of debitage. It is distinguished from all of the other sectors by unexpectedly high frequencies of both fire-cracked rock and modified artifacts. Small billet flakes are much more abundant in the Center sector than in any other sector. The Center sector also contains the only two projectile points, the only two unmodified spalls and all five of the notches found on this floor. The Center sector contains such a high proportion of all the modified artifacts on this floor that even the occurrence of 5 out of 5 notches there is not improbable at the 0.05 level. Even so, these distributions suggest that Center sector may have been preferred for some activities involving the use of these three artifact types, as tends to be the case in the other two housepits examined.

These data suggest that the Center sector was used for activities which were substantially different from those which occurred in other areas of the floor, including the Northeast and East sectors. Small billet flakes could be taken as evidence of the maintenance of bifacial tools which were probably part of the personal gear people

carried with them during forays away from the site, in contrast to the flake tools which are so common inside these houses. The smallest of the flakes identified as billet flakes could also be by-products of the pressure flaking of projectile points. Notches have been interpreted as tools used in the preparation of shafts including shafts used for arrows and darts. So this sector could be interpreted as an area commonly used for the maintenance of hunting gear. An open area would have been required to allow the handling of the shafts of spears, darts, and long arrows, which might have to be turned in several directions as they were worked.

The Northeast and East sectors are distinguished from the Southeast and Southwest sectors by unexpectedly high debitage frequencies. While modified artifacts, in general, are more or less evenly distributed among these four sectors, Figure 3.45, showing the distribution of modified artifact types, suggests that the Northeast and East sectors may also be distinguished from the Southeast and Southwest sectors by the distribution of artifact types. Acute-edged expedient flake tools, (types 70, 170, and 140) which are improbably abundant in the Southwest sector, are represented by one bifacially retouched flake in the Southeast sector but are entirely absent in the East and Northeast sectors. Single scrapers, (type 150) which are improbably abundant in the East sector, are present in the Northeast sector but absent in the Southwest and Southeast. The Northeast and East sectors are also the only sectors which contain endscrapers (type 162).

The Northeast sector is distinguished from all other sectors, including the East sector by improbably high frequencies of both chert flakes and flakes in the over 5 cm size category. The chert flakes in the Northeast sector are very concentrated and probably represent a single reduction event. Also, there are only three of the large flakes among the 589 pieces of debitage. Thus, while the distributions of these two debitage classes distinguish the Northeast sector from the East sector, they seem less important than the distribution of all debitage and the distributions of several artifact types which distinguish the Northeast and East sectors from the Southwest and Southeast sectors.

In functional terms, the Northeast and East sectors have scrapers and endscrapers which have been interpreted as evidence of hide-working. Most of the other modified artifacts in this sector are retouched flakes. In the interpretation of Housepit 7, a combination of utilized flakes fire-cracked rock, and presumed hide-working tools was taken as possible evidence of a women's work area and this may also have been the function of the East and Northeast sectors of Housepit 12.

Modified artifacts in the Southwest and Southeast sectors tend to have acute, retouched edges though there are also one inverse scraper and two utilized flakes. Food preparation is the activity which has usually been associated with acute edges in this study but faunal material on this floor is found mostly in the north. Also, modified artifact in general were scarce in the Southwest and Southeast sectors of Housepit 12 but were unexpectedly abundant in the sectors identified as food preparation areas in Housepits 3 and 7. At this point, I will argue only that activities common to the Southwest and Southeast sectors were apparently different from those in other areas of the floor.

The abundance of all classes of lithic artifacts in the Center sector of the floor of Housepit 12 and the abundance of modified artifacts in particular suggests that the center of the floor was strongly preferred by the inhabitants of this pithouse for many activities involving the use of lithic artifacts. This is probably because there was less useful space near the edges of the floor in this house than in deeper houses. If many activities were restricted to the center of the floor, there might have been less distinction between areas used for different activities or between men's and women's areas than in larger houses.

Overall, the evidence presented above suggests that, in Housepit 12, the center of the floor and three distinct sections of the periphery were each used for different activities. Adjacent sectors in the periphery tend to be more similar than sectors on opposite sides of the floor. This is most consistent with model proposed for a house occupied by a single social unit which conducted different activities in different "rooms" on different sides of the house. There is no

evidence to suggest that the floor was divided radially into areas with similar functions which might have been occupied by several somewhat independent social units.

Chapter 4: Formation processes

In Chapter 3, it was argued that some sectors defined on the floors of three housepits were used for different purposes than others on the following grounds:

- 1) some sectors contained features, most notably hearths, which were absent in other areas.
- 2) some sectors contained significantly more fire-cracked rock, and/or lithic debitage and/or modified lithic artifacts than others in proportion to their respective areas.
- 3) some classes of lithic debitage and some types of modified artifacts occurred in some sectors in frequencies which would be improbable if every flake and every modified artifact, regardless of class or type, had an equal chance of being deposited in any sector in proportion to the total number of flakes or modified artifacts in that sector.

The argument which attributes these differences to different uses of different areas of the three floors rests on the following assumptions:

- 1) the fire-cracked rocks, debitage, and modified artifacts which were found on these floors were deposited there as the direct result of processes which occurred on these floors during the relatively short periods in which these houses were last occupied. That is, from the time the housepit was last re-excavated and re-roofed until its final abandonment.
- 2) the processes which resulted in the deposition of these artifacts were directly related to the activities in which the artifacts were last used or to storage. (Some of the interpretations suggested in Chapter 3 refer to the possible storage of artifacts at some other location than the site of their last use. The possible contribution of artifact storage to the patterns observed in the distributions of artifacts on the floors of the three housepits will be discussed below.) Likewise, it is assumed that debitage was deposited at or near the location at which it was generated. Analyses of "microdebitage" distributions may provide a means of testing this assumption.

Schiffer (1985, 1987) has cautioned against archaeological interpretations of house-floor assemblages which are based on the assumption that these assemblages represent "complete systemic inventories" (Schiffer 1985:21). He suggests several processes which may deplete systemic artifact inventories. Generally, these involve the removal of still-usable items either by the occupants, during the abandonment process, or by others, after the house is abandoned. Several of these processes very probably contributed to the depletion of the systemic artifact inventories in use on the three house-floors examined in this study, just prior to their abandonment. Indeed, it is presumed that most of the valuable and portable artifacts in the systemic inventory were curated and carried away by the occupants or distributed to other inhabitants of the village during a fairly gradual process of abandonment.

Note, however, that the argument, proposed in this thesis, that different areas were used for different purposes does *not* depend on the assumption that the artifacts distributed on the three floors represent complete systemic inventories. I assume, only, that most of the artifacts which were found on these floors were deposited, during the last occupations, near the locations where they were used.

I argue that most of the artifacts on the three floors examined in this thesis were probably deposited as what Schiffer (1985:24) calls "primary refuse", that is items of little intrinsic value or future utility which were "lost" at or near the locations where they were last used. I think this argument can be supported despite the fact that Schiffer expects primary refuse from the principal use of a structure to be rare (Schiffer 1985:24). The great majority of the modified artifacts on the three floors are simple flake tools which are presumed to have had short use-lives and little intrinsic value. The average maximum dimension for the modified artifacts from the three floors is only 35 mm and McKellar (1983) has shown that small artifacts are often deposited as primary refuse. In Housepit 7, where artifacts are most densely distributed, the modified artifact density in the excavated floor is only 14.0 artifacts/m². Housepit 3 and Housepit 12 have 8.0 artifacts/m² and 2.2 artifacts/m², respectively. Thus, it seems quite probable that a large proportion of the artifacts found on

the three floors could have been pressed into the floor deposits and lost as two or three centimeters of floor deposit accumulated over several seasons of occupation.

Debitage and fire-cracked rock may also have been deposited as primary refuse, in the sense that they were probably not valuable or portable enough to be worth removing and are likely to have accumulated where they were used or manufactured. Schiffer (1987:268) suggests that accumulations of primary refuse are especially likely in lithic workshops.

Some of the artifacts found on the three floors may also have been deposited as "de facto refuse" (Schiffer 1985:26). That is they may be items with some potential for further use which were left behind when a house was abandoned. This is especially likely in the case of some spall tools, cores, abraders, and hammerstones which were apparently cached at various locations around the edges of the floors of Housepits 3 and 7.

Schiffer (1985) also suggests that artifacts may be deposited on house-floors as abandonment refuse, as ritual deposits, as secondary refuse, or as the result of postabandonment uses, postoccupational collapse, or other postoccupational disturbances.

In this chapter, I discuss these processes and others which may have contributed to the formation of the floor assemblages in the three housepits examined in this study and consider how they affect the appropriateness of my assumptions.

Given the assumptions which must be examined, there are two categories of formation processes to be considered: 1) processes which may have introduced artifacts ordebitage from sources other than the floors and/or from deposits associated with some other occupation of the site, and 2) processes which may have displaced artifacts from the location at which they were last used to another location on the floor or which may have removed artifacts from the floor.

Processes which may have introduced artifacts to the house floors

These processes fall into two broad categories:

1) processes which introduced artifacts from other strata within the housepits including: the roofs, the rims, pits excavated into the sterile soil beneath floor, and, in the case of Housepit 7, sub-floor deposits associated with earlier occupations.

2) processes which introduced artifacts from sources outside the houses either during the period of occupation or after abandonment.

Processes which may have introduced artifacts to the floor from other strata within the housepits

Artifacts might have been introduced into the floor strata from other strata within the housepits by any of the following processes:

a) people in the houses may have pulled artifacts out of the rim, roof, or sub-floor and deposited them on the floor.

b) portions of the roof or rim may have collapsed onto the floor during the last period of occupation and artifacts from the rim or roof may have become mixed with the floor deposits.

c) pits may have been excavated through the sub-floor with the result that artifacts from the sub-floor deposits were deposited on the floor.

d) pits which had been filled in with material from other occupations may have been re-excavated with the result that artifacts from the pit fill were deposited on the floor.

e) after abandonment of a pithouse, artifacts may have fallen out of the roof as it deteriorated and collapsed and been deposited on the floor.

f) after the collapse of a roof, artifacts may have been vertically displaced from the roof stratum to the floor stratum by gravity, bioturbation, cryoturbation, etc.

Any or all of these processes might easily have introduced artifacts to some sectors of the floors in sufficient numbers to distort any activity-related patterns in the artifact distributions. Any or all of these processes might also have introduced some class(es) of debitage or some type(s) of modified artifacts to some sectors of the floors in sufficient numbers to distort activity-related patterning. However, the available evidence suggests that none of these

processes contributed to the assemblages of artifacts on the housepit floors to such an extent as to obscure differences between sectors which resulted from different activities.

There are a number of lines of evidence which support this claim:

1) Artifacts in the floor strata appear to be distinguished from those in other strata by their consistently horizontal orientation in the matrix (Hayden et al., 1987) (see Table 4.01). This argues against mixing of the roof and floor deposits and suggests that mechanical disturbance of the floor deposits was minimal.

	% of artifacts which were horizontally oriented by stratum		
	Surface	Roof	Floor
HP 7	81	74	96
HP 3	-	34	92

Table 4.01. Percentage of artifacts which were horizontally oriented by stratum in Housepits 3 and 7. Data were recorded for artifact excavated in the test trenches in both housepits.

2) Patterns observed in the distributions of mesodebitage in the floor strata (Handly, pers. comm.) are generally consistent with those observed in the distribution of macrodebitage.

3) Analyses of the distributions of faunal material and the extent to which bones were weathered in the roof, rim, and floor strata indicate minimal mixing or "contamination" of the floor with material from other strata (Kusmer, 1991:4).

4) There is no geomorphic evidence of significant mixing resulting from cryoturbation or mass movements. There are some cicada larvae burrows but these are never so dense that strata were obliterated. Rodent activity was largely limited to the rim deposits. Generally, the excavators found it easy to distinguish the floor from other strata on the basis of differences in color, texture and compactness. In many areas, a layer of charcoal, resulting from the burning of the roof, separated the roof and floor strata.

5) The observed distributions of those modified artifact types which were most important in distinguishing some sectors of the floors from others are most consistent with a model that admits the

deposition of artifacts which were last used on the floors but which does not, necessarily, incorporate any of the processes which may have introduced artifacts from other strata.

Consider, for example, the clustering of fire-cracked rocks and debitage around the hearths on the floor of Housepit 7. Consider also, the distributions of utilized flakes (Figure 3.07) and heavily retouched scrapers (Figure 3.08) on the floor of Housepit 3. Both types were relatively abundant in this assemblage. Both occurred in improbable frequencies in at least one sector of the floor and both were important to the recognition of a major distinction between the northeast and southwest sides of this floor. In addition, each of these types is effectively absent in the sector where the other is most abundant.

A similar phenomenon can be observed in the distributions of heavily retouched scrapers (Figure 3.28) and utilized flakes (Figure 3.29) on the floor of Housepit 7. Again, each type is absent where the other is most abundant. In this case the two distributions distinguish the Outer and Central zones of the floor.

Both of these artifact types appear to be present throughout most of the deposits which make up the housepits. The two types are distinguished only by edge angle and retouch. So it is difficult to imagine any process, even intentional human activity, which would selectively extract only one of these types from the roof, rim, or sub-floor deposits or from pit-fill. Even if we supposed that one or more of the suggested formation processes introduced utilized flakes but not heavily retouched scrapers into one area of a floor from other deposits, we would still need to invoke cultural processes occurring during the last period of occupation to account for the absence of heavily retouched scrapers in the other area. Either heavily retouched scrapers were never used in, for example, the Southwest sector of Housepit 3 or they were consistently removed from that sector. Only if we suppose that cultural processes occurring during the last occupations of the floors of Housepits 3 and 7 played no role in the formation of the lithic assemblages found on those floors can we reasonably deny that the distributions of heavily retouched scrapers and utilized flakes indicate that quite different activities

occurred in different areas of those floors. It seems far more reasonable and parsimonious to argue that activities involving the use of heavily retouched scrapers but not utilized flakes occurred in the one area while activities involving the use of utilized flakes but not heavily retouched scrapers occurred in another.

While not every type of modified artifact is so discretely distributed, each floor contains several types which are concentrated within limited areas. As was shown in Chapter 3, the distributions of these types, combined with the distributions of various debitage classes and the distributions of fire-cracked rock, debitage, and modified artifacts in general, tend to consistently distinguish the same areas of the floors. This consistent patterning is more easily explained in terms of patterned behavior than by the more random processes which might have introduced artifacts from other strata within the housepits.

It cannot be confidently stated that no artifacts were introduced to the floors from other strata within the housepits. The distributions of some specific artifact types, especially those which occur in very low frequencies, may be largely the products of processes which introduced artifacts from other deposits. Specific activities which have been inferred from associations between artifact types on these floors must, therefore, be viewed with some caution. Never the less, the overall patterns that characterize some areas of the floors can only be satisfactorily explained with reference to behaviorally patterned cultural activities.

Processes which may have introduced artifacts from sources outside the housepits

Processes which may have introduced artifacts from sources outside the housepits fall into three categories:

1) Collection

Modified artifacts may have been introduced to the floors from a variety of outside sources by residents of the housepits during the last periods of occupation. These artifacts might have been selectively collected for the purpose of reuse or simply as curiosities or playthings.

2) Disposal of secondary refuse

After the houses were abandoned, modified artifacts, debitage, and fire-cracked rock from a variety of sources may have been introduced to the house floors as refuse.

Unfortunately, all three of these categories of formation processes are likely to have resulted in patterned distributions of artifacts and classes of artifacts.

3) Postabandonment uses

After the houses were abandoned but before they collapsed or were burned down they may have been used for a variety of purposes other than long-term residence. For example they may have been used as children's play areas, or as short term shelters.

Collection involves the selection of objects which are useful or interesting to the collector. The selected objects are quite likely to be deposited close together, either where they were used in a localized activity or in storage or disposal contexts. Clearly, collection could easily have resulted in significant variability between sectors in the distributions of certain artifact types. For example, Teit (1909:545) documents the collection and reuse of projectile points in this region. The concentration of early projectile point types on the east side of the floor Housepit 7 (Figure 3.37) could be explained in terms of collection.

Most collected artifacts without time-diagnostic features may not be easily distinguishable from artifacts which were manufactured, used, and deposited on the house floors. Surface finds of older pieces might be expected to exhibit some patination but more recent artifacts might have been collected from active work areas outside the houses. The residents of the pithouses may even have excavated artifacts from matrices quite similar to the floor deposits.

As long as variability between sectors in the distributions of modified artifact types is interpreted simply as evidence that different sectors of the floors were used for different activities, the possibility that some types of modified artifacts were introduced to the floors as the result of collection does not present major difficulties. Objects that were collected were probably acquired

because they were suited to or required for a specific activity. The more abundant types, such as utilized flakes and heavily-retouched scrapers, were probably too commonplace to have been of interest. Rarer and, perhaps, more valuable types, particularly artifacts which were carefully made or made of exotic materials, may have been more useful and interesting.

On all three house floors, the identification of areas used for different activities is based on the distributions of some of the most abundant types of modified artifacts and on the distributions of fire-cracked rock and debitage. Some of the rarer types of modified artifacts are distributed in patterns which conform to those identified in the distributions of the more abundant artifact types. Others are not. In both cases, it is conceivable that these distributions could be the result of the deposition of collected artifacts. Thus, interpretations which relate the association of rare artifact types to specific activities must be viewed with some caution.

Disposal, on the abandoned housepit floors, of **secondary refuse** containing artifacts from sources outside the housepits can present a more serious problem. It is not improbable that refuse from one house could be dumped into a fairly limited area on the floor of another, abandoned house. Unlike materials introduced from other strata within the housepits, the material deposited in this kind of dumping event might well include relatively large numbers of one of the more common flake tool types and none of another type. A single dumping event might account for all of the utilized flakes in the Southwest sector of Housepit 3 or all of the heavily retouched scrapers and debitage in the West sector of Housepit 7.

There are, however, several strong arguments against any significant contamination from outside dumping. First, it is unlikely that refuse was carried to abandoned housepits for disposal when it could more conveniently be deposited at the base of the roof of the house in which it had accumulated. Especially during cold weather occupations, it is doubtful if many people would want to carry their refuse any further than necessary.

Second, any refuse which was deposited onto an abandoned housepit floor would be deposited through the central roof opening

onto the *center* of the floor. It is inconceivable that people would climb down into an abandoned housepit to deposit refuse around the edges of the floors. Refuse which was deposited through collapsed portions of the roof would fall on roof deposits rather than floor deposits. Yet large areas in the centers of two floors had very low frequencies of all classes of lithic artifacts.

Third, deposits characteristic of dumping events were identified in other excavations at this site, specifically, in the test trench in Housepit 58 at the Keatley Creek site. These deposits occurred in localized mounds, containing ash, fire-cracked rock, bone, cumbersome rock, and debitage, which were easily distinguished from the floor deposits. No such deposits were identified in Housepits 3, 7, or 12.

Fourth, the fact that utilized flakes are absent where heavily retouched scrapers are most concentrated and vice versa is most readily explained in terms of different activities in different areas. It is stretching the bounds of coincidence to suggest that the one sector on the floor of Housepit 3 and the one sector on the floor of Housepit 7 which contained utilized flakes in improbably low frequencies happened to be the sectors where large numbers of heavily retouched scrapers were dumped.

Thus, it may be said with relative confidence that different areas on these floors were used for different purposes and that these differences are reflected in the artifact distributions.

Postabandonment occupations could have resulted in patterned distributions of artifacts which might be difficult to distinguish from patterns generated by the behavior of the last residents. Children or visiting groups of hunters might have repeatedly used one area of a floor for the same activity over fairly long periods of time. If so, they could have introduced some class or classes of artifacts to one sector of the floor in significant numbers. Thus, the patterned behavior of the last visitors rather than the patterned behavior of the last residents could account for some of the complementary distributions and other patterns observed on the floors of the three housepits.

There are, however, several reasons to suppose that this was not

the case:

1) The artifacts are distributed throughout floor deposits which are several centimeters deep. So at least some of the observed patterning is attributable to activities which occurred during the last occupation.

2) At least in Housepit 7, the distribution of debitage and fire-cracked rock, coincides with distribution of fire-reddened areas all over the floor. This pattern almost certainly developed in the course of long-term residence and is apparently undisturbed by subsequent visits.

3) In both Housepit 7 and Housepit 3, a large area in the center of the floor was relatively free of artifacts. This pattern, too, is most likely to have been established by long-term residents. There is less reason for casual visitors to have kept this space clear.

4) Utilized flakes and retouched scrapers have complementary distributions on two floors. The areas where each type occurs and the areas where each type is absent are quite different in the two houses and are arranged quite differently. Thus, it seems most probable that, at least so far as these artifact types are concerned, the observed patterns in the two houses resulted from two quite different approaches to the organization of space. It seems more likely to me that such differences would exist between larger and smaller long-term, coresidential groups, or between long-term residential groups and visiting parties of hunters than that two visiting hunting parties would organize their use of space so differently. Thus, at least one of the complementary patterns was probably established by a long-term residential group and since the same types have complementary distributions in both houses it seems likely that both patterns were established by similar processes.

The fact that patterns established on these floors during the last occupations have not been disturbed does not preclude the patterned distribution of some artifact types after the houses were abandoned. Neither does the argument that patterns in the distribution of some artifact types are the results of patterned behavior before abandonment demonstrate that no artifact types were distributed in patterns after abandonment. Inferences which depend on the

distributions of artifact classes which are not associated with the distributions of utilized flakes, heavily-retouched scrapers, fire-cracked rock, or hearths and other features should be viewed with particular caution. However, it does appear that the distributions on which the most important conclusions of this study depend (see Chapter 6) can most reasonably be explained as the results of organization of space on the the floors during the last occupations.

Processes which may have displaced artifacts from primary contexts

Most of the processes which are likely to have displaced artifacts which were originally deposited in primary contexts on the house floors are cultural processes which would have occurred on the house floors during the final periods of occupation. These include:

a) clean-up

From time to time, during the periods when the pithouses were last occupied, modified artifacts, debitage, and fire-cracked rock were probably removed from primary contexts in some areas of the floor and deposited in secondary contexts in other areas. In Chapter 3, it was suggested that dense concentrations of debitage in the West sector of Housepit 7 and the Northeast sector of Housepit 3 might be dumps which had resulted from some such clean-up process. It was also suggested that the large numbers of heavily-retouched scrapers associated with these concentrations might have been provisionally deposited there with a view to future reuse or discard. Significant differences between sectors in the distributions of some artifact types may identify distinctions between areas in which artifacts were deposited in secondary contexts and areas where artifacts were deposited in primary contexts rather than between areas used for different tasks.

In the preceding discussion of formation processes which may have introduced artifacts to the floor it was shown that, in Housepits 3 and 7, heavily-retouched scrapers are absent where utilized flakes are most abundant and vice versa (Figures 3.07, 3.08, 3.24, and 3.25). In fact, given the relatively large numbers of both types in both assemblages and their broad distributions on both floors, there is

surprisingly little overlap in the distributions of these two artifact types on either floor. On the other hand, the distributions of both types do overlap to a much greater extent with the distributions of expedient scrapers (Figures 3.23 and 3.41) and acute-edged expedient flake tools (Figures 3.22 and 3.42) on both floors. These distributions might be expected if expedient scrapers and acute-edged expedient flake tools were interpreted as intermediate stages in processes of remanufacture and reuse of flake tools which lead from utilized flakes to heavily-retouched scrapers.

In this model, when the edges of utilized flakes were too worn to be of further use in the task for which they were originally manufactured, some of the flakes would have been selected to be modified into expedient scrapers or acute-edged expedient flake tools. These tools may have been used in some activities which also required the use of utilized flakes and, perhaps, in other activities which did not. If both utilized flakes which were not selected for modification and retouched flake tools which had some potential for further resharpening tended to be deposited in primary contexts, then the distributions of these types could be expected to overlap to a large extent. Retouched flake tools which were worn and repeatedly resharpened to the point where further resharpening seemed less rewarding than the manufacture of a new tool might well have been discarded in an area used for lithic reduction where piles of debitage already existed. This discard may have been provisional in the sense that both the debitage and the heavily-used retouched flake tools may have had some recognized potential for future use. The distribution of heavily-retouched scrapers would then tend to overlap with the distributions of acute-edged expedient flake tools and expedient scrapers simply because some of the artifacts classified as expedient flake tools would, in the eyes of the users, have fallen into the discard category.

This model does not invalidate the arguments which were employed to distinguish between areas used for different purposes. It may still be confidently concluded that some areas of both floors were not used for activities involving the use of utilized flakes. These areas may have been used simply as dumps for artifacts and

debitage collected from all over the floors. More probably, given the dense concentrations ofdebitage in these areas and, in Housepit 3, the association with cores and hammerstones, they were also used for lithic reduction. In either case they were used for different activities from the remainder of the floor.

c) removal

Artifacts which were used on the house floors are likely to have been removed for two reasons: 1) because they were worn out or useless and 2) because they were valuable and likely to be useful somewhere else.

In the first case, accumulations of artifacts may have been removed from time to time as they began to impede the use of the floor or fill-up provisional discard areas (see Hayden and Cannon, 1983). If the concentrations of artifacts on the floors of Housepits 3 and 7, which were interpreted as dumps in the preceding discussion of clean-up processes, did, in fact, accumulate in the manner suggested, then it is likely that the classes of artifacts typically removed for this reason were the same classes found in the dumps. Alternatively, concentrations containing relatively large numbers of, for example, utilized flakes may have been periodically "cleaned-up" from other parts of the floor. It seems unlikely, though, that heavily retouched scrapers could have originally accumulated in the areas where utilized flakes were found in large numbers and then been removed so thoroughly as to account for their almost total absence in these areas. Nor does removal adequately explain the absence of utilized flakes in the areas where heavily retouched scrapers are most abundant.

Fire-cracked rock is one class of artifacts whose distribution could easily have been significantly influenced by removal although the fire-cracked rocks which were removed would, presumably, have been replaced.

b) trampling

Artifacts may have been kicked aside by people walking across the floors. Generally, artifacts would only have been displaced a short distance by this process.

d) storage

In both Housepit 3 and Housepit 7, several artifacts occurred in contexts suggestive of storage. Most of the abraders in both houses were found near the edges of the floors. Cores, hammerstones, and spall tools were found in similar locations, often in close proximity to one another. A stack of five spall tools was found at the edge of the floor in the Northwest sector of Housepit 7 in a deposit which may have been associated with the last occupation (see Figure).

Artifacts are sometimes stored some distance from the locations at which they are used and distributions which have been interpreted as evidence that some sectors were used for a particular activity may actually indicate storage instead. Where possible, I have tried to identify artifact patterns which may have resulted from storage.

The concentration of cores and hammerstones on the east side of Housepit 3 includes several examples of both types which do not appear to be in storage contexts. These artifacts are also associated with a very high debitage frequencies. So cores and hammerstones which do appear to have been stored were presumably stored close to where they were used. On the other hand, a possible hide-working area in the southeastern part of the floor of Housepit 7 was defined around a concentration of spall tools which may have been deposited in a storage context.

Other processes

Two additional processes must also be considered which do not fit conveniently into any of the categories so far discussed. These are: the deposition of **ritual deposits** and the deposition of **abandonment refuse**.

Ritual deposits, in the sense suggested by Schiffer (1985:29), are associated with the abandonment, and sometimes the burning, of houses in which someone has died. Schiffer cites an example from Kent (1984) who concluded that a burned Navajo hogan had been abandoned due to a death because it contained many still-usable portable objects.

The three pithouses considered in this study do appear to have

been burned and may, in fact, have been abandoned because someone died inside them. However, none of the floor assemblages included many artifacts which are considered likely to have been curated and it is hard to imagine that anyone would have introduced or rearranged the flake tools and debitage which predominate in these assemblages as part of any ritual.

Schiffer (1985:25) argues that **abandonment refuse** will accumulate as standards of cleanliness and order are relaxed in anticipation of an impending abandonment. He suggests that broken artifacts, artifacts with high discard rates (such as simple flake tools), and the waste products of food preparation (such as fire-cracked rock) are particularly likely to accumulate under these circumstances. I would add debitage to this list.

It is quite probable that some of the artifacts on the floors of Housepits 3, 7, and 12 did accumulate during the process of abandonment. Since standards of cleanliness are presumed to have relaxed during this period, these artifacts are, if anything, more likely to have been deposited in primary contexts than artifacts which accumulated throughout the period of occupation. Thus, the possible deposition of abandonment refuse does not invalidate any of the assumptions on which the interpretations in Chapter 3 are based.

Summary

In general, the distributions of artifact classes and features which distinguish between areas of the floors which were used for different purposes can most reasonably be explained as the products of patterned human behavior which occurred on the floors of the three housepits during their last occupations. In some cases, individual artifact classes, especially some of the rarer classes, whose distributions have been interpreted as the results of specific activities, may have been introduced or rearranged by other processes. The fact that the broadest patterns on these floors do not appear to have been greatly disturbed by processes other than patterned human behavior does, however, suggest that such disturbances were minimal. The different patterns in the distributions of lithic artifacts on the floors of the three housepits

must, therefore, be explained with reference to factors which may have influenced the social organization of space.

CHAPTER 5.

Models of the Social Organization of Space in Plateau Pithouses

In Chapter 3, analyses of the distributions of various classes of lithic artifacts on the floors of three housepits revealed quite different patterns on the floor of each house. These differences were provisionally attributed to differences in the way in which the use of space was organized in each house during its last occupation. Chapter 4 examined a variety of other processes which might have contributed to the formation of the floor deposits and concluded that the observed patterns could, in fact, most reasonably be interpreted as the products of patterned human behavior during the last occupations of the three houses. The aim of this chapter is to suggest some reasons why space might have been organized differently in different houses.

Since the three housepits examined in this thesis are located within 200 m of one another and are presumed, on the basis of the available data, to have been occupied at about the same time, differences between houses cannot be attributed to different environmental conditions or changes over time. For the same reasons, it seems unlikely that the observed differences resulted from major cultural differences between groups residing in different houses. That is, there is no compelling reason to suppose that space was organized differently in different houses because of different kinship structures, marital practices, or cosmologies. If it is assumed that all three pithouses were used for the same basic purpose, that is, for winter residence, differences between pithouses in terms of the organization of space can most reasonably be explained with reference to physical constraints imposed by the size and form of the structures themselves and/or to social differences. In this context, social differences include differences in the wealth and/or status of different coresidential groups as well as different forms of social organization.

Some consideration will be given to the influence of physical constraints on the organization of space. However, differences in the

size and form of the three pithouses must themselves be explained with reference to socioeconomic factors. The focus of this discussion will, therefore, be on the effects of different forms of socioeconomic organization. Other researchers working in this region (Hayden et al. 1985) have suggested that the construction, during the Kamloops phase, of the largest pithouses at large pithouse village sites may have been associated with the development of large, hierarchically-organized corporate groups. So, particular attention will be given to a model predicting the effects of this form of social organization on the social organization of space within pithouses.

Physical constraints

In Housepit 12, the smallest of the three housepits, modified artifacts and debitage were concentrated near the center of the floor and were relatively sparsely distributed around much of the periphery. In Housepits 3 and 7, large areas near the centers of the floors contained relatively few modified artifacts and little debitage. The densest concentrations of modified artifacts and debitage were found nearer the edges of the floors. Most peripheral areas on the larger floors contained relatively dense concentrations of lithic artifacts.

It was suggested that the organization of space in Housepit 12 differed from that in the larger houses largely because Housepit 12 was smaller and shallower and would have offered little headroom near the edges of its floor. Most activities involving the use of lithic artifacts require at least sitting headroom so these activities would, necessarily, have occurred nearer the center of the floor.

In the larger, deeper houses, there was more useful space near the edges of the floors. So the center of the floor, near the foot of the entry ladder, could be used as a traffic area. In fact, the presumably larger populations in these houses probably made such traffic areas necessary.

Some differences in the way space was organized in Housepit 3 as opposed to Housepit 7 might also have been the result of differences in the size and form between the two structures. Besides the difference in estimated floor area, (78.5 m² in Housepit 3 vs. 113.1

m² in Housepit 7), Housepit 3 was more rectangular in shape while Housepit 7 was apparently round or ovoid in form (see Figures 2.12 and 2.14).

It may be that a concentric arrangement like that identified in Housepit 7 was impractical in Housepit 3 simply because each concentric zone in the smaller house would have been too narrow to accommodate the activities for which it was intended. However, the difference between the two houses in the width of each concentric zone would not have been very great. The floor of Housepit 3 has a radius of 5m and the floor of Housepit 7 has a radius of 6m. In the larger house, three concentric zones of equal width would each be 2 m wide. In the smaller house the width of these zones would be 1.66 m. Still, even this small difference may have been enough to make a concentric arrangement less convenient in the smaller house. Alternatively, a bilateral arrangement, like that identified in Housepit 3, might have "fit" better than concentric zones in a rectangular structure.

As was suggested above, these explanations beg the question to some extent. Assuming that a concentric arrangement is awkward in a rectangular house or impractical on a floor with a radius under 6m, we must still ask why the residents of Housepit 7 chose to build a larger, round house and why they chose to divide it into concentric zones rather than bilateral areas. I see no obvious reasons why a bilateral arrangement should be impractical in a large round house.

Leaving aside such intangibles as taste, differences between housepits in the organization of space must be explained with reference to socioeconomic factors.

Socioeconomic factors

Within societies with generally uniform kinship structures and marital practices, the social organization of individual coresidential groups could be expected to vary with their relative wealth and status. In a society, like that recorded in the ethnographies of B.C.'s Interior Plateau, which practiced polygyny (Teit 1906:592, 1909:269) and slavery, (Teit 1906:570) wealthier and more prestigious groups could be expected to include more slaves and

more wives than poorer, less prestigious groups. The greater size of the wealthier coresidential groups and the greater diversity in the status of individual members of those groups should certainly influence the way in which they were organized and, thus, the way in which they organized the spaces where they lived.

Competition, between smaller groups in a society just beginning to develop status and control of important resources, might have led some groups to seek competitive advantages through new forms of social organization. Hayden et al. (1985) have suggested that groups living in large pithouse villages in the Mid-Fraser River region about 1100 years ago might have gained a number of competitive advantages by organizing themselves into large, hierarchically-organized coresidential corporate groups.

The model presented below attempts to predict how this form of social organization would have influenced the social organization of space within the residences of such groups.

Large, hierarchically-organized, coresidential corporate groups

Hayden et al. (1985) argue that the large pithouse villages along the Mid-Fraser River which were suddenly abandoned about 1000 years ago may have been dominated by large, hierarchically organized, coresidential corporate groups. The social organization of space created by these relatively complex corporate groups can be expected to have differed from that produced by more egalitarian coresidential groups in several ways. Ethnographic descriptions of pithouse life typically refer to a single hearth. I argue that the interiors of large houses organized around large, hierarchically-organized, coresidential corporate groups are unlikely to have been arranged in this way. Instead, several domestic units within the coresidential group would have used separate hearths and occupied separate areas. Not only would separate domestic groups within a larger coresidential group have been in competition with each other for wealth and power, but they can be expected to have been anxious to exhibit evidence of their acquired wealth and status. Structures occupied by large, hierarchically organized corporate groups might

also be expected to present more evidence of craft specialization and, possibly, surplus production than structures occupied by less complex groups.

While more egalitarian aggregations of individual families living together in large residences might also have divided the space into separate domestic areas for sleeping and storage of gear, they would probably have had a greater tendency to share hearths, storage facilities, and domestic utensils, as well as the space itself. I argue, too, that since there are several important drawbacks and few obvious practical advantages to housing large groups of people under one roof in this environment, large coresidential structures would probably not have been built without the incentives created by hierarchical corporate groups.

Definition of the term

Hayden and Cannon (1982) use the term "residential corporate group" to distinguish relatively large and hierarchical, coresidential groups, from smaller, more egalitarian coresidential groups. In this thesis I have chosen the more cumbersome but more specific term "large, hierarchically-organized, coresidential corporate group" to refer to the same phenomenon. Hayden and Cannon (1982:135) argue that residential corporate groups are only formed in response to strong environmental or economic pressures, or for defense. Only these forces are considered strong enough to overcome a natural human tendency to pursue individual self-interest, enter into conflicts, dissolve old alliances, and form new ones.

These authors (Hayden and Cannon 1982, Hayden 1990) have given particular attention to combinations of environmental and technological factors which allow small groups of people to control access to highly productive resource extraction locations.

The Formation of Residential Corporate Groups in the Mid-Fraser Region

The following summary is based on the arguments and the hypothetical model Hayden has developed for formation of large, hierarchically-organized, coresidential corporate groups in the Mid-

Fraser River region. He suggests that a community will only tolerate exclusive claims to some sources of an important subsistence resource if 1) most of the community has access to locations which provide an abundant and reliable supply of the resource under normal conditions and 2) access to some highly productive locations is restricted by some combination of natural and artificial conditions. If everyone can normally depend on an adequate supply of a resource which can be readily preserved and stored, security against privation for individual families will increasingly depend on individual effort, rather than on cooperation and sharing. Under these conditions, people will come to regard the fruits of their labor as their own. If a small group of people can monopolize a particular location, without denying others access to an adequate supply of the resource, their claims of ownership will be tolerated. This is especially true where successful exploitation of the location depends on special knowledge and/or the development and maintenance of special facilities, such as fishing platforms or weirs.

Such locations would be developed because of their potential for exceptionally high productivity. Any resulting surpluses could be used to support labor to produce more valuable commodities or to acquire exotic goods through trade. These luxury goods would not only improve the owner's standard of living. They could also increase his or her influence over community affairs. Luxury goods could be distributed through "competitive feasting systems" (Strathern 1971 235-236, Hayden 1990) to enhance the prestige of the feast givers and, more importantly, to create obligations, which would be expected to be repaid with interest. Through successful manipulation of these obligations the feast-givers could gradually increase their authority in the community. Less successful competitors would become increasingly disenfranchised.

Ethnographically recorded competitive feasting systems have been associated with the Northwest Coast potlatch (Codere 1950), the Kula rings of the Solomon Sea (Firth, 1957; Malinowski 1922), and pig feasts in the New Guinea highlands (Strathern 1971).

In the Mid-Fraser River region, salmon have been a subsistence resource of primary importance for thousands of years. In normal

years, they have been reliable, abundant, and dense on a seasonal basis. An adequate supply would have been available to everyone at easily accessible locations such as the Six Mile Fishery near Lillooet (Romanoff 1985:51,56). The fish keep well when preserved using ethnographically recorded methods (Romanoff 1985:27-50). Thus, in normal years, any industrious family could be assured of being able to catch and store their annual supply of this staple food during the summer salmon runs.

At the same time, the topography of the Fraser Canyon provides some relatively inaccessible locations where the installation of fishing platforms would have allowed a small number of fishers to take a relatively large number of fish. Small groups of people, perhaps even single families, might easily have gained control over access to such sites. Ethnographic evidence (Kennedy and Bouchard 1990) indicates that successful exploitation of these sites required "careful monitoring of water levels and often special knowledge of fish behavior associated with the sites". These requirements and the labor invested in the development and maintenance of the facilities would have reinforced claims of privileged or even exclusive use of the site, as noted above. Some of these sites were defended and some are marked with crests which may have indicated ownership by a particular group (Kennedy and Bouchard 1990).

The productivity of these sites was limited less by the number of fish which could be taken than by the number which could be processed for preservation. Several workers would have been needed to clean and dry all the fish that a single fisher could catch. A site owner who wished to exploit the potential surplus production of his fishing station through exchange, gift-giving, and competitive feasting would have needed to control a large labor force to ensure that the maximum possible quantity of fish was taken and processed. Demands against old debts or promises of future rewards might have persuaded some members of the community to work for the site owners. Slavery and polygyny, institutions which survived in this region into historic times, would have provided control over a more reliable labor pool. In addition, Hayden argues (1990), site owners would have encouraged other families, especially their close

relatives, to join them in forming residential corporate groups. Members would have been guaranteed heritable access to the small but highly productive fishing stations. The original owner, and "house chiefs" descended from him, would have gained control over the labor of participating families while retaining some control over access to the site. The group would have cooperated in preparing competitive feasts, to the benefit of all members, but especially the house chief. Corporate groups could also have been readily organized for other cooperative enterprises, such as defense, game drives, slave raids, and trading expeditions which would have provided additional sources of wealth. As the economic power of these corporate groups grew, families not belonging to corporate groups would have been increasingly disenfranchised. Membership in large corporate groups would have become a still more highly valued privilege while the prestige, authority, and socioeconomic power of the chiefs would have grown.

Coreidence

Thus far, Hayden's model has accounted for the emergence of large, hierarchical corporate groups but the motivation for coresidence remains to be explained. It is easy to imagine more pleasant ways to spend a winter than living in a pithouse with a large, corporate group. According to Teit (1900:192), the largest houses of the early historic period were laid out as circles about 40 feet (12.2 meters) in diameter. The relative dimensions of the houses shown in Teit's diagrams as well as those of excavated prehistoric houses (see Chapter 2) indicate that a house with an external diameter of 12m may have had an internal floor 10m or less across. This would have provided less than three square meters of floor for each of the 30 people Teit (1900: 192) says lived in the largest houses. This suggests that the largest prehistoric structures, with internal floors up to 15m across may have housed as many as 60 people. Smaller houses, with fewer inhabitants must have been more peaceful and easier to keep clean, warm, and cosy. It would very probably have been easier to build several small houses than one big one and the smaller spaces would also have been easier to heat. Why, then, would

a group formed primarily to cooperate in summer tasks choose to spend the winter in the same house?

Hayden (1990) suggests that residential corporate groups, rather than more fluid alliances, would have formed in this region because access to the fishing sites in question was physically restricted, and therefore, presumably, susceptible to control, and because of the unusual labor requirements of the resource. Perhaps, competition for labor, within the rather narrow time constraints of the fishing season, lead the owners of fishing sites to urge coresidence on the members of their groups. Ethnographic evidence (Romanoff 1985:40) and the presence of large storage pits in excavated housepits indicate that a certain proportion of the winter supply of salmon was stored inside the houses. This would have permitted considerable surveillance and control over the distribution of stored food. The loyalty of the work force would have been, to some extent, ensured by their knowledge that their best chance of obtaining some benefit from the distribution of the fruits of their labor was to live in the structure where the wealth was stored and where decisions about its use for consumption, trade, and feasting were made. In times of shortage, security against privation would also have depended on access to stores of salmon laid down during better years in the residences of surplus-generating corporate groups.

Vagaries in the productivity of individual fishing sites and in the fortunes of individual corporate groups, combined with the strong demand for good labor and relatively unrestricted access to resources at other sites, would have meant that the control of corporate group administrators could never have been absolute. Elite members may have been bound to their residential groups by rank, privilege, and close consanguineal and affinal relationships. Families or individuals without close relations to the leaders of any large residential corporate group probably maintained ties to many groups, moving as opportunity and inclination directed. In normal times, the survival, perhaps even the comfort, of this independent labor pool would have remained relatively secure. This may partly explain why large houses and the large corporate groups presumed to have inhabited them are a relatively limited phenomenon in the

study area while much smaller winter residential sites are relatively common and widely distributed.

Simpler economic considerations may also have made coresidence a more attractive, or at least less unattractive, proposition. Larger houses might have been more defensible against raiding neighbors due to strength in numbers. Also, while there are obvious disadvantages to living at close quarters with such a large group, thirty people living in a 40 foot (12.2 meter) wide house would have enjoyed roughly half again as much personal space as the 15 people who, Teit's (1900:192) observations suggest, typically lived in a 20 foot (6.1 meter) wide house. If, as was suggested in Chapter 2, a house with an internal floor 12m across is comparable to a house with an external diameter of 50 foot (15.2 m) in Teit's terms, the largest of the three excavated housepits would have provided as much space per person for 45 people as the largest ethnographically recorded houses provided for 30.

Given the inefficiencies and discomforts associated with the largest houses, I doubt whether their greater defensibility and roominess would have provided sufficient motivation for their construction. These ends could probably have been served more effectively and less expensively by building palisades or other defensive works and more of the smaller houses. Archaeological expectations derived from different models of social organization in pithouse residences are discussed below. While a more egalitarian aggregation of families will be considered as one of the possible forms of social organization in the largest houses, I maintain that the demands of hierarchical corporate groups would have provided the likeliest incentive for their construction.

Archaeological Expectations

Residential Corporate Groups and the Social Organization of Space

Obviously, large pithouses were built and we may reasonably assume that they were built and occupied by larger groups than inhabited the smaller houses. If large, hierarchical, coresidential

corporate groups did develop in the manner proposed in Hayden's model, they are the most likely residents of these large structures. The corporate group model suggests two characteristics of such groups which are relevant to this consideration of the social organization of space within the houses; their competitive purpose and their hierarchical social structure.

Competitive purpose

According to the model, these groups were formed in response to a system based on the competitive manipulation of obligations for personal gain. Participation in a corporate group was rewarded with specific rights and exacted specific obligations. Accounts of potlatches on the Northwest Coast (Codere 1950) and similar competitive feasts in other areas (eg. New Guinea (Strathern 1971)) suggest that one of the functions of these gatherings was the public accounting of such rights and obligations, as well as of payments for services and of gifts given and received. Most members of a community with significant investments in competitive feasting would have been intensely interested in keeping track of debts, credits, and stock in hand. These concerns would have been especially important to the high ranking administrators of corporate groups. Competition and the manipulation of obligations would probably have played as large a part in the internal economy of corporate groups as they did in their interactions with the community at large.

Communal preparation of food and indiscriminate sharing of important tools and supplies seems unlikely in a system where most exchanges of goods and services were predicated on obligation and repayment in a well defined hierarchy. Instead, individual domestic groups would have maintained wealth as a private possession in separate domestic spaces within the corporate residence, probably centered around separate hearths.

Hierarchical social structure

The hierarchical structure of the corporate groups described by this model also has implications for the social organization of space within these houses. The portion of the house floor allotted to the

family of the 'house chief' might be expected to have been somewhat larger than that assigned to other families simply as a mark of authority and prestige. More importantly, the chief's family would have had both the means and the need to acquire more slaves and, if polygyny were practiced, more wives than the other families in the corporate group. A larger family would, of course, require more space.

Archaeological Expectations and Complications

A residential corporate group which organized its living space according to the principles outlined above would deposit similar collections of artifacts in each area occupied by an independent domestic group. Each domestic group would probably deposit artifacts in discrete clusters within the bounds of its domestic space. In addition to discrete clusters of artifacts, each independent domestic area would also include a hearth. The most influential group might be expected to occupy a somewhat larger area than the rest and this area might exhibit greater evidence of wealth, status, and craft specialization. The largest domestic area might also be situated at some particularly desirable location within the structure; in the warmest part of the house or close to an important feature, for example.

In a house which was not divided into spaces used by independent groups within a large, hierarchically-organized, coresidential corporate group, the organization of space would have been governed by concerns other than internal competition and displays of social status. Activities such as sleeping, food preparation, refuse disposal and various manufactures would be conducted in separate areas for reasons of comfort and convenience. Also, men and women may have had different tasks and worked in separate areas. Archaeologically, it would be expected that various classes of artifacts would be deposited in quite different proportions in areas used for different activities.

The same practical concerns would also have affected the members of large, hierarchically-organized, coresidential corporate groups. So it is likely that each separate domestic space in the residence of such

a group would have been internally divided into areas used for different activities.

Every space in the residence of a large, hierarchically-organized, coresidential corporate group need not have been associated with an individual domestic group. Some spaces probably served as traffic areas. Certain categories of people, slaves or young children, for example, may have been assigned to communal areas even while adult members of the corporate group maintained separate domestic spaces. Some activities, especially feasts and rituals, may have been performed cooperatively despite a generally competitive social environment. Separate areas may have been set aside for such activities or areas which were normally divided among several families might have been appropriated for communal activities on special occasions. In fact, given the limited space available, many areas of a house must have been used for a wide variety of activities on a regular basis.

For all of these reasons, patterned artifact distributions distinguishing areas used by separate domestic groups for similar activities will, to some extent, be obscured by patterns distinguishing between areas used for different activities. Thus, if several distinct areas containing similar collections of artifacts and features, and exhibiting similar internal divisions can be identified on a floor this should be taken as a strong indication that the floor was divided among several somewhat independent domestic groups.

Other Models of the Social Organization of Space in Large Pithouses

Separate domestic areas on floors occupied by more egalitarian groups

Large, hierarchically-organized, coresidential corporate groups are not the only social structures which might divide a residential space among several domestic groups. A large coresidential group composed of several families without hierarchical distinctions might have been organized into several separate domestic economies simply to reduce scheduling conflicts and other logistical difficulties.

There are strong practical arguments against housing large groups of people in this environment in residences as large as the largest housepits at the Keatley Creek site. I have argued that neither the need for defense nor the desire for more space per capita would have been particularly well served by the construction of such large pithouses. Still, there may have been some incentives other than those imposed by economic competition and a hierarchical social structure which could have moved some groups of people to choose this form of residence.

If relatively egalitarian aggregation of families did choose to occupy a large pithouse, they might well divide the floor into several single family domestic spaces. However, in the absence of competition and clearly defined status differences between families, the boundaries between these spaces would probably have been much less rigorously defined and maintained. There would have been a greater tendency to share not only the available space but also important facilities like hearths and storage pits, as well as food and all kinds of tools. Cooperation in tasks would also have been greater. Family size would probably have been more uniform than in a hierarchical corporate group where it would have been regulated by status differences and economic competition. There would also have been less variability in the quality and quantity of personal possessions.

Archaeological Expectations

Egalitarian groups sharing large houses would be even more likely than hierarchically-organized corporate groups to have reserved some spaces for communal use. They would also be more likely to appropriate separate domestic spaces for occasional communal uses. Thus, the distribution of lithic artifacts on floors occupied by more egalitarian groups would tend to reflect functional dissimilarity between areas, probably to the extent that similarities between areas used by independent domestic groups for similar purposes would be indistinguishable. Hearths would be fewer and might also be associated with artifacts indicative of functional dissimilarity rather than redundancy between hearths. Storage pits might tend to be

more concentrated rather than distributed among several domestic areas. If they were widely distributed, they would be more uniform in size, reflecting a more equitable distribution of wealth.

If the separate domestic areas containing similar collections of artifacts were distinguishable, they would probably be associated with areas of a more uniform size than those in hierarchically organized houses where the dominant family might be expected to occupy a significantly larger area. Any luxury goods or exotic raw materials would also be more evenly distributed.

The Social Organization of Space in Smaller Houses

Obviously, smaller pithouses are likely to have been occupied by fewer families. If it is assumed that coresidence depended on consanguineal or affinal ties, the residents of smaller houses would also have tended to be more closely related to one another than those in larger houses. It seems probable that in the smallest houses with perhaps as few as fifteen closely related residents, individuals would tend to see themselves less as members of one of several competing families within a large hierarchical corporate group and more as part of a single family unit including the entire household. Within these houses, age and sex rather than debts, credits, and inherited privileges would have been the most important determinants of an individual's status, regardless of the importance of economic competition and heritable status in the community at large. If, as the proposed model for the origins of hierarchical corporate groups suggests, the highest ranking individuals in the community were the chiefs of large, hierarchically-organized, corporate groups, rare materials and luxury goods should be relatively rare in the smallest houses. The interiors of these houses would probably have been organized into along functional lines, into sleeping, eating, and working areas for example. Areas assigned to women, men, or the members of a particular age group might also have been especially important in the smallest houses.

Archaeological Expectations

Archaeologically, it is expected that collections of artifacts from different areas on the floors of the smallest housepits will tend to be functionally dissimilar. Hearths and storage pits will be few, partly because of the smaller area and the smaller population and partly because of the lack of internal social divisions.

Non-residential structures

Some of the cultural depressions at the Keatley Creek site and elsewhere on British Columbia's Interior Plateau are probably not housepits at all. Certainly, it is unlikely that the smallest depressions, with rim-to rim diameters under 5 m, served as residences. In fact, it may be argued that a depression of almost any size could have been used as a ceremonial structure, a storehouse, or a mortuary, to suggest only a few possibilities. It is beyond the scope of this thesis to suggest how space might have been organized in structures used for such purposes. Instead, I argue that the types of features and lithic artifacts found on these floors and the patterns in which they are distributed are not inconsistent with their use as residences. I suggest, too, that it is most probable that at least one of these structures was used as a residence and that the types of artifacts found in all three of the houses analyzed and the proportions in which they occur are sufficiently similar to suggest that all three houses were used for the same basic purpose.

Interpreting lithic artifact distributions

The criteria presented above for distinguishing the social organization of space in the residences of hierarchical corporate groups from that of more egalitarian groups are expressed in relative terms. They ask not whether the lithic assemblage on a housepit floor is arranged in functionally redundant or functionally dissimilar groups of artifacts but whether the tendency towards redundancy or dissimilarity is greater in one housepit than in others. The distinction between the two forms of social organization is, itself, a relative one. The question here is not whether the groups which occupied the largest housepits were absolutely egalitarian or absolutely

hierarchical. No society is absolutely egalitarian and no social hierarchy is completely undisturbed by egalitarian impulses. Rather, the long term aim of this research is to determine whether the groups which occupied the largest housepits were *more* hierarchically organized than their contemporaries in smaller houses or than the societies observed in this region in historic times. This question cannot be resolved without reference to a much larger comparative sample than is currently available. The goal of this thesis is to develop methods by which this question can eventually be addressed with reference to the criteria suggested by the model outlined above.

The results of the analyses in Chapter 3 demonstrate that meaningful patterns can be identified in the distributions, on housepit floors, of the classes of artifacts defined for this study. The observed patterns can most readily be explained as the products of human behavior, specifically, the social organization of space on the three pithouse floors during their last occupations. The next chapter will review the results of the analyses to determine how well they conform to the proposed model.

Chapter 6: Conclusion

Comparison of lithic distributions on the floors of the three housepits

In Chapter 3, the distributions of various classes of lithic artifacts on the floors of three housepits at the Keatley Creek site were described in detail. The floors were divided into sectors and statistical analyses showed that, in every housepit, some classes of artifacts occurred in some sectors in frequencies which would have been improbable had those classes of artifacts been deposited at random. The observed variability in the distribution of lithic artifacts was interpreted as evidence that different areas on each floor were consistently used for different activities during the periods when the three pithouses were last occupied. Visual examination of artifact distributions helped to clearly identify the predominate patterns.

In some cases, specific activities were ascribed to specific areas on the basis of the classes of artifacts which were found in those areas. Particular attention was given to the recognition of differences between areas on the floors which might be related to differences in the social status or the sex of the people who lived and worked in those areas or which might distinguish areas used by specialists in particular crafts. Where distinct areas containing similar collections of artifacts were identified, it was suggested that the floor had been divided among somewhat independent domestic groups within the larger coresidential group.

These interpretations were based on the assumption that the observed patterns were, primarily, the results of patterned human behavior which occurred on the floors during the periods when they were last occupied. Chapter 4 considered the contributions of other processes to the formation of these assemblages and concluded that the observed patterns could, in fact, most reasonably be attributed to the spatial organization of activities in the houses during their last occupations.

In this chapter, the patterns recognized in the distributions of lithic

artifacts on each of the three house floors will be reviewed and compared with one another and with the patterns which the model proposed in Chapter 5 predicts both for floors occupied by large, hierarchically organized, coresidential corporate groups and for floors occupied by less complex social structures.

The model proposes that, if large, hierarchically-organized, coresidential corporate groups developed in the Mid-Fraser River region in the manner suggested by Hayden et al. (1985), they would have been more likely to be internally divided into somewhat independent hierarchically-arranged sub-groups than would simpler contemporary social structures. According to the model, these sub-groups, which are presumed to have been frequently united by close consanguineal and affinal ties, should each have maintained domestic economies which were, to some extent, separate and independent from one another. These social divisions should have resulted in the physical division of living spaces into several areas, each of which was used for generally similar activities. Since the development of large, hierarchically-organized, coresidential corporate groups is thought to have been associated with increased craft specialization and increased status differentiation, some areas in the residences of such groups should also be distinguished by evidence of craft specialization and/or differences in status.

In a house which was occupied by a more egalitarian single coherent social group whose most important internal social distinctions were based on sex and age, a different pattern is expected. In this case the space would be divided primarily along functional lines, perhaps into male and female activity areas. One possibility is that different activities would have occurred on opposite sides of the floors in a similar manner to what has been described ethnographically (Teit 1909:492).

In the Mid-Fraser River region, the largest housepits and the largest pithouse villages have been attributed to the Kamloops Phase of the Plateau Pithouse Tradition (Richards and Rousseau 1987:41). Hayden et al. (1985) have proposed that the beginning of this period also saw the development of large, hierarchically-organized coresidential corporate groups. These corporate groups are thought to

have been dominant in the competition over the products of fishing and trade which is presumed to have been the organizing force behind their formation. Cross-cultural studies show that house size is strongly related to wealth and control over resources (Netting 1982). Also, these groups would presumably have included more members than simpler contemporary social structures. So there are reasonable grounds to expect that the largest houses are the likeliest residences of large, hierarchically-organized corporate groups. Lithic artifacts on the floors of the largest housepits are, therefore, expected to be distributed in patterns which are consistent with the social organization of space attributed to large, hierarchically-organized coresidential corporate groups. The floors of smaller houses are considered more likely to have been divided along strictly functional lines. That is, particular areas would have been used communally for particular activities. Some of these activities may have been associated with a particular sex or age group but internal social and spatial divisions between domestic groups are considered to be less likely or likely to be less pronounced in smaller houses.

Housepit 3

The analysis of the distribution of lithic artifacts on the floor of Housepit 3 concluded with the opinion that this floor had been divided, by the occupants, into at least two areas which were used for quite different activities. Of the lithic artifact types which occur in improbable ($p < 0.10$) frequencies in some sectors, those which are unexpectedly abundant in the Southwest sector (utilized flakes, bifacial knives, small piercers, and small billet flakes) are proportionately scarcest in the Northeast sector. Types which are improbably abundant in the Northeast sector (heavily-retouched scrapers, hammerstones, and debitage in general) are proportionately scarcest in the Southwest sector. Distribution maps for these types (Figure 3.03: debitage, Figure 6.01: small billet flakes, Figure 3.07: utilized flakes, Figure 3.08: heavily retouched scrapers, Figure 3.12: bifacial knives, Figure 3.10: hammerstones) confirm the impression that these distributions distinguish opposite sides of the floor. Between these areas, the center of the floor, represented by the

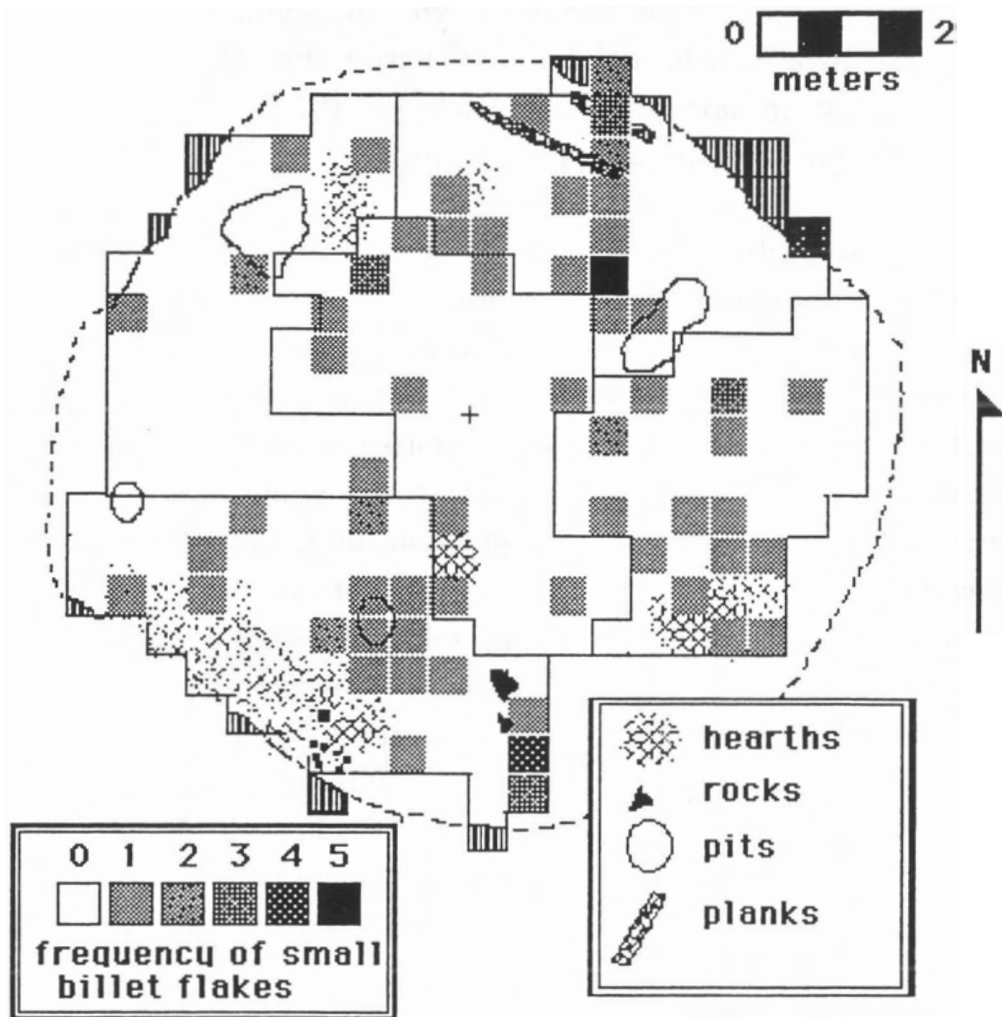


Figure 6.01. Distribution of small billet flakes on the floor of Housepit 3.

Center sector, is distinguished by a general scarcity of debitage and modified artifacts, though visual examination of the distribution of large notches (Figure 3.17) suggests that the center of the floor was preferred for some activity involving the use of this modified artifact type.

In the light of these distributions, which so clearly distinguish opposite sides of the floor of Housepit 3, the similarities between all sectors represented by the "underlying" distribution were interpreted as evidence that the most common tool types in this assemblage were used in a variety of activities, so that least a few examples of each of these types were deposited in all sectors of the floor. Figures 3.07 and 3.08 show that the distributions of utilized flakes and heavily-retouched scrapers, while clearly complementary and concentrated on opposite sides of the floor, do overlap to some extent. This overlap may also account for the occurrence of both types in the underlying distribution.

The fact that there is only one hearth on this floor which is clearly associated with the most recent occupation and a only single concentration of fire-cracked rock, further reinforces the argument that this house was spatially organized so as to accommodate a single group which cooperated in most domestic and economic activities.

Thus, patterns suggesting that this floor was divided among several domestic groups, each of which used its own area for similar activities, are weakly developed at best. If different sectors of the floor of Housepit 3 were occupied by different domestic groups, each group was clearly involved in quite different activities. It seems much more likely that the southwest, northwest, and northeast sides of the floor were each used by members of the same domestic group for a distinct set of activities. Women's tasks have been suggested for the southwest and men's tasks for the northeast. The concentration of projectile points and exotic debitage in the northwest may have resulted from some activity related to hunting. Exotic lithic materials were probably collected on hunting forays. The central area probably served primarily as a traffic area. It may also have been used for activities requiring a large open work space. Large notches have been interpreted as tools used in working shafts and extra space

would have been required for the manipulation of long objects.

To summarize, I argue that the residents of this house were organized into a single, economically cooperative, domestic unit. By this I mean that competition for status and resources would generally have been limited to competition between individuals rather than competition between groups. The most important distinctions within the coresidential group would have been based on sex, age, and individual status.

In Chapter 2, the population of this pithouse was estimated at 31. In a polygamous society, a large extended family centered, perhaps, on two or three brothers with their wives, children, parents, elders, slaves, and other dependents might have approached this size. Close bonds of kinship may have helped to maintain this household as a cohesive social unit.

Housepit 12

The patterns observed in the distribution of lithic artifacts on the floor of Housepit 12 were similar in some respects to those on the floor of Housepit 3. In Housepit 12, acute-edged expedient flake tools are improbably abundant in the Southwest sector and present in the Southeast sector but absent in the East and Northeast sectors. Single scrapers are improbably abundant in East sector and present in the Northeast sector but absent in the Southwest and Southeast sectors. There is less debitage than expected in a random distribution in the Southwest and Southeast sectors and more debitage than expected in the East and Northeast sectors. While different artifact types are involved, these complementary distributions, like those in Housepit 3, suggest that opposite sides of the floor were used for quite different activities. Another interesting similarity is that the Center sector of Housepit 12, like the central area in Housepit 3, is rich in notches.

There are important differences between the two housepits, as well. Utilized flakes are associated with high debitage frequencies in Housepit 3 and with low debitage frequencies in Housepit 12. Also, the Center sector of Housepit 12 is rich in fire-cracked rock, debitage, and modified artifacts while the Northwest sector is poor in all

classes of lithic artifacts. The Center sector of Housepit 3 is poor in both debitage and modified artifacts.

In fact, the use of space seems to have been organized somewhat differently in the two houses, in functional terms. In Housepit 12, the center of the floor appears to have been used more intensely for activities involving heavy use of lithic artifacts. This may be because Housepit 12 is only 8m in diameter as compared with 15m for Housepit 3. The part of Housepit 12 below ground level is also much shallower. Headroom and working space would, therefore have been more restricted near the edge of the floor in Housepit 12.

So far as the social organization of space is concerned though, the similarities between Housepit 3 and Housepit 12 outweigh the differences. In both houses, the northeastern area of the floor appears to have been used for some activity which resulted in the deposition of relatively large quantities of debitage. Possibly, this location was chosen for lithic reduction because it received more daylight than other areas. In both houses the center of the floor appears to have been preferred for some activity involving the use of notches. While it does not appear that the southwest and northwest sides of the floor of Housepit 12 were used for the same sorts of activities as in Housepit 3, it is clear that in both houses the most important division of space was between opposite sides of the floor.

In Housepit 12, as in Housepit 3, there is little indication that separate areas of the floor were used by different domestic units for similar purposes. Instead, four distinctive areas were identified on the floor of Housepit 12, each of which appears to have been used for different activities. Again, I interpret this as evidence that social distinctions based on age, sex, and individual status were more important to the residents of Housepit 12 than was their identification with any internal sub-group within the coresidential structure. I have not, however, been able to identify specific areas on the floor of Housepit 12 with men's or women's activities. The concentrations of debitage and utilized flakes which, to a large extent, distinguished a possible men's activity area from a possible women's activity area in Housepit 3 occur in the same sector in

Housepit 12. This may be because space was so constricted near the periphery of this floor that both men's and women's tasks were confined to a relatively small area in the center.

The population of Housepit 12 was estimated at 19, which is few enough to be included in one or two large extended families.

Housepit 7

Housepit 7 is more complex. In the southern part of the floor, an "Inner zone" was distinguished from the remainder of the floor by relatively low frequencies of debitage and modified artifacts and by higher than expected frequencies of chert flakes. A "Central zone", surrounding the Inner zone, was distinguished by higher than expected frequencies of utilized flakes. Both zones are relatively rich in fire-cracked rock. In the Central zone, though, fire-cracked rock is concentrated along the boundary with the Inner zone. Along the northern half of the perimeter, an "Outer zone" was distinguished by an abundance of debitage, higher than expected frequencies of heavily-retouched scrapers and a relative scarcity of fire-cracked rock.

In Housepit 7, as in Housepit 3, heavily-retouched scrapers tend to be present where utilized flakes are absent and vice versa. Also, heavily retouched scrapers are associated with high debitage frequencies in both houses. In Housepit 3, though, utilized flakes were concentrated on one side of the floor and debitage and heavily retouched scrapers are concentrated on the other. In Housepit 7 the complementary distributions of heavily-retouched scrapers and utilized flakes are concentrically distributed. Assuming that these two artifact types were associated with similar activities (possibly gender-specific activities) in both houses, it seems clear that space was organized somewhat differently in each house. Activities involving heavily-retouched scrapers and concentrations of debitage, which were concentrated on the northeast side of Housepit 3, were distributed around the northern perimeter of Housepit 7 while activities involving utilized flakes, which were concentrated on the southwest side of Housepit 3, were distributed in a band extending from slightly north of the center of the floor towards the

southwestern and southeastern perimeter.

Despite the overall scarcity of modified artifacts in the Inner zone, almost every modified artifact type is represented there in approximately the proportion which would be expected in an even distribution. The only statistically significant departures from the expected values are in the distributions of some of the rarest artifact types: cores, key-shaped scrapers, drills and perforators. This was interpreted as an indication that the Inner zone was used less intensely than the Central and Outer zones but for many of the same activities.

It was suggested that the Inner zone, in association with a hearth in the southwestern part of the Central zone, might have constituted a domestic area occupied by a group, or a polygynous cluster of domestic groups, whose high status entitled it to a larger living space than other domestic groups in this house. Unexpectedly high frequencies of chert and chalcedony flakes in the southern sectors of the floor reinforce this argument. The southern part of the floor also contains a single stone bead and a fragment of a nephrite ornament, the only artifacts in any of the three floor assemblages which can be interpreted as status goods. The frequencies of cores, key-shaped scrapers, drills and perforators in the Inner zone were judged to be statistically significant in part because other artifact types occurred there in such low frequencies. Nevertheless, the high frequency of cores in this zone, coupled with the unexpectedly high frequency of chert and chalcedony flakes does suggest the possibility of greater control over lithic resources by a group residing in this zone.

The concentration of spall tools in the southeastern part of the floor of Housepit 7, which has proportionately more tools of this type than either of the other houses, may be the strongest indicator of an area set aside for a specialized activity in any of the three houses. Largely on the strength of this concentration and an associated space containing relatively few artifacts, the southeastern part of the floor was identified as a possible hide-working area. Since control over hides was considered a likely to have been associated with wealth and high status, this was interpreted that as further evidence that a group occupying the adjacent Inner zone may have been the

dominant group in this house.

Other modified artifact types which occur in improbably high frequencies in different sectors of the floor of Housepit 7 include: small piercers and expedient scrapers in the Northwest sector, acute-edged expedient flake tools in the Northeast sector, and acute-edged expedient flake tools and "early" projectile points in the East sector. The distributions of these types tend to distinguish between the east and west sides of the floor in the northern part of the houses. These distributions can best be interpreted as indicators of household or individual craft specializations peculiar to domestic groups occupying spaces on opposite sides of the floor.

Also of interest is the distribution of notches on this floor. They are improbably abundant in the West Center sector and, as Figure 3.30 shows, tend to be located towards the center of the floor. This modified artifact type was also concentrated near the center of the floors in both Housepit 3 and Housepit 12, which was interpreted as evidence that it was used in some activity requiring a relatively unrestricted work space.

To summarize, I have suggested that the Inner zone of the floor of Housepit 7 was occupied by a domestic group with higher status than other domestic groups in this house and that the Outer and Central zones were divided so as to accommodate two or more domestic groups. Three distinct hearth areas are clearly recognizable in concentrations of fire-cracked rock associated with fire-reddened areas in the Central and Outer zones (Figure 2.13). Two additional fire-reddened areas without much fire-cracked rock were also identified in these zones. It could be argued that the three distinct hearths indicate that the Central and Outer zones were divided among three domestic groups. However, while some subsquares associated with the hearth in the Northwest sector do have improbably high frequencies of fire-cracked rock, there is substantially less fire-cracked rock associated with this hearth than with those in the East Center and West sectors. Based on this difference and the fact that only the hearth in the Northwest sector extends into the Outer zone, I have chosen to argue that the Outer and Central zones were divided between two domestic groups, one

associated with the hearth in the East Center sector and one associated with the hearth in the West sector.

The population of Housepit 7 was estimated at 45, which means that three domestic groups would each have had an average of 15 members. Four domestic groups would each have had an average of 11.25 members. Either figure is within the range suggested for the size of large extended families.

Comparisons

Thus, the series of hearths and artifact concentrations within the concentric zones on the floor of Housepit 7 are more consistent with the model of a space divided among several sub-groups, each of which had a similar role within a coresidential corporate group, than is the bilateral division of space described for Housepits 3 and 12. If the activities represented by utilized flakes on the one hand and heavily-retouched scrapers and debitage on the other represent a fundamental division in general domestic behavior, possibly female vs. male activities, then it is likely that both components would be present in each area occupied by an economically independent sub-group within a coresidential corporate group. The Central and Outer zones of Housepit 7 can be radially divided into several similar areas each incorporating a portion of each zone. Hearths are distributed on the floor of Housepit 7 in a manner which suggests the existence of a number of such areas, each containing a hearth. In addition, boundaries between artifact clusters in these zones, which are defined by marked drop-offs in artifact densities, suggest boundaries between independent domestic areas.

In Housepit 3, it would have been nearly impossible to devise a division of the floor into two or more domestic areas which each included part of any two of the distinct activity areas identified on the floor. It would be even more difficult to divide the floor of Housepit 12 into areas which incorporate parts of each of the distinct distributions identified there. In addition, there is good evidence for only a single main hearth associated with most recent occupation in either Housepit 3 or Housepit 12. Since it seems likely that each domestic area would have been organized around a hearth, this is

further evidence that, in of each of the two smaller houses the residents were organized into one egalitarian residential group.

Thus, of the three floors examined in this study, only the floor of the largest house, Housepit 7, has artifacts distributed on it in patterns which are unambiguously consistent with a division of the living space into several domestic areas. This is the arrangement which the model proposed in Chapter 5 predicts for the social organization of space in the residences of large, hierarchically-organized, coresidential corporate groups. The model associates large, hierarchically-organized corporate groups with the largest pithouses. So, as far as these three housepit are concerned, the observed patterns are consistent with the model.

More detailed questions related to status differentiation, craft specialization, and the sexual division of labor cannot be so easily dealt with. Housepit 12 has substantially fewer lithic artifacts in relation to floor area than either of the two larger houses. It also has less diversity in artifact types, suggesting a narrower range of activities, and is relatively poor in exotic lithic raw materials. All of this could be interpreted as evidence of relative poverty for the residents of this house or of a shorter occupation span. There is less discrepancy between Housepits 3 and 7.

All three houses contain spatial concentrations of exotic debitage, which might have been controlled by high status individuals, and all three have areas where artifact densities are relatively low. Special attention has been given to the southern part of the floor of Housepit 7 as an area which might have been occupied by a high-status domestic unit or complex. This suggestion was made on the basis of: the relative clear space in the South Center sector (indicating some special use of part of the Inner zone as a space from which ordinary activities were excluded), low artifact densities (indicating less involvement in mundane tasks) combined with a desirable southerly location, an abundance of fire-cracked rocks and large hearth areas (associated with access to firewood), a concentration of desirable chert and chalcedony flakes, the presence of the only prestige valuables, large storage pits in the sector, and proximity to an area which may have been used for hide-working. Control over hides and

hide-processing may be related to high status.

While this possible hide-working area was given particular attention as an area which may have housed a specialized craft, some types of modified artifacts which may have been used for particular crafts have localized distributions in every house. It is difficult to determine whether these concentrations represent areas set aside for a particular activity which was practiced by most residents of a house, or constitute areas used by single craftspeople in the context of their domestic space or in generally accessible spaces. It is also possible that several members of a sub-group, within a coresidential corporate group may have specialized in a particular craft.

The lithic assemblages left behind by the residents of Housepits 3 and 7 do not differ greatly in terms of the relative abundance of status goods. Any differences which may have existed in the relative abundance of prestige items in the two houses have disappeared, probably because such items are highly curated and generally enter the archaeological record in funerary rather than domestic contexts.

Thus, on the basis of the available lithic evidence it could even, hypothetically, be argued that the residents of Housepit 3 might have been as wealthy as or even wealthier than the residents of Housepit 7. However, even if this were so, it would not refute the hierarchical corporate group model. The social context in which large, hierarchically-organized coresidential corporate groups are thought to have arisen may have offered other avenues to success in economic competition, such as inherited privilege or specialization in hunting or healing. Hierarchical corporate groups may well have formed to gain an advantage in a competition among households which were already economically differentiated. Assuming they did gain such an advantage that need not imply that they completely dominated all other coresidential groups which were smaller and less hierarchically organized.

The argument that the residents of housepit 12 may have been poorer and less specialized than the residents of the larger houses rests, to a great extent, on the size of the housepit itself and the relative richness of the larger assemblages in the larger houses. Since assemblage richness has been shown to be a function of assemblage

size, this evidence, too, is inconclusive. I have also suggested that the greater density of lithic artifacts on the floors of the larger houses may be the result of longer occupations. Still, the combined evidence does suggest that the residents of the Housepit 12 were poorer than their neighbors in the larger houses.

As far as the sexual division of labor is concerned, I have suggested that the artifact types which distinguish the Southwest sector of Housepit 3 and the Central zone of Housepit 7 could have been predominantly associated with female tasks. Similarly, the tools which distinguish the Northeast sector of Housepit 3 and the Outer zone of Housepit 7 could have been largely associated with male tasks. I did not identify any similar distinction in Housepit 12. On the basis of ethnographic data, a sexual division of labor and of activity areas might be expected (Flannery 1976:42) but there may be other reasonable explanations for these distributions, such as divisions of activities based on task space requirements.

Conclusion

The rim-crest-to-rim-crest diameter of Housepit 3 is 14 m which is above the 11.13 m average diameter for housepits at the Keatley Creek site but considerably below the maximum diameter of 21 m. Housepit 7 has a diameter of 19 m, near the upper end of the range, and Housepit 12 is only 9m in diameter. Pithouses as large as Housepit 3 have been attributed to both the Shuswap and Kamloops phases of the Plateau Pithouse Tradition (Richards and Rousseau, 1987:25,41) and were being constructed until early historic times (Teit 1900:192). Pithouses as large as Housepit 7 may be peculiar to the early Kamloops Phase in the Mid-Fraser River region and seem to have fallen out of use by about 1000 B.P. If the full development of large, hierarchically-organized coresidential corporate groups was associated with the construction of the largest houses, patterns in the distribution of lithic artifacts on the floor of Housepit 7 would certainly be expected to be consistent with those predicted for the residences of large, hierarchically organized corporate groups. While Housepit 3 was probably large enough to accommodate several sub-groups within a large, hierarchically organized, coresidential

corporate group, it is also small enough to have been used in periods which have not been associated with the full development of such groups. In fact, rim deposits of Housepit 3 indicate that it was in use as early as the Shuswap Horizon. Patterns in the distributions of lithic artifacts on the floor of Housepit 3 could, therefore, be reasonably expected to potentially display either type of spatial organization. Housepit 12 is considered too small to have been occupied by a large, hierarchically-organized coresidential corporate group.

This study demonstrates that patterns can be identified in the distributions of lithic artifacts on housepit floors and indicates that, in some cases, those patterns can most reasonably be interpreted as the products of patterned cultural behavior and social organization associated with the floors during the periods when the structures were last occupied. Differences between housepits in the patterns observed can reasonably be interpreted as the results of differences in the spatial organization of activities on the floors arising out of different forms of social organization. While it cannot be conclusively stated, on the basis of data from only three housepits, that all of the largest housepits at the Keatley Creek site were occupied by large, hierarchically-organized corporate groups, the observed patterns are consistent with those predicted by the model for the social organization of space in the residences of such groups. These results suggest that future analysis of the distributions of artifacts on a larger sample of housepit floors will provide clearer insights into the meaning of patterning in housepit floor deposits and into questions related to variability and change in forms of social organization on the Interior Plateau.

Appendix A. Artifact type definitions employed in the classification of artifacts found in the floor strata of Housepits 3, 7, and 12 at the Keatley Creek site (EeRl 7).

001 General miscellaneous: artifacts which cannot be assigned to any other category. (In the analyses of artifact distributions, the following types were classified as miscellaneous: 001, 002, 004, 143, 148, 157, 171.)

PROJECTILE POINTS

EARLY POINTS

101 Lochnore point: side notched, leaf shaped, convex basal margin, edge grinding at base.

102 Lehmann point: thin, pentagonal with obliquely-oriented, V-shaped corner or side notches.

KAMLOOPS POINTS

109 Side-notched point, base missing.

110 Side-notched point/concave basal margin.

111 Side-notched point/straight basal margin.

112 Side-notched point/convex basal margin.

113 Multi-notched.

114 Stemmed.

PLATEAU POINTS:

115 Corner-notched point/concave basal margin.

116 Corner-notched point/straight basal margin.

117 Corner-notched point/convex basal margin.

118 Corner-notched point/base absent.

119 Basally-notched/straight basal margin.

SHUSWAP POINTS:

121 Contracting stem/slight shoulders.

122 Contracting stem/pronounced shoulders.

123 Parallel stem/slight shoulders.

124 Parallel stem/pronounced shoulders.

125 Corner removed/concave base.

126 Corner removed/"eared".

127 Stemmed/single basal notch.

128 Shallow side notched/straight basal margin.

129 Shallow side notched/concave basal margin.

BIFACIAL ARTIFACTS

002 Miscellaneous biface: bifacially worked artifacts which cannot be assigned to any other category.

004 Biface retouch flake with hide polish.

100 Flake blank: flake requiring little further thinning for reduction to bifacial tool; some indication of intent to manufacture formal tool but not yet recognizable as preform (type134).

130 Bifacial knife: bifaces with either a cutting edge backed by a thick edge, or two bifacial cutting edges.

Categories 192, 193, 131, and 134 represent stages in the reduction of formal bifaces.

Artifacts assigned to these categories should exhibit some formal regularity, eg circumferential, roughly centered edges. The use as tools of objects in any of these categories is not precluded Compare with type 186.

192 Edged piece: Callahan's (1979) Stage 2 (Initial edging) biface or fragment . Bifacially worked, circumferential, roughly centered edge-angles (55° - 75°) on biface with width/thickness ratio ≤ 2.00

193 Primarily thinned piece: Callahan's (1979) Stage 3 (Primary thinning) biface or fragment . Lenticular cross-sectioned biface with width/thickness ratio 3.00-4.00 and aligned, centered edges. Edge-angles 40° - 60° . Flake scars contact in center.

131 Biface: Callahan's (1979) Stage 4 (Secondary thinning) biface or fragment . Flattened cross-section; aligned, centered edge-angles 25° - 45°); flake scars cross center line and may undercut scars from opposing edge.

132 Bifacial perforator: narrow, elongated, bifacially chipped point with sharp tip.

133 Bifacial drill: narrow, elongated, bifacially chipped point, tip more rounded than on perforator, may exhibit rotary wear.

134 Preform: biface (see type 131) or flake with the outline of a recognizable tool form but lacking some features of the completed tool (eg. notching).

135 Distal tip of biface (triangular): self explanatory. However, it may be difficult to distinguish the distal tips of large bifaces from projectile point preforms.

136 Plateau horizon projectile point preform.

137 Kamloops horizon projectile point preform.

138 Bifacial denticulate pendant: oval to leaf shaped biface with shallow notches at one or both extremities suitable for attachment of thong.

- 140** Lightly retouched "knife-like" biface/fragment: flake or fragment with one or more bifacially retouched edges with an edge angle less than 55° . No bifacially reduced surfaces and no retouch extending more than 5mm from edge.
- 141** Lightly retouched "scraper-like" biface/fragment: flake or fragment with one or more bifacially retouched edges with an edge angle greater than 55° . No bifacially reduced surfaces and no retouch extending more than 5mm from edge.

UNIFACIAL ARTIFACTS

SCRAPERS

Flake tools without the characteristic forms of endscrapers or key-shaped scrapers but with regular, continuous, unilaterally retouched edges at least 15mm in length and edge angles $> 55^{\circ}$ were classified as scrapers. Scrapers with resharpened edges were classified as heavily-retouched scrapers in this analysis, while scrapers which had only been retouched once were classified as expedient scrapers. Scrapers were also classified according to the number and location of retouched edges (types 150, 156, 163, 164).

- 150** Single scraper: one unilaterally retouched lateral or distal edge.
- 156** Alternate scraper: retouched edges on opposing surfaces.
- 163** Inverse scraper: single scraper with retouch on ventral face of flake. If retouch is present on both ventral and dorsal surfaces see type 156.
- 164** Double scraper: two retouched edges on the same surface.
- 165** Convergent scraper: two scraper edges come together to form a point. Apparently not intended for use as a projectile point or unsuitable for such use.
- 151** Unifacial perforator: see bifacial perforator (type 132) but with unifacial retouch.
- 152** Unifacial formed borer: artifacts with pronounced projections in the form of a point or spur created by unifacial retouch. Suitable for heavy boring.

- 153** Small piercer: short, sharp point on a retouched edge or at the intersection of a break and a concave retouched edge.
- 154** Notch or multinotch: one or more concave edges each formed by the removal of a single large flake from a thick, (> 3mm) steep (> 55⁰) side of a flake tool. Width and shape of concave edge suited to scraping shafts with diameters ≥ 8mm. i.e. concave edge curvilinear as opposed to angular and notch width > 8mm.
- 54** Small notch: one or more concave edges each formed by the removal of a single large flake from a thick, (> 3mm) steep (> 55⁰) side of a flake tool. Width and shape of concave edge suited to scraping shafts with diameters < 8mm. i.e. concave edge angular as opposed to curvilinear and/or notch width ≤ 8mm.
- 157** Miscellaneous uniface fragments: unilaterally retouched fragments that cannot be further identified as to type.
- 158** "Key-shaped" unifacial scraper: one lateral edge straight from base to tip converging with concave edge on opposite lateral edge.
- 159** Unifacial "knife": this category will be reserved for unifacial artifacts with long, strongly-backed knife-like edges and edge angles less than 55⁰.
- 160** Unifacial denticulate: any flake with a unilaterally retouched, "serrated" edge.
- 161** "Thumbnail" scraper: classified as endscrapers in this analysis. See type 162.
- 162** Endscraper: a single retouched edge opposite the striking platform; edge angle approaching 90⁰ and "long" parallel retouch (usually extending from ventral to dorsal face of thick flake) "Thumbnail" scraper distinguishes a small scraper of the same form.
- 170** Retouched flake: unifacial invasive retouch on dorsal surface of flake with no edge robust and/or straight enough to serve as a scraper. Edge angles < 50⁰. Intentional retouch tends to be more invasive (> 2mm) and less abrupt than use retouch (see type 180).

70 Inversely retouched flake: same as 170 except that retouch is on the ventral surface of the flake.

171 Flake with abrupt irregular retouch: edge resembles trampled edge but may be the product of use retouch.

MISCELLANEOUS CHIPPED STONE

143 scraper retouch flake with hide polish

145 Piece esquillee: flake with ventral scar, crushed at ends but without primary flake scars or scars extending full length of flake, usually thinner than bipolar core (see type 146).

146 Bipolar core: core with crushing on both ends, usually thicker than pieces esquillee with no original ventral scar, primary flake scars on one or more faces may extend full length of core (see type 145).

147 Microblade: straight, parallel edges; striking platform approximately at right angle to axis of blade; width \leq 7mm.

148 Flake with polish/sheen: (but no retouch including use retouch).

149 Microblade core/core fragment: unidirectional core with regular parallel ridges around circumference; width of flake scars \leq 7mm (see type 189)

180 Utilized flake: any flake exhibiting continuous use retouch extending at least 1cm. Use retouch is typically more abrupt and less invasive (\leq 2mm) than intentional retouch. Use retouch may be confused with trampling. Use wear is typically more regular and extensive than trampling retouch and flake scars may appear older, more worn and weathered (see type 171).

182 Core rejuvenation flake: dorsal surface shows evidence of use as striking platform with beginnings of flake scars around circumference.

183 Spall tool: cobble spall with use retouch (Spall: large, flat flake derived from cobble and exhibiting cobble cortex on rounded surfaces May be produced by natural or cultural forces.)

184 Retouched spall tool: retouched cobble spall

186 Multidirectional core: nodule, chunk, or large flake from which flakes suitable for use as retouched or unretouched flake tools, scrapers, etc have been removed from more than two directions; no apparent intent to reduce core into formal bifacial tool though use of core as tool is not precluded. Compare 192.

188 Retouched/backed blade: blade with one retouched edge

189 Unidirectional (pyramidal) core: similar to microblade core but larger; tapered; single striking platform; regular, parallel flake scars around circumference; width of flake scars > 7mm.

190 Hammerstone

191 Blank: flake, nodule or chunk suitable for bifacial reduction. Spalls which might be assigned to this category will be counted as spalls in the lithic sample coding and will not be assigned artifact numbers.

GROUND STONE ARTIFACTS

200 Miscellaneous ground stone: fragments with ground surfaces or edges.

201 Abrader: slab of sandstone or similar material exhibiting striations and possibly grooves on one or more surfaces

202 Sandstone saw: wedge-shaped sandstone slab; narrow edge used for cutting stone by abrasion

203 Ground slate

204 Steatite pipe/tube fragment

206 Anvil stone

207 Abraded cobble or block: cobble with striations, polish or other evidence of cultural

208 Abraded cobble spall

209 ornamental ground nephrite

210 Celt: wedge shaped with sharp edge

211 Grinding stone/mortar: boulder or large cobble with ground or pecked depression(s).

214 Stone bead

215 Stone pendant or eccentric

OTHER DEFINITIONS

Scraper retouch: abrupt ($> 55^{\circ}$), regular retouch

Backing: in general refers to a thick, blunt edge opposite a cutting edge; may be manufactured by unifacial or bifacial retouch.

Use retouch: regular but non-intrusive (1-2mm) retouch, extending at least 10mm; edge angle $< 40^{\circ}$.

Billet flake: pronounced lip, broad fracture front (absence of point impact features), small platform area in relation to flake size, little crushing of platform, possible evidence of platform preparation

Bipolar flake: crushing at both ends; crushing of platform; ventral scarring; relatively straight ventral surface.

Primary flake: flake suitable for use as tool; maximum dimension $> 2\text{cm}$; at least 1cm of edge robust enough for retouch (edge angle $< 45^{\circ}$).

Secondary flake: flakes with recognizable ventral surface not classified as bifacial, bipolar, or primary.

Shatter: debitage lacking a recognizable ventral surface.

Spall: (large, flat flake derived from cobble and exhibiting cobble cortex on rounded surfaces May be produced by natural or cultural forces)

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