

**LITHIC ANALYSIS OF BLOCKS B, C, D, AND E
AT CHARLIE LAKE CAVE (HbRf-39),
NORTHEASTERN BRITISH COLUMBIA**

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1.0 INTRODUCTION

This report presents the results of the lithic analysis of Blocks B through E at Charlie Lake Cave (HbRf-39), located in northeastern British Columbia. The artifacts associated with Blocks B through E were recovered during the 1983 and 1990/91 excavation seasons at Charlie Lake Cave, under the supervision of Dr. Knut Fladmark and Dr. Jon Driver, respectively.

The lithic analysis for Excavation Block A, consisting of units 1 to 7, 9, 11, 13, 14, 20 to 29, and 32 to 35 and containing cultural components 1 through 10 (spanning the period from 10,500 BP to 200 BP), has been discussed previously in an MA thesis by Handly (1993). These excavation units were contiguous between the 1974, 1983, 1990, and 1991 field seasons, allowing for stratigraphic units and diagnostic artifacts to be correlated with the radiocarbon dates from Block A.

No such correlation was attempted in the thesis for Blocks B through E, due to the spatial distance separating these blocks from Block A, and a lack of diagnostic material culture and radiocarbon dates. However, it was considered important to summarize the lithic analysis for Blocks B through E prior to the site monograph being completed, since 201 pieces of debitage, one formed tool, eight unformed tools, and three cores, representing approximately 14 % of the total lithic inventory at Charlie Lake Cave, occurred in Blocks B to E (Table 1).

Interpretations of cultural activities associated with the lithic artifacts recovered from Blocks B through E were derived from a hunter-gatherer model developed in Handly (1993). This model will **not** be elaborated on in this report, and only a brief review of the analytical methodology will be presented. The reader is referred to Fladmark, Alexander, and Driver (1984), Driver (1988, 1992), Fladmark, Driver, and Alexander (1988), Driver and Handly (1991), Handly (1993), and Sullivan (1993) for more detailed discussions concerning previous archaeological excavations, site stratigraphy, faunal materials, and interpretations of cultural activities at Charlie Lake Cave.

1.1 LOCATION OF EXCAVATION BLOCKS

Block B consists of a three unit trench (Units 8, 10, and 12) located five metres to the east of Block A (Figures 1 and 2). These units were excavated in 1983 and preliminary analyses are presented in Fladmark, Alexander, and Driver (1984). In the earlier publication, these artifacts were correlated with those recovered from Block A and used to develop the first local site chronology. As was stated above, the lack of congruence between the stratigraphic exposures in Blocks' A and B, as well as the lack of radiocarbon dates in Block B, made it necessary to separate these Blocks during the earlier analysis (Handly 1993).

Blocks C through E were excavated to assist in the understanding of site formation processes and geomorphology at Charlie Lake Cave. Block C consists of two isolated units (30 and 31) located slightly upslope from Block A. Both were excavated to the underlying sandstone bedrock in 1991. Block D consists of Unit 35, downslope and to the west of Block A, and a test trench (approximately 3.0 x .50 m) located at the base of the parapet. The trench was excavated in 1983, and Unit 35 was excavated in 1991. Block E (not illustrated in Figure 2) is composed of Unit 37, located approximately

100 m upslope and to the north, on a flat terrace above the site. Stratigraphic profiles for all of the above excavation Blocks are **not** included in this report, but will hopefully be presented in the final monograph.

1.2 REPORT FORMAT

This report consists of seven sections: Introduction, Lithic Analysis and Interpretations, Conclusions, References Cited, Figures Cited, Tables Cited, and Appendices.

2.0 LITHIC ANALYSIS AND INTERPRETATIONS: OVERVIEW

The lithic artifacts recovered from Blocks B to E were classified into four categories: debitage, unformed tools, formed tools, and cores (although not all components possessed each of these classes) (see Handly 1993, Chapter 4). For all artifact categories, lithic raw material type and raw material inclusions were recorded to provide information on aboriginal raw material procurement and mobility patterns (i.e., Binford 1979, 1980). Cortical presence was also recorded. As the reduction process continues, the presence of cortex on debitage is also expected to decrease. Magne (1989) and Mauldin and Amick (1989) see cortical debitage as an indicator of only the earliest stages of lithic reduction. However, cortex cover is determined not only by early lithic reduction processes, but also by raw material nodule size, and the intensity and type of reduction present at the site (Sullivan and Rozen 1985; Beck and Jones 1990).

Debitage analysis was approached through a combination of size grade and individual flake attribute analysis (see Henry, Haynes, and Bradley 1976; Patterson and Sollberger 1978; Raab, Cande, and Stahle 1979; Jefferies 1982; Ahler 1989a, 1989b for similar approaches). Mass analysis defines the overall debitage size distribution across an assemblage while attribute analysis describes specific variability at the level of individual pieces of debitage within the assemblage. With size grade analysis it is assumed that as systematic lithic reduction occurs, decreasing load applications should produce predictable changes in flake size (Patterson and Sollberger 1978; Stahle and Dunn 1982; Cotterell and Kamminga 1987). The most diagnostic size grade differences are noted experimentally between early stage reduction, with relatively more large flakes produced, and late stage reduction (Henry, Haynes, and Bradley 1976). Weight (in gm) was also determined for all artifacts.

Platform modification is seen as the most diagnostic criterion used to differentiate between different force application processes (Cotterell and Kamminga 1987:703; also Crabtree 1975; Frison and Bradley 1980; Magne 1989). Early stage reduction is associated with unprepared platforms and crushing or shattering of the initiation surface, due to high load applications (Newcomer 1975; Speth 1972; Sheets 1973; Hayden and Hutchings 1989). Late stage reduction is identified by the presence of multiple flake removals and extensive grinding or abrasion of the platform. Additionally, if biface reduction is present in an assemblage, platforms often display the lateral juncture of the bifacial edge (i.e., a facet) (Frison 1968; Magne and Pokotylo 1981; Magne 1985, 1989).

For additional data concerning debitage reduction stage, the presence or absence of interior surface lipping and erailure scars was also recorded. Interior surface lipping is produced as a result of a bending initiation associated with soft indenter force applications (Cotterell and Kamminga 1987:685-689, 704). The formation of erailure scars tends to occur only with force applications associated with hard indenters (Cotterell and Kamminga 1987:687-689).

The final attributes chosen to describe debitage in this study focused upon possible post-depositional effects that could be observed on debitage. In lithic assemblages, the degree and type of debitage fragmentation may indicate the relative intensity of site usage as reflected by the presence of trample damaged flakes (Neilson 1991). To

initially identify debitage fragmentation patterns, a modified Sullivan and Rozen (1985:759) debitage typology was used to determine the distribution of complete, proximal, mediobasal, and shattered pieces of debitage in the assemblages (Sullivan and Rozen 1985; Sullivan 1987; Prentiss and Romanski 1989). Following this, trample damaged flake termination margins were identified by identifying those margins that displayed right angle snap, or concave flake scars (i.e., 'half moons') (Keeley and Newcomer 1977; Moss 1983; Cotterell and Kamminga 1987; Pryor 1988; Prentiss and Romanski 1989). If trample damage was occurring, high debitage fragmentation frequencies should be associated with high snap fracture frequencies. The presence or absence of potlid formation of the artifacts was also used to monitor the presence or absence of hearth or fires in the components (Purdy 1974).

Unformed and formed tool categories were differentiated by the degree of retouch intensity or the amount of energy expended in the production of the tool, as indicated by the extent to which the original flake blank has been modified. Unformed tools (i.e., use-retouched tools, unformed unifaces, and unformed bifaces) were defined by the presence of use-retouch or intentional retouch which had not significantly altered the original flake morphology. For unformed tools, retouch location and retouched margin outline morphology were also noted.

Conversely, formed tools (formed unifaces, formed bifaces and projectile points) have had a significant amount of energy placed into their acquisition, production and maintenance. As well, their original flake morphologies have been extensively altered. Classification of artifacts in this manner allowed for information to be derived concerning the relationship between expedient or generalized tools (i.e., unformed) and specialized or curated tools (i.e., formed), allowing for inferences to be drawn concerning hunter-gatherer settlement and mobility adaptations at the site (Binford 1979, 1980; Bamforth 1986; Odell 1989; Shott 1989; Andrefsky 1991).

Core variability was classified according to the degree of technological specialization used to prepare and maintain the core. Specialized core technologies are characterized by the efficient use of raw material, display a high degree of core pre-shaping and platform preparation and maintenance, and produce standardized flakes (Sheets and Muto 1971; Clark 1987). Generalized core technologies tend to be raw material wasteful, core pre-shaping and platform preparation are absent, and the flakes removed tend to be unstandardized (Parry and Kelly 1987). For this study, the number and direction of flake removals and the presence or absence of platform preparation was recorded to aid in determining the degree of specialization. Within hunter-gatherer societies, specialized core technologies are usually associated with mobile aspects of the subsistence settlement pattern (i.e., kill-sites or game monitoring stations), while expedient core technology occurs more frequently at more sedentary sites (i.e., residential basecamps) (Binford 1979, 1980; Bamforth 1986; Bleed 1986; Odell 1989; Shott 1989; Torrence 1983).

Both non-metric and metric attributes were recorded for all unformed tools, formed tools, and cores recovered. Non-metric, subjective, variables that were recorded included: retouched edge shape, morphology, location and type of intentional or non-intentional retouch, type and degree of usewear (if present), and presence or absence of cortex. Metrical attributes included maximum length, width, thickness, and length of all intentionally or non-intentionally retouched margins. All metrical data was

recorded in millimetres (mm) to two decimal places. Both non-metric and metrical data were entered into the REFLEX (Version 2) database program to generate the cross-tabulations in Tables 1 to 11.

2.1 ARTIFACT SUMMARY

The four excavation Blocks provide the basis for the lithic analysis presented here. Six vertical artifact concentrations were noted in Block B in 1983; therefore, Block B has been further subdivided into six subgroups (from earliest to latest); B1, B2, B3, B4, B5, and B6. One hundred and ten pieces of debitage were recorded from Block B, representing 52.1 % of all the artifacts recovered from Block B through E: Unit 8 (n = 104), Unit 10 (n = 6), and Unit 12 (n = 0). Each contributed the following percentage: B1 (3.6 %), B2 (2.7 %), B3 (37.3 %), B4 (1.8 %), B5 (50.9 %), and B6 (3.6 %). Due to the low numbers of artifacts associated with Components B1, B2, B4, and B6 the majority of cultural interpretations in Block B will focus upon Components B3 and B5. One core was recovered from Component B1.

Block C contained 10 pieces of debitage, representing 4.7 % of the study assemblage: Unit 30 (n = 2) and Unit 31 (n = 8).

Block D contained 1 piece of debitage and one unformed tool, both from the 1983 test trench, which represents < 1.0 % of the total study assemblage.

Block E contained 80 pieces of debitage, one formed tool fragment, seven unformed tools, and two cores, representing 42.3 % of the Block B assemblage.

2.2 COMPONENT B1 DEBITAGE

Only four pieces of debitage were recovered from Component B1 in stratigraphic layers 3-11 (n = 3) and 3-13 (n = 1). All were located in Unit 8. These artifacts were associated with component 2 by Fladmark, Alexander, and Driver (1984). This roughly corresponds to Component 3 defined by Driver (1992) and Handly (1993), dated to 9,500 BP (Table 2).

All the debitage in B1 is produced from vitreous black chert (Table 3). No artifacts contained raw material inclusions (Table 4) and only one displayed a cortical surface (Table 5).

An unimodal peak in debitage size grade 3 (10-15 mm) is noted (50.0 %, Table 6). Early stage initiation platform modification appears to dominate with 50.0 % of the debitage displaying unprepared and single flake removal platforms (Table 7). Conversely, interior surface lipping is present on 75.0 % of the debitage (Table 8), while errillure scarring is present on one artifact (Table 9). An unimodal peak at 2 to 3 exterior scar counts is noted for 75.0 % of the assemblage in B1 (Table 10).

Seventy-five percent of the debitage is fragmentary (Table 11), and snap terminations are present on 7.7 % of flake termination margins (Table 12). No potlids are recorded for this component (Table 13).

CORE

One, fairly small, vitreous black chert core (# 0007) was recovered from B1 in Unit 10 (Table 14). Inclusions and cortical surfaces were present. A single flake removal was noted which was struck from an unprepared platform.

INTERPRETATION

The small number of artifacts recovered from this component severely limits the strength of the following interpretations. Both the debitage and core are produced from vitreous black chert. Early stage platform modification is suggested, but the presence of interior surface lipping and high exterior flake scar counts may indicate that secondary lithic reduction (i.e., soft hammer percussion) was occurring. The core also appears to be expediently produced.

In comparison, Component 3 in Block A was characterized by small-sized, vitreous grey and mottled chert debitage, with high frequencies of late stage platform modification, interior surface lipping and very high exterior scar counts (Handly 1993:109-111, Figure 5.3). The tight spatial clustering of the debitage indicated that this area may have been a locus for the production or maintenance of at least two bifaces. This was supported by the presence of two soft quartzitic hammerstone adjacent to the debitage concentration (Handly 1993:111). The incongruence in lithic raw materials and reduction strategies observed between Component 1, Block A, and Component B1, indicate that these two areas of the site probably represent different activity areas or temporally different occupations.

2.3 COMPONENT B2 DEBITAGE

Three pieces of debitage were recovered in Component B2, stratigraphic layers 3-6 (n = 1) and 3-8 (n = 2), and all from Unit 8. They were associated with Component 3 in 1984, corresponding roughly to Component 4, defined in 1993 (7,250 BP).

Two were produced from vitreous black chert, while the third was produced from brown obsidian, identified by x-ray fluorescence as Mt. Edziza, Type 3 (Fladmark, Alexander, and Driver 1984:85). One artifact contained raw material inclusions, while none displayed cortical surfaces.

An unimodal peak in debitage size grade 2 (5-10 mm) is present (100.0 %). Initiation platform modification is absent on all artifacts from B2 and no evidence for interior surface lipping or erailure scarring was retained. An unimodal peak of 0 to 1 exterior scars is noted for two thirds of the artifacts in B2.

All of the debitage was fragmentary, and snap terminations are noted on 33.3 % of flake termination margins. No potlids are recorded.

INTERPRETATIONS

Very little can be said concerning cultural adaptations in Component B2 due to the small sample size. Exterior scar counts may indicate early stage reduction; however,

the lack of initiation platforms and evidence for interior surface lipping makes this assumption tentative. Possible trample damage on flake margins could be inferred from the high percentage of snap fractures noted on flake terminations.

Component 4 in Block A was interpreted as an adjunct area associated with a residential basecamp which may have been located on the terrace above the site (Handly 1993:114-116). This was inferred by the the low formed:unformed tool ratio, expedient nature of the unformed and formed tools, and the strong evidence for early stage lithic reduction. High traffic areas were noted in Block A as reflected by the high frequencies of snap fractured flake terminations. The artifacts recovered from B1 could also fit the interpretation of a residential basecamp area as identified for Block A (Handly 1993:116).

The presence of obsidian in B2 indicates that aboriginal lithic raw material exchange 'networks' were established between the Stikine River and Charlie Lake Cave (approximately 600 km apart) by at least 7,250 BP (Handly 1993:111).

2.4 COMPONENT B3 DEBITAGE

In Component B3, 41 pieces were recorded from Unit 8, stratigraphic layers 3-1 (n = 20), 3-2 (n = 19), and 3-3 (n = 2). This was associated with Component 6 in 1984, and may correspond to Component 6, Block A, dated to 4,600 BP.

All lithic raw materials are produced from either vitreous (56.1 %) or fine-grained chert (43.9 %). The majority are produced from fine-grained black chert (43.9 %) or vitreous black chert (29.3 %), with lesser percentages of vitreous, banded brown and black chert (19.5 %) and vitreous, mottled grey and black chert (7.3 %). Fourteen artifacts (34.1 %) display raw material inclusions, while three (7.3 %) displayed cortical surfaces.

An unimodal peak in debitage size grade 2 (5-10 mm) is present (51.2 %), with size grade 3 (10-15 mm) slightly lower at 31.7 %. Of those artifacts which retain evidence of initiation platform modification (n = 32), 28 (87.5 %) display late stage platform preparation in B3. This appears to correlate with the high interior surface lipping frequency (46.3 %) and complete absence of erailure scarring. An unimodal peak 2 to 3 exterior scar counts (63.4 %) for the artifacts in B3.

Thirty seven percent of the debitage is complete, and snap terminations are noted on only 16.5 % of flake termination margins. No potlids are recorded.

INTERPRETATIONS

The high frequencies of late stage platform modification, interior surface lipping, and high exterior scar counts, and small flake size, indicates that Component B3 represents a period where late stage reduction was occurring in Block B.

Component 6 in Block A contained a small, hearth-like feature located along the southern boundary between Units 24 and 26 (Handly 1993:124). The artifact concentrations in Component 6 were fairly complex with separate areas of early and late

stage lithic reduction located to the west and south of the hearth, respectively, indicating that the hearth may have been a focus for aboriginal lithic activities (Handly 1993:125-126, Figure 5.6). Of more concern for our interpretation of B3 are overlapping concentrations of late and early stage reduction activities to the east of the hearth, centred around Units 3, 6, and 7. Unit 7, the closest excavated unit to Block B, contains a very localized concentration ($n = 25$) of late stage debitage as well as a number of unformed tools and one core (Handly 1993:126-127). As with B3, the majority of debitage is produced from fine-grained black chert (60.0 %).

Although 5 metres apart, the similar lithic reduction patterns and raw material frequencies noted between Unit 7 in Component 6 (Block A) and Component B3 may indicate that a common locus of late stage lithic reduction extends between these two areas of the site.

2.5 COMPONENT B4 DEBITAGE

Only two pieces of debitage are recorded from Component B4. Both were recovered from stratigraphic layer 2-5 in Unit 8. This component was correlated with Component 8 in 1984, and may be contemporaneous with Component 8 (1,360 BP), as defined in 1993.

All of the debitage in B4 is produced from vitreous chert, with mottled, grey and black chert and banded, brown and black chert, equally represented. One artifact contained raw material inclusions, and no cortical surfaces were noted.

No peak in debitage size grade is present. Only one initiation platform displays evidence of modification in the form of crushing, and interior surface lipping and erailure scarring are absent on all artifacts. No exterior scar count peak is seen.

One artifact is complete, no snap terminations are displayed, and potlids are absent.

INTERPRETATIONS

The lack of diagnostic attributes on the two pieces of debitage from Component B4 precludes any interpretive statements being made at this time.

2.6 COMPONENT B5 DEBITAGE

Fifty-six pieces of debitage were recorded in Component B5, with the majority from Unit 8 ($n = 54$). The artifacts were recovered in stratigraphic layers 2-1 ($n = 10$), 2-2 ($n = 16$), 2-3 ($n = 22$), and 2-4 (8). This component was correlated with Component 9 in 1984, and may be contemporaneous with Component 9 ($< 1,360$ BP), defined in 1993.

Most of the debitage was produced from vitreous chert (92.9 %). Vitreous black chert is most numerous at 42.9 %, with vitreous grey chert at 33.9 %. Twenty artifacts (35.7 %) display raw material inclusions and one (1.8 %) retained a cortical surface.

An unimodal peak in debitage size grade 2 (5-10 mm) occurs with 64.3 %. With those artifacts retaining evidence of initiation platform modification (n = 30), 23 (76.7 %) display late stage platform preparation. This correlates with high frequencies of interior surface lipping (47.4 %) and an absence of erailure scars. A pronounced unimodal peak of 2 to 3 exterior scar counts (67.9 %) in B5 is noted.

Debitage completeness in B5 is fairly high at 32.1 %, and snap terminations are noted on 15.4 % of flake margins. No potlids are recorded.

INTERPRETATIONS

The debitage recovered from Component B5 indicates that late stage lithic reduction activities were occurring: high percentages of small-size debitage, high frequencies of late stage platform preparation, interior surface lipping, and exterior scar counts.

Component 9 in Block A contained the largest number of artifacts recovered from any component in that Block. Component B5 holds the same distinction. The majority of the debitage recovered from Component 9 also displayed evidence of late stage reduction; however, vitreous mottled chert occurred slightly more frequently than did vitreous black chert; 42.1 % vs 39.9 % (Handly 1993:138).

Two lithic reduction loci were noted in Component 9. Sparsely distributed directly in front of the cave mouth were low numbers of cortical debitage, debitage with erailure scars, and cortical unformed tools (Handly 1993:141-143, Figure 5.9). Slightly to the west, a small ovate depression was located in Units 5, 25, and 26 and contained the majority of late and early stage debitage. Formed tools were concentrated to the south and east of this ovate depression and it was previously suggested that "the refuse from both production events (...) appears to have been collected, possibly facilitated by a mat or hide ground-cover, and dumped in the depression for disposal" (Handly 1993:141).

The concentration of debitage in Unit 8 may indicate where late stage reduction was occurring during the deposition of Component 9. This is supported by the similar raw material type frequencies and the 'dump' of lithic detritus from one area to another.

2.7 COMPONENT B6 DEBITAGE

Four pieces of debitage were recovered from Component B6 in stratigraphic layers 1-1 (n = 2) and 2-1 (n = 2), Unit 10. These artifacts were previously associated with cultural component 10 and 11 from 1984, roughly corresponding to Component 10 defined in 1993 (< 1,360 BP).

All of the debitage in B6 is produced from either vitreous (n = 3) or fine-grained (n = 1) chert, with grey chert representing 50.0 % of the sample. One artifact contained raw material inclusions, and no cortical surfaces were present.

Debitage size grade 2 (5-10 mm) contains 75.0 % of the assemblage. Of those artifacts retaining initiation platform modification (n = 2), both display evidence of late stage reduction. Interior surface lipping is present on one artifact and no erailure scar is noted. Exterior scar counts peak at category 2 (2 to 3 scars) with 75.0 %.

Seventy-five percent of the B6 assemblage is fragmentary and 35.7 % display snap terminations on their flake margins. No potlids are recorded.

INTERPRETATIONS

The low number of artifacts recovered from Component B6 makes interpretation difficult. Small size, late stage platform modification, presence of interior surface lipping and fairly high exterior scar counts **may** indicate that late stage lithic reduction was occurring in B6.

2.8 BLOCK B: DEBITAGE SUMMARY AND INTERPRETATIONS

Seventy-eight percent of thedebitage recovered from Block B is produced from vitreous cherts, with 20.0 % contributed by fine-grained cherts. Vitreous black chert (39.1 %), vitreous grey chert (18.2 %), and fine-grained black chert (17.3 %) are the most common lithic raw material types. Inclusions were noted in 33.6 % of the Block B assemblages and cortical surfaces were only noted in 4.5 %.

The majority ofdebitage in Block B occurs either in size grade 2 (5-10 mm), with 59.1 %, or size grade 3 (10-15 mm), at 26.4 %. Fordebitage retaining evidence of initiation platform modification (n = 68), 80.1 % appears representative of late stage lithic reduction. Interior surface lipping was present on 37.3 % of thedebitage, while only one artifact retained evidence of erailure scarring (0.9 %). Exterior scar counts show an unimodal peak at 65.5 % in category 2 (2-3 scars).

Sixty-seven percent of thedebitage assemblage is fragmentary. Snap terminations were highest in B2 and B6 and lowest in B4. No potlidded surfaces were noted in Block B.

In general, the artifacts from Block B display evidence of late stage lithic reduction **throughout** the sequence presented. Lithic reduction activities appear more uniform than those identified for comparable components in Block A: i.e., very little early stage reduction or cortical surface attributes were noted and no evidence of overlapping lithic reduction areas was noted. However, this may be more related to the small area excavated, rather than reflecting aboriginal cultural behaviours. As well, no evidence for hearths or other features was noted by excavators.

It is suggested that the assemblages in Block B, especially B3 and B5, indicate that activities relating to Charlie Lake Cave's function as a game monitoring station were occurring; specifically those activities relating to the maintenance and production of formed bifaces (Handly 1993:66-67). This would indicate that game monitoring was most prevalent in this section of the site around 4,600 BP (B3) and after 1,360 BP (B5).

2.9 BLOCK C DEBITAGE

A total of 10 pieces of debitage were recovered from Block C: Unit 30 (n = 2) and Unit 31 (n = 8). These units are located on a midslope section of the hillside above the site proper. It is assumed that the artifacts recovered here were redeposited from upslope cultural deposits as a result of colluvial action, probably from the terrace where the present landowners home is located.

All of the debitage in Block C is produced from vitreous (n = 6) or fine-grained (n = 4) chert, with vitreous black chert (n = 4) most prominent. Eighty percent of the assemblage contains inclusions and 20.0 % display a cortical surface.

A unimodal size grade peak in category 4 (15-20 mm) is noted at 40.0 %, and a single flake outlier is present at size grade 8 (35-40 mm). Seventy percent of the assemblage lacks any evidence of initiation platform modification. The remainder is more indicative of early stage platform modification. No evidence of interior surface lipping or erailure scars was noted. Exterior scar counts display an unimodal peak in category 2 (2 to 3 scars) with 60.0 %.

Seventy percent of the assemblage is fragmentary and 21.6 % of flake margins display snap fractures. No potlids are noted.

INTERPRETATION

The overall large size of the debitage, in association with high cortical frequencies and evidence of early stage platform preparation indicates that early stage lithic reduction was occurring upslope from Units 30 and 31. It was suggested by Handy (1993:46, 67-68) that the terrace above Charlie Lake Cave could have functioned ethnographically as a residential basecamp during the spring and fall. Although probably redeposited, the artifacts recovered from Block C would tend to support this interpretation.

2.10 BLOCK D DEBITAGE

Only one piece of vitreous, banded brown and black chert, debitage was recorded from Block D in the test trench excavated in 1983. The artifact contained inclusions, but no cortical surfaces.

The lone piece of debitage was classed in size grade 8 (35-40 mm). Early stage platform modification is indicated, although interior surface lipping is present. No erailure scar was recorded. Exterior flake scars were noted in category 2 (2-3 scars).

The artifact was complete and no snap terminations were noted on the flake margin. No potlids were present.

UNFORMED TOOL

One complete, fairly small (30-35 mm), unformed tool (# 0006) was recovered from the test trench in 1983. The tool is produced from a vitreous, mottled grey and black chert. Inclusions and cortex are absent. The initiation platform is still retained present on the artifact and a number of flake removals scars are noted on the platform. Interior surface lipping is also seen, but no erailure scars are recorded. Three exterior flake scar removals are apparent. The unformed tool displays circumferential, abrupt retouch (i.e., end/side scraper) and extensive evidence of usewear along the lateral and distal margins.

INTERPRETATION

Due to the small sample size associated with Block D, no cultural interpretations are presented at this time, except to note that these artifacts were probably intentionally discarded over the parapet.

2.11 BLOCK E DEBITAGE

A total of 80 pieces of debitage were recovered from Unit 37 in Block D. Ninety-five percent of the assemblage was produced from vitreous chert. The two most common raw material types were vitreous black chert (61.3 %) and vitreous, mottled grey and black, chert (30.0 %). Inclusions were noted in 46.3 % of the assemblage and cortical surfaces were present on 10.0 %.

Debitage size grades display an unimodal peak in category 3 (10-15 mm) at 53.8 %. Of that debitage retaining any evidence of initiation platform modification (n = 42), late stage modification appears more prevalent than early stage modification (64.3 % vs 35.7 %). Interior surface lipping is present on 30.0 % of the debitage, and no evidence of erailure scarring was seen. Exterior scar counts show an unimodal peak in category 2 (2-3 scars) with 46.3 %.

The majority of the assemblage is fragmentary (77.5 %) and snap terminations were noted on 16.9 % of flake margins. One potlid was recorded.

FORMED TOOLS

One formed tool fragment (# 1908) was recovered from Unit 37. It is a small, asymmetrical projectile point basal fragment produced from fine-grained, reddish-brown chert. Due to the fragmentary nature of the artifact, nothing of cultural-historical significance can be determined.

UNFORMED TOOL

Seven unformed tools were recovered from Unit 37 in Block E. (#'s 1858, 1862, 1864, 1867, 1884, 1886, and 1888). Four of the unformed tools are produced from vitreous black chert and the remainder are made of vitreous, mottled grey and black chert. Inclusions and cortical surfaces are both noted on three artifacts.

Of those unformed tools retaining information on initiation platform modification (n = 4), 75.0 % display evidence of having being detached during late stage lithic reduction. One tool displays interior surface lipping, while none of the artifacts shows evidence of erailure scarring.

Of the ten retouch surfaces present on the seven artifacts, 90 % represent use-retouch (usewear). Eight of the use-retouched surfaces display a straight retouched edge morphology, as does the one intentionally retouched artifact.

CORES

Two cores were recovered from Unit 37, Block E. The first core is large and produced from a light brown quartzite (# 1839). Both inclusions and cortical surfaces were noted. Core platforms appear unprepared. Multidirectional force direction applications were apparent and four flake removals are present.

The second is fairly small and produced from a vitreous black chert (# 1879). Cortical surfaces were noted, but raw material inclusions were lacking. Four flakes scars were noted and appear to have been detached through bipolar reduction. The core platforms appears to have been abraded prior to flake detachment.

INTERPRETATION

High frequencies of raw material inclusions and cortical surfaces on the debitage from E1 may indicate the presence of early stage reduction. However, portions of the debitage assemblage also contain high frequencies of late stage platform preparation and interior surface lipping.

The unformed tools from E1 were expediently produced, with the majority displaying use-retouch along straight flake margins. They were predominantly produced during late stage lithic reduction activities (as evidenced by late stage platform preparation and interior surface lipping). As with the debitage, however, cortical surfaces are also noted on 43.0 % of the unformed tools. Both cores are also expediently produced. From the above, it is inferred that a mixture of lithic reduction strategies were present during the deposition of E1.

This would suggest that a number of lithic reduction strategies and aboriginal activities were occurring on the terrace above the site. The second interpretation presented for aboriginal activities at Charlie Lake Cave indicated that a residential base-camp could have been located on the terrace above the site proper. The observed mixture of lithic reduction strategies and the expedient nature of the unformed tools and cores in Block E1 **could** support this inference. It should be remembered that problems associated with compressed stratigraphy, common in the boreal forest, make **any** perceived correspondences between artifact types and behaviour should be seen as tenuous.

3.0 CONCLUSIONS

Two expectations concerning lithic activities at Charlie Lake Cave were developed by Handly (1993:66-68). The first stated that Charlie Lake Cave could have functioned as a game monitoring station for observing bison movements on the plains below the site. At game monitoring stations lithic activities relating to the maintenance and production of projectile points and bifaces should be present; i.e., late stage reduction processes and staged reduction strategies. The artifacts recovered from the platform in Components B3 and B5 provide strong evidence for these activities having occurred in Block B around 4,600 BP and after 1,360 BP, respectively.

The second expectation indicated that Charlie Lake Cave could also have functioned as an adjunct activity area associated with a residential basecamp located on the terrace above the site. Artifacts recovered from Blocks C and E indicate that a mixture of lithic reduction strategies and more expedient lithic tool production was occurring in these areas. This supports the inference of a residential basecamp located just upslope from Charlie Lake Cave proper. Unfortunately, no relative or absolute age determination for Block C and E is available.

The information presented in this report indicates that lithic reduction activities at Charlie Lake Cave, especially with regards to the relationship between Block A and B, could be potentially more complex than was originally identified by Handly (1993). In Block A, lithic reduction activities changed through time (from a residential basecamp in the Middle Prehistoric Period to a game monitoring station during the Late Prehistoric [Handly 1993:188-192]); this pattern is **not** repeated in Block B. This may be related to the different spatial location of Blocks A and B on the platform, as regards suitability for a basecamp vs game monitoring function. In the future, areal excavation of the intervening space between Blocks A and B on the platform would allow for the artifacts to be seen more contextually, using the entire available platform area as the analytical and interpretive focus for understanding aboriginal adaptations at Charlie Lake Cave.

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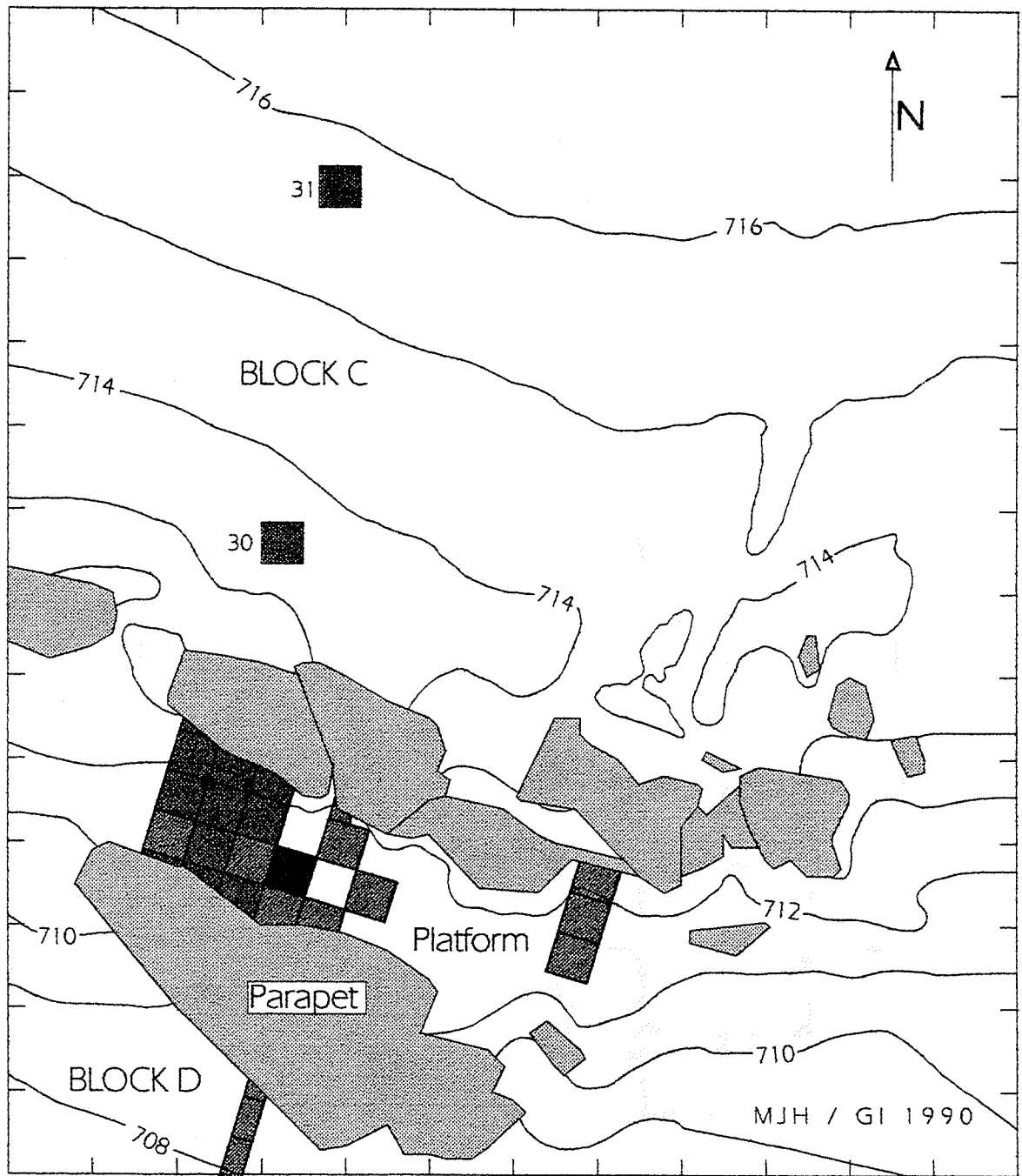
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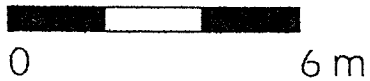
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FIGURE 1: LOCATION OF EXCAVATION BLOCKS C AND D, CHARLIE LAKE CAVE (HbRf-39)



Scale



Legend





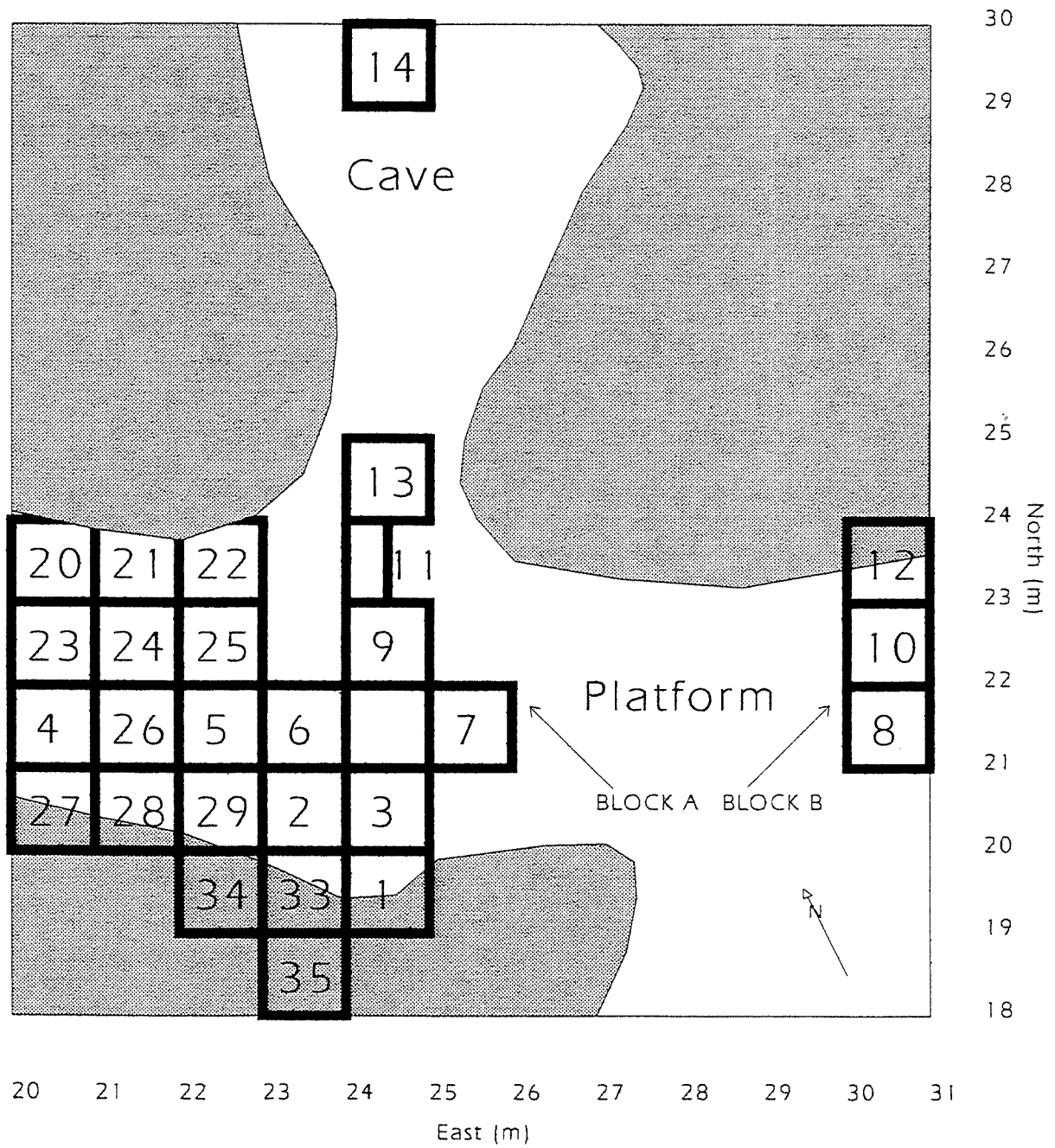

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|---|---|
|  Sandstone |  1983 |
|  1974 |  1990 / 1991 |

FIGURE 2: LOCATION OF EXCAVATION BLOCKS A AND B, CHARLIE LAKE CAVE (HbRf-39)



Legend

 Bedrock


 Excavated Unit

TABLE 1: COMPARISON OF BLOCK A TO BLOCKS B TO E LITHIC ARTIFACTS

	DEBITAGE	FORMED TOOLS	UNFORMED TOOLS	CORES	TOTAL
BLOCK A	1223	73	33	18	1347
BLOCK B	110	00	00	01	111
BLOCK C	10	00	00	00	10
BLOCK D	01	00	01	00	02
BLOCK E	80	01	07	02	90
TOTAL	1424	74	41	21	1560

TABLE 2: RADIOCARBON DATE CORRELATIONS BETWEEN BLOCK A AND B

BLOCK A C14 DATE	INST.	BLOCK A COMPONENT	MATERIAL	BLOCK B COMPONENT
10,500 +/- 080	CAMS 2129	1	UNGULATE	
10,290 +/- 100	CAMS 2317	1	RAVEN	
10,380 +/- 160	SFU 378	1	BISON	
10,450 +/- 150	SFU 300	1	BISON	
10,560 +/- 080	CAMS 2134	1	BISON	
10,770 +/- 120	SFU 454	1	BISON	
9,670 +/- 150	CAMS 2316	2	BISON	
9,760 +/- 160	SFU 355	2	BISON	
9,990 +/- 150	RIDDL 393	2	BISON	
10,100 +/- 210	RIDDL 392	2	SQUIRREL	
9,490 +/- 140	CAMS 2318	3	RAVEN	B1
7,800 +/- 800	SFU 370		CHARCOAL	
8,400 +/- 240	SFU 357		CHARCOAL	
7,100 +/- 350	SFU 452		CHARCOAL	
7,400 +/- 300	RIDDL 10	4	CHARCOAL	B2
6,700 +/- 290	SFU 356	5	CHARCOAL	
4,400 +/- 400	SFU 385	6	CHARCOAL	B3
4,800 +/- 640	SFU 451	6	CHARCOAL	B3
2,900 +/- 400	SFU 358	7	CHARCOAL	
4,270 +/- 160	SFU 382	7	BISON	
4,400 +/- 080	CAMS 3174	7	UNGULATE	
1,130 +/- 240	SFU 453	8	CHARCOAL	B4
1,400 +/- 400	SFU 379	8	CHARCOAL	B4
1,550 +/- 100	RIDDL 59	8	CHARCOAL	B4

TABLE 3: DEBITAGE LITHIC RAW MATERIALS

MATERIAL	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
VC Black	04	02	12	00	24	01	04	00	48	95
VC Mottled	00	00	03	01	09	00	01	00	24	38
VC Grey	00	00	00	00	19	01	01	00	01	22
FGC Black	00	00	18	00	01	00	00	00	01	20
VC Banded	00	00	08	01	00	00	00	01	00	10
FGC Banded	00	00	00	00	02	00	01	00	01	04
VC Green	00	00	00	00	00	01	00	00	01	02
VC Brown	00	00	00	00	00	00	00	00	02	02
O Brown	00	01	00	00	00	00	00	00	00	01
FGC Mottled	00	00	00	00	00	00	01	00	00	01
FGC Grey	00	00	00	00	00	01	00	00	00	01
FGC Green	00	00	00	00	00	00	01	00	00	01
FGC Brown	00	00	00	00	00	00	01	00	00	01
CH Grey	00	00	00	00	01	00	00	00	00	01
CG Grey	00	00	00	00	00	00	00	00	01	01
CG Brown	00	00	00	00	00	00	00	00	01	01
TOTAL	04	03	41	02	56	04	10	01	80	201

Legend:

VC	Vitreous Chert	CG	Coarse-Grained Chert
FGC	Fine-Grained Chert	O	Obsidian
		CH	Chalcedony

TABLE 4: DEBITAGE RAW MATERIAL INCLUSIONS

INCLUSIONS	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
ABSENT	04	02	27	01	36	03	02	00	43	118
PRESENT	00	01	14	01	20	01	08	01	37	83
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 5: DEBITAGE CORTICAL SURFACE

CORTEX	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
ABSENT	03	03	38	02	55	04	08	01	72	186
PRESENT	01	00	03	00	01	00	02	00	08	15
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 6: DEBITAGE SIZE GRADE

CORTEX	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
< 5 mm	00	00	00	00	01	00	00	00	01	02
5-10 mm	01	03	21	01	36	03	01	00	10	76
10-15 mm	02	00	13	00	13	01	01	00	43	73
15-20 mm	01	00	06	00	04	00	04	00	18	33
20-25 mm	00	00	01	01	00	00	02	00	04	08
15-20 mm	00	00	00	00	01	00	01	00	03	05
20-25 mm	00	00	00	00	00	00	00	00	01	01
25-30 mm	00	00	00	00	00	00	01	01	00	02
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 7: DEBITAGE INITIATION PLATFORM MODIFICATION

PLATFORM	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
Absent	01	03	09	01	26	02	07	00	38	87
Unprepared	01	00	00	00	00	00	01	00	02	04
Crushed	01	00	12	01	10	00	00	00	11	35
Single Flake	01	00	04	00	07	00	01	01	13	27
Multiple Flake	00	00	11	00	08	02	01	00	13	35
Faceted	00	00	04	00	03	00	00	00	02	09
Abraded	00	00	01	00	02	00	00	00	01	04
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 8: DEBITAGE INTERIOR SURFACE LIPPING

LIPPING	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
ABSENT	01	03	22	02	38	03	10	00	56	135
PRESENT	03	00	19	00	18	01	00	01	24	66
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 9: DEBITAGE ERAILLURE SCARRING

ERAILLURE	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
ABSENT	03	03	41	02	56	04	10	01	80	200
PRESENT	01	00	00	00	00	00	00	00	00	01
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 10: DEBITAGE EXTERIOR SCAR COUNT

SCAR COUNT	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
INDETERM.	00	00	02	00	03	00	02	00	20	27
0 TO 1	00	02	10	00	06	00	00	00	05	23
2 TO 3	03	01	26	01	38	03	06	01	37	116
4 TO 5	01	00	03	01	08	01	02	00	15	31
> 6	00	00	00	00	01	00	00	00	03	04
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 11: DEBITAGE COMPLETENESS

Completeness	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
Shatter	00	01	02	00	02	00	02	00	19	26
Mediodistal	01	02	07	01	25	02	05	00	19	62
Split	00	00	03	00	01	00	00	00	06	10
Proximal	02	00	14	00	10	01	00	00	18	45
Complete	01	00	15	01	18	01	03	01	18	58
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 12: DEBITAGE SNAP FRACTURE TERMINATIONS

LOCATION	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
DISTAL	01	00	16	00	15	02	03	00	25	62
PROXIMAL	00	01	02	01	11	02	04	00	13	34
LEFT LAT.	00	02	02	00	02	01	00	00	04	11
RIGHT LAT.	00	01	01	00	02	00	01	00	05	10
TOTAL	01	04	21	01	30	05	08	00	47	117

TABLE 13: DEBITAGE POTLID FORMATION

POTLIDS	COMPONENTS									TOTAL
	B1	B2	B3	B4	B5	B6	C	D	E	
ABSENT	04	03	41	02	56	04	10	01	79	200
PRESENT	00	00	00	00	00	00	00	00	01	01
TOTAL	04	03	41	02	56	04	10	01	80	201

TABLE 14: FORMED AND UNFORMED TOOLS, AND CORE DESCRIPTIONS

No.	Comp.	Description	L (mm)	W (mm)	T (mm)	Wt (gm)	Comments
0006	D1	Vitreous mottled grey and black chert unformed tool	28.4	34.3	07.0	008.5	Usewear is present along a straight retouch margin (20.9 mm). Intentional retouch occurs along an exterior convex margin (58.5 mm).
0007	B1	Vitreous black chert core	57.1	51.8	30.3	117.6	Large core with single flake removal.
1839	E1	Brown quartzite core	83.7	54.0	37.1	103.6	Four multidirectional flake removals present. Core platforms unprepared.
1858	E1	Vitreous black chert unformed tool	18.4	31.0	05.9	003.1	Usewear present along straight margin (21.6 mm).
1862	E1	Vitreous black chert unformed tool	26.1	22.4	04.1	003.0	Usewear present along straight margin (16.2 mm).
1864	E1	Vitreous black chert unformed tool	11.7	24.8	04.1	001.1	Usewear present along convex margin (05.4 mm).
1867	E1	Vitreous mottled grey and black chert unformed tool	11.6	16.7	03.5	000.4	Two usewear surfaces. Both are located along straight margins and measure 12.0 mm and 04.9 mm respectively.
1879	E1	Vitreous black chert core	34.7	23.3	10.9	009.5	Four unidirectional flake removals noted from bipolar reduction.

No.	Comp.	Description	L (mm)	W (mm)	T (mm)	Wt (gm)	Comments
1884	E1	Vitreous mottled grey and black chert unformed tool	31.4	22.2	03.9	002.8	Two usewear surfaces. Both are located along straight margins and measure 18.5 mm and 16.0 mm, respectively.
1886	E1	Vitreous black chert unformed tool	22.7	27.2	06.7	005.3	One intentionally retouched surface is located along a straight interior margin (15.7 mm). One usewear surface is present along a straight margin (10.6 mm).
1888	E1	Vitreous mottled grey and black chert unformed tool	25.4	24.8	05.7	002.2	Usewear present along straight margin (25.4 mm).
1908	E1	Fine-grained reddish brown formed tool	08.3	15.7	08.3	000.1	Small asymmetrical basal fragment of a projectile point.

APPENDIX 1: DEBITAGE ATTRIBUTES**A. Artifact Number:**

This entry refers to the catalogue number assigned to each artifact. Numbers correspond to the year of collection:

- 001 - 999; artifacts from 1974, 1983;
- 1000 - 1999; artifacts from 1990, 1991.

B. Natural Stratigraphic Layer:

This entry refers to the natural stratigraphic layer from which the artifact was recovered.

C. Level within Layer:

This entry refers to the contoured or arbitrary level, within the natural stratigraphic layer, from which the artifact was recovered.

D. Component Assignment:

This entry refers to the cultural component, defined on the basis of vertical and horizontal artifact patterning, and sedimentological analysis, from which the artifact was recovered.

E. Excavation Unit:

This entry refers to the excavation unit from which the artifact was recovered.

1. Lithic Raw Material:

This entry refers to the type of lithic raw material from which the artifact is produced. Seven types are recognized, and are recorded as:

- (1) Vitreous Chert
- (2) Fine-Grained Chert
- (3) Coarse-Grained Chert
- (4) Quartzite
- (5) Chalcedony
- (6) Obsidian
- (7) Other

2. Lithic Raw Material Colour:

This entry refers to the colour of the lithic raw material. Ten (10) raw material colours are recognized and are recorded as:

- (1) Black
- (2) Grey
- (3) Mottled Grey and Black or Grey and White
- (4) Banded Brown and Black
- (5) Green or Olive
- (6) Reddish Brown
- (7) Brown
- (8) Brown and White Banded
- (9) Pink
- (10) Clear or White Opaque

3. Lithic Raw Material Inclusions:

This entry refers to the presence (1) or absence (0) of inclusions within the lithic raw material, which should provide a rough measure of the heterogeneity or homogeneity of the lithic raw material.

4. Cortex:

This entry refers to the presence (1), or absence (0) of cortex on the exterior surface of the Debitage.

5. Weight:

This entry refers to the weight, measured in grams, of artifacts in all categories.

6. Size Grade:

This entry refers to the maximum dimension of the Debitage, in millimeters, measured with reference to a standardized circular opening. Seven size grades are recognized, and are recorded as:

- (1) < 5 mm
- (2) 5 to 10 mm
- (3) 10 to 15 mm
- (4) 15 to 20 mm
- (5) 20 to 25 mm
- (6) 25 to 30 mm
- (7) > 30 mm

7. Initiation Face Modification:

This entry refers to whether or not the initiation face of the Debitage or Tool has been modified prior to flake removal, or during flake removal. Seven modification states are recognized (with the possibility for combinations of initiation face modification to be added later) and are recorded as:

- (0) Absent
- (1) Unprepared
- (2) Crushed or Shattered
- (3) Single Flake Removal
- (4) Multiple Flake Removals
- (5) Faceted
- (6) Abraded or Ground
- (7) Combination of 4 and 6
- (8) Combination of 5 and 6
- (9) Combination of 2 and 4
- (10) Combination 1 and 2

8. Lipping on Interior Surface:

This entry refers to the presence (1) or absence (0) of an interior projection or 'lip' on the Debitage.

9. Erailure Scar:

This entry refers to the presence (1), or absence (0), of a small secondary scar located on the interior surface of the Debitage near the initiation face.

10. Exterior Scar Count:

This entry refers to the number of scars greater than 2 millimetres in length, present on the exterior surface of the Debitage. Five classes of scar number are recognized, and are recorded as:

- (0) Indeterminate
- (1) 0 or 1 scars
- (2) 2 or 3 scars
- (3) 4 or 5 scars
- (4) > 6 scars

Post-Depositional Attributes: Debitage

56. Completeness or Breakage Index:

This entry refers to the completeness of Debitage, as defined by Sullivan and Rozen (1985), Sullivan (1987), Prentiss and Romanski (1989), and Rozen and Sullivan (1989a, 1989b). Five subclasses are recognized within the Debitage and Tool categories, and are recorded as:

- (1) Shatter
- (2) Mediodistal flake
- (3) Split flake
- (4) Proximal flake
- (5) Complete flake

57. Distal Termination Type:

This entry refers to the type of flake termination present on the distal end of the Debitage. Seven termination states are recognized (Cotterell and Kamminga 1987, 1990), and are recorded as:

- (0) Indeterminate
- (1) Feather
- (2) Step
- (3) Hinge
- (4) Outrepassé
- (5) Snap
- (6) Axial
- (99) Absent

58. Proximal Termination Type:

This entry refers to the type of flake termination present at the proximal end of the mediodistal fragment of the Debitage. Four terminations are possible (Cotterell and Kamminga 1987, 1990), and are recorded as:

- (0) Indeterminate
- (1) Step
- (2) Hinge
- (3) Snap
- (99) Absent

59. Left Lateral Termination Type:

This entry refers to the type of flake termination present on the left lateral margin of the Debitage. Five termination states are recognized (Cotterell and Kamminga 1987, 1990), and are recorded as:

- (0) Indeterminate
- (1) Feather
- (2) Step
- (3) Hinge
- (4) Snap
- (5) Axial
- (99) Absent

60. Right Lateral Termination Type:

This entry refers to the type of flake termination present on the right lateral margin of the Debitage. Five termination states are recognized (Cotterell and Kamminga 1987, 1990), and are recorded as:

- (0) Indeterminate
- (1) Feather
- (2) Step
- (3) Hinge
- (4) Snap
- (5) Axial
- (99) Absent

61. Potlids:

This entry refers to the presence (1) or absence (0) of potlids on the surface of all artifacts.

APPENDIX 1: DEBITAGE RAW DATA

A.	B.	C.	D.	E.	1	2	3	4	5	6	7	8	9	10	56	57	58	59	60	61
0217	3	13	B1	8	1	1	0	0	0.1	3	2	1	0	3	4	3	99	1	1	0
0218	3	11	B1	8	1	1	0	1	0.3	4	1	1	0	2	4	5	99	1	1	0
0219	3	11	B1	8	1	1	0	0	0.1	3	0	0	0	2	2	1	1	1	1	0
0220	3	11	B1	8	1	1	0	0	0.1	2	3	1	1	2	5	1	99	1	1	0
0225	3	6	B2	8	6	7	0	0	0.1	2	0	0	0	1	2	0	3	4	4	0
0226	3	8	B2	8	1	1	0	0	0.1	2	0	0	0	2	2	2	0	4	1	0
0227	3	8	B2	8	1	1	1	0	0.1	2	0	0	0	1	1	0	0	0	0	0
0293	3	3	B3	8	1	1	1	0	0.2	3	3	1	0	2	4	5	99	1	1	0
0294	3	3	B3	8	1	1	1	0	0.1	3	0	0	0	2	2	5	3	1	1	0
0396	3	2	B3	8	1	3	0	0	0.1	3	4	1	0	2	4	5	99	1	1	0
0397	3	2	B3	8	2	1	0	0	0.2	4	5	1	0	3	5	2	99	1	1	0
0398	3	2	B3	8	2	1	0	0	0.2	4	2	0	0	2	5	1	99	1	1	0
0399	3	2	B3	8	2	1	0	0	0.4	4	0	0	0	3	2	5	0	1	1	0
0400	3	2	B3	8	2	1	0	1	0.8	5	0	0	0	2	2	3	1	1	1	0
0401	3	2	B3	8	2	1	0	0	0.3	4	0	0	0	2	2	5	1	1	1	0
0402	3	2	B3	8	2	1	1	0	0.2	3	2	0	0	2	4	5	99	1	1	0
0403	3	2	B3	8	2	1	0	0	0.1	2	5	1	0	2	4	5	99	1	1	0
0404	3	2	B3	8	2	1	1	0	0.1	2	2	0	0	2	5	1	99	1	1	0
0405	3	2	B3	8	2	1	1	0	0.1	2	4	0	0	2	4	5	99	1	1	0
0406	3	2	B3	8	2	1	0	0	0.1	2	4	0	0	2	4	5	99	1	1	0
0407	3	2	B3	8	2	1	0	0	0.1	2	4	0	0	2	5	3	99	1	1	0
0408	3	2	B3	8	2	1	1	1	0.1	2	0	0	0	0	1	0	0	0	0	0
0409	3	2	B3	8	2	1	0	0	0.1	2	4	1	0	1	5	2	99	1	1	0
0410	3	2	B3	8	2	1	1	0	0.1	2	3	1	0	1	4	2	99	1	1	0
0411	3	2	B3	8	2	1	1	0	0.1	2	4	1	0	1	4	5	99	4	4	0
0412	3	2	B3	8	2	1	0	0	0.1	2	4	1	0	2	5	2	99	1	1	0
0413	3	2	B3	8	2	1	1	0	0.1	2	5	1	0	2	4	5	99	1	1	0
0414	3	2	B3	8	2	1	1	0	0.1	2	2	1	0	2	4	5	99	1	1	0
0416	3	1	B3	8	1	1	1	0	0.1	3	3	1	0	3	3	5	99	1	1	0
0417	3	1	B3	8	1	3	0	0	0.1	3	0	0	0	1	2	5	0	1	5	0
0418	3	1	B3	8	1	1	1	0	0.1	2	2	0	0	2	5	1	99	1	1	0
0419	3	1	B3	8	1	1	0	1	0.3	3	0	0	0	0	1	0	0	0	0	0
0420	3	1	B3	8	1	3	0	0	0.1	3	4	0	0	1	3	0	99	4	5	0
0421	3	1	B3	8	1	1	1	0	0.1	3	2	0	0	2	3	2	99	5	1	0
0422	3	1	B3	8	1	4	0	0	0.4	4	4	1	0	2	5	3	99	1	1	0
0423	3	1	B3	8	1	1	0	0	0.1	4	4	1	0	1	5	3	99	1	1	0
0424	3	1	B3	8	1	4	0	0	0.1	2	2	1	0	2	5	2	99	1	1	0
0425	3	1	B3	8	1	4	0	0	0.1	2	2	1	0	2	5	2	99	1	1	0
0426	3	1	B3	8	1	4	0	0	0.1	3	5	1	0	2	4	5	99	1	1	0
0427	3	1	B3	8	1	4	1	0	0.1	3	4	0	0	2	5	1	99	1	1	0
0428	3	1	B3	8	1	4	0	0	0.2	3	2	0	0	1	4	0	99	1	1	0
0429	3	1	B3	8	1	4	0	0	0.2	3	8	1	0	2	5	2	99	1	1	0
0430	3	1	B3	8	1	4	0	0	0.1	2	3	1	0	1	4	5	99	1	1	0
0431	3	1	B3	8	1	1	0	0	0.1	2	0	0	0	1	2	1	3	0	0	0
0432	3	1	B3	8	1	1	0	0	0.1	2	2	0	0	2	4	0	99	1	1	0
0433	3	1	B3	8	1	1	0	0	0.1	2	2	0	0	2	5	1	99	1	1	0
0434	3	1	B3	8	1	1	0	0	0.1	2	2	1	0	2	5	3	99	1	1	0

A.	B.	C.	D.	E.	1	2	3	4	5	6	7	8	9	10	56	57	58	59	60	61
0833	3	1	B3	8	1	1	0	0	0.1	2	0	0	0	1	2	3	0	1	1	0
0455	2	5	B4	8	1	4	1	0	0.5	5	0	0	0	3	2	1	3	1	1	0
0456	2	5	B4	8	1	3	0	0	0.1	2	2	0	0	2	5	1	99	1	1	0
0463	2	4	B5	10	1	3	0	0	0.1	2	0	0	0	2	2	1	0	1	1	0
0464	2	4	B5	10	1	1	1	0	0.1	2	0	0	0	1	2	5	1	1	1	0
0595	2	4	B5	8	1	2	0	0	0.3	4	0	0	0	2	2	5	3	1	1	0
0596	2	4	B5	8	2	1	1	0	0.2	3	0	0	0	2	2	0	0	1	1	0
0597	2	4	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	1	3	4	1	0
0598	2	4	B5	8	1	2	1	0	0.1	2	4	1	0	2	4	5	99	1	0	0
0599	2	4	B5	8	1	3	0	1	0.1	2	6	0	0	2	2	1	0	1	1	0
0600	2	4	B5	8	1	2	1	0	0.1	2	0	0	0	2	2	1	1	1	1	0
0601	2	3	B5	8	1	2	0	0	0.1	3	3	0	0	3	5	1	99	1	1	0
0602	2	3	B5	8	1	2	0	0	0.1	2	4	1	0	2	5	2	99	1	1	0
0603	2	3	B5	8	1	2	0	0	0.1	2	4	1	0	3	5	0	99	1	1	0
0604	2	3	B5	8	1	3	0	0	0.1	2	0	0	0	1	2	1	0	1	1	0
0605	2	3	B5	8	1	3	0	0	0.1	2	2	1	0	2	5	3	99	1	1	0
0606	2	3	B5	8	5	2	1	0	0.1	2	2	1	0	2	5	1	99	1	1	0
0607	2	3	B5	8	1	1	0	0	0.1	3	4	0	0	2	3	1	99	1	5	0
0608	2	3	B5	8	1	1	0	0	0.1	3	5	1	0	2	5	1	99	1	4	0
0609	2	3	B5	8	1	2	0	0	0.1	2	2	0	0	2	4	5	99	1	1	0
0610	2	3	B5	8	1	3	0	0	0.1	3	0	0	0	2	4	5	99	1	1	0
0611	2	3	B5	8	1	1	0	0	0.1	3	2	1	0	2	5	1	99	1	1	0
0612	2	3	B5	8	1	1	1	0	0.1	3	2	0	0	2	5	3	99	1	1	0
0613	2	3	B5	8	1	1	1	0	0.2	4	2	1	0	2	5	3	99	1	1	0
0614	2	3	B5	8	1	1	0	0	0.1	2	5	1	0	2	5	1	99	1	5	0
0615	2	3	B5	8	1	3	0	0	0.5	4	8	1	0	3	4	5	99	1	1	0
0616	2	3	B5	8	1	1	1	0	0.5	4	2	0	0	3	5	1	99	1	1	0
0617	2	3	B5	8	1	1	1	0	0.1	2	2	1	0	2	5	1	99	1	1	0
0618	2	3	B5	8	1	1	1	0	0.1	3	4	1	0	2	4	5	99	1	1	0
0619	2	3	B5	8	1	2	0	0	0.1	2	0	0	0	3	2	1	3	1	1	0
0620	2	3	B5	8	1	1	0	0	0.1	1	2	0	0	3	5	1	99	1	1	0
0621	2	2	B5	8	1	1	1	0	0.2	3	3	1	0	2	4	5	99	1	0	0
0622	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	3	2	1	1	0
0623	2	2	B5	8	1	1	1	0	0.1	3	3	1	0	2	4	2	99	1	1	0
0624	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	1	2	1	0	0	1	0
0625	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	5	3	1	1	0
0626	2	2	B5	8	1	1	0	0	0.1	2	0	0	0	1	2	1	3	4	1	0
0627	2	2	B5	8	1	1	1	0	0.1	2	0	0	0	2	2	5	3	1	1	0
0628	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	1	2	3	3	1	1	0
0629	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	1	3	1	1	0
0630	2	2	B5	8	1	1	0	0	0.2	3	0	0	0	2	2	0	0	0	1	0
0631	2	2	B5	8	1	2	1	0	0.1	2	0	0	0	2	2	5	3	1	4	0
0632	2	2	B5	8	1	1	1	0	0.1	2	0	0	0	2	2	1	1	1	1	0
0633	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	5	3	1	1	0
0634	2	2	B5	8	1	1	0	0	0.1	2	5	1	0	4	5	1	99	1	1	0
0635	2	2	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	1	0	1	1	0
0636	2	2	B5	8	1	3	0	0	0.1	2	0	0	0	2	2	1	0	1	1	0
0637	2	1	B5	8	1	1	1	0	0.3	3	3	0	0	1	4	5	99	1	1	0
0638	2	1	B5	8	1	3	0	0	0.1	2	2	0	0	3	5	1	99	1	1	0
0639	2	1	B5	8	1	1	0	0	0.1	2	4	1	0	3	4	5	99	1	1	0

A.	B.	C.	D.	E.	1	2	3	4	5	6	7	8	9	10	56	57	58	59	60	61
0640	2	1	B5	8	2	4	1	0	0.1	2	3	1	0	2	5	3	99	1	1	0
0641	2	1	B5	8	1	1	0	0	0.1	2	0	0	0	0	1	0	0	0	0	0
0642	2	1	B5	8	1	2	0	0	0.1	2	0	0	0	2	2	3	3	1	1	0
0643	2	1	B5	8	2	4	1	0	0.1	2	4	1	0	2	5	1	99	1	1	0
0644	2	1	B5	8	1	2	1	0	0.4		4	0	0	0	2	0	4	99	1	0
0645	2	1	B5	8	1	3	0	0	0.2	3	3	0	0	2	4	5	99	1	1	0
0646	2	1	B5	8	1	1	1	0	1.1	6	0	0	0	2	2	1	0	1	1	0
0834	2	3	B5	8	1	1	0	0	0.1	2	3	0	0	2	5	1	99	1	1	0
0835	2	3	B5	8	1	1	0	0	0.1	2	0	0	0	0	1	0	0	0	0	0
0647	2	1	B6	10	1	1	1	0	0.1	3	0	0	0	2	2	3	3	4	0	0
0648	2	1	B6	10	1	5	0	0	0.1	2	4	0	0	3	4	5	99	1	1	0
0782	1	1	B6	10	2	2	0	0	0.1	2	4	1	0	2	5	2	99	1	1	0
0783	1	1	B6	10	1	2	0	0	0.1	2	0	0	0	2	2	5	3	1	1	0
1556	1	1	C1	30	1	1	1	1	3.3	5	0	0	0	0	1	0	0	0	0	0
1557	2	1	C1	30	1	1	1	0	0.8	4	0	0	0	3	2	5	3	1	1	0
1558	1	1	C1	31	2	5	0	0	1.3	5	0	0	0	2	2	5	3	1	1	0
1559	2	1	C1	31	1	1	1	1	2.7	6	1	0	0	2	5	3	99	1	0	0
1560	2	1	C1	31	1	3	1	0	0.5	4	3	0	0	2	5	3	99	1	1	0
1561	2	1	C1	31	2	3	1	0	0.3	4	0	0	0	0	1	0	0	0	0	0
1562	2	1	C1	31	2	7	1	0	0.4	4	0	0	0	2	2	5	3	1	1	0
1563	2	2	C1	31	2	4	1	0	4.1	8	0	0	0	2	2	3	3	1	4	0
1564	2	2	C1	31	1	2	0	0	0.1	3	0	0	0	2	2	1	0	1	1	0
1565	3	1	C1	31	1	1	1	0	0.1	2	4	0	0	3	5	1	99	1	0	0
0010	1	6	D1	TT	1	4	1	0	5.5	8	3	1	0	2	5	3	99	1	1	0
1840	1	1	E1	37	1	2	0	0	0.1	3	2	1	0	3	4	5	99	1	1	0
1841	1	1	E1	37	1	1	1	0	0.1	3	0	0	0	3	2	1	3	1	1	0
1842	1	1	E1	37	1	1	0	0	0.1	3	4	1	0	2	5	1	99	1	1	0
1843	1	1	E1	37	1	1	1	0	0.1	3	0	0	0	0	1	0	0	0	0	0
1844	1	1	E1	37	1	1	1	0	0.1	2	0	0	0	2	2	5	3	1	1	0
1845	1	1	E1	37	1	1	0	0	0.1	3	0	0	0	0	1	0	0	0	0	0
1846	1	1	E1	37	1	3	1	0	0.2	4	2	1	0	3	5	1	99	1	1	0
1847	1	1	E1	37	1	1	0	0	0.2	4	0	0	0	0	1	0	0	0	0	0
1848	1	1	E1	37	1	1	1	0	0.1	3	3	1	0	3	4	5	99	1	1	0
1849	1	1	E1	37	1	3	0	0	0.3	3	3	1	0	2	3	3	99	5	1	0
1850	1	1	E1	37	1	1	0	0	0.1	3	3	0	0	4	3	1	99	1	5	0
1851	1	1	E1	37	1	3	1	0	0.2	3	3	1	0	1	3	1	99	4	4	0
1852	1	1	E1	37	1	1	0	0	0.4	4	3	1	0	3	4	5	99	1	1	0
1853	1	1	E1	37	1	1	1	0	0.3	3	4	1	0	1	3	5	99	1	5	0
1854	1	1	E1	37	1	3	0	0	0.2	3	0	0	0	2	2	3	0	4	1	0
1855	1	1	E1	37	1	3	0	0	0.2	4	0	0	0	0	1	0	0	0	0	0
1856	1	1	E1	37	1	7	0	0	0.1	3	5	1	0	3	5	1	99	1	1	0
1857	1	1	E1	37	1	3	0	0	0.2	3	0	0	0	0	1	0	0	0	0	1
1859	1	1	E1	37	1	3	1	0	0.3	4	2	0	0	2	5	3	99	1	1	0
1860	1	1	E1	37	1	1	0	1	0.4	4	2	0	0	2	5	1	99	1	1	0
1861	1	1	E1	37	1	1	1	0	0.3	4	0	0	0	3	2	5	1	1	1	0
1863	1	1	E1	37	1	3	1	0	0.7	4	8	1	0	4	4	5	99	1	1	0
1865	1	1	E1	37	1	3	0	0	0.1	3	0	0	0	2	2	5	3	1	1	0
1866	1	1	E1	37	1	1	1	0	0.2	5	2	1	0	2	4	5	99	1	1	0

A.	B.	C.	D.	E.	1	2	3	4	5	6	7	8	9	10	56	57	58	59	60	61
1870	1	1	E1	37	1	1	0	0	1.2	4	0	0	0	0	1	0	0	0	0	0
1871	1	1	E1	37	1	3	0	0	0.5	3	3	0	0	2	5	3	99	1	1	0
1872	1	1	E1	37	1	1	0	0	0.3	4	0	0	0	2	2	1	3	4	1	0
1873	1	1	E1	37	1	1	1	0	0.4	4	0	0	0	2	2	2	0	0	4	0
1874	1	1	E1	37	1	3	0	0	0.2	3	3	1	0	3	4	0	99	1	1	0
1875	1	1	E1	37	1	3	0	0	0.2	3	0	0	0	2	2	5	1	1	1	0
1876	1	1	E1	37	1	3	0	0	0.5	4	0	0	0	0	1	0	0	0	0	0
1877	1	1	E1	37	1	3	1	0	1.6	4	3	1	0	2	3	0	99	5	1	0
1878	1	1	E1	37	1	1	1	0	1.8	6	4	1	0	1	5	1	99	1	1	0
1880	1	1	E1	37	1	1	0	0	0.3	4	4	1	0	3	5	2	99	1	1	0
1881	1	1	E1	37	1	1	1	0	0.2	3	4	0	0	2	5	1	99	1	1	0
1882	1	1	E1	37	1	1	1	0	0.4	4	0	0	0	2	2	3	3	1	1	0
1883	1	1	E1	37	1	1	0	0	0.3	3	0	0	0	0	1	0	0	0	0	0
1885	1	1	E1	37	1	1	1	0	0.1	3	2	1	0	2	4	5	99	1	1	0
1887	1	1	E1	37	1	1	1	0	0.2	3	0	0	0	0	1	0	0	0	0	0
1889	1	1	E1	37	1	1	1	0	0.1	2	0	0	0	2	2	1	3	1	1	0
1890	1	1	E1	37	1	3	0	0	0.1	3	4	1	0	2	4	5	99	1	4	0
1891	1	1	E1	37	1	3	0	1	0.1	3	1	1	0	2	4	5	99	1	1	0
1892	1	1	E1	37	1	1	0	0	0.1	3	2	0	0	4	5	1	99	1	1	0
1893	1	1	E1	37	1	1	1	0	0.1	3	2	0	0	2	4	1	99	1	1	0
1894	1	1	E1	37	1	1	1	1	0.1	3	0	0	0	2	2	1	3	1	1	0
1895	1	1	E1	37	1	1	1	1	0.1	2	1	0	0	2	5	1	99	1	1	0
1896	1	1	E1	37	1	3	0	0	0.1	2	4	0	0	2	5	1	99	1	1	0
1897	1	1	E1	37	1	1	0	1	0.1	3	3	1	0	0	5	1	99	1	1	0
1898	1	1	E1	37	1	1	0	0	0.1	3	0	0	0	3	2	5	3	1	1	0
1899	1	1	E1	37	1	1	1	0	0.2	3	3	0	0	2	4	5	99	1	1	0
1900	1	1	E1	37	1	3	0	0	0.1	3	0	0	0	0	1	0	0	0	0	0
1901	1	1	E1	37	1	1	0	0	0.1	3	0	0	0	2	2	5	2	1	1	0
1902	1	1	E1	37	1	3	0	0	0.3	3	3	0	0	2	5	1	99	1	1	0
1903	1	1	E1	37	1	1	1	0	0.1	3	0	0	0	2	2	1	3	1	1	0
1904	1	1	E1	37	1	1	0	0	0.1	3	5	0	0	3	4	5	99	1	1	0
1905	1	1	E1	37	1	7	0	1	0.1	2	4	1	0	1	5	0	99	1	1	0
1906	1	1	E1	37	1	1	0	0	0.1	2	0	0	0	0	1	0	0	0	0	0
1907	1	1	E1	37	1	1	0	0	0.1	3	0	0	0	0	1	0	0	0	0	0
1909	1	1	E1	37	1	1	0	0	0.1	3	0	0	0	0	1	0	0	0	0	0
1910	1	1	E1	37	1	1	1	0	0.1	3	4	1	0	2	4	5	99	1	1	0
1911	1	1	E1	37	1	1	1	0	0.2	3	4	0	0	2	4	5	99	1	1	0
1912	1	1	E1	37	1	1	1	1	0.3	4	0	0	0	0	1	0	0	0	0	0
1913	1	1	E1	37	1	3	0	0	0.1	1	2	0	0	2	5	1	99	1	1	0
1914	1	1	E1	37	1	1	1	0	0.1	3	0	0	0	2	2	1	3	1	1	0
1915	1	1	E1	37	1	1	0	0	0.1	2	2	0	0	2	3	1	99	5	1	0
1916	1	1	E1	37	1	1	1	0	0.1	3	3	0	0	3	4	5	99	1	1	0
1917	1	1	E1	37	1	1	1	0	0.2	3	2	0	0	3	4	5	99	1	1	0
1918	1	1	E1	37	1	1	0	0	0.1	3	4	1	0	3	5	1	99	1	1	0
1919	1	1	E1	37	1	3	0	0	0.1	2	3	0	0	2	4	5	99	1	1	0
1920	1	1	E1	37	1	3	1	0	0.2	2	0	0	0	0	1	0	0	0	0	0
1921	1	1	E1	37	1	5	1	0	0.1	2	0	0	0	2	2	5	3	1	1	0
1922	1	1	E1	37	2	1	0	0	0.4	4	0	0	0	1	2	1	3	1	1	0
1923	1	1	E1	37	3	7	0	1	1.6	6	0	0	0	2	2	3	0	4	4	0
1924	1	1	E1	37	3	2	1	0	1.2	5	0	0	0	0	1	0	0	0	0	0
1925	1	1	E1	37	2	4	1	0	1.7	6	0	0	0	0	1	0	0	0	0	0
1926	1	1	E1	37	1	3	0	0	1.1	5	0	0	0	0	1	0	0	0	0	0

A.	B.	C.	D.	E.	1	2	3	4	5	6	7	8	9	10	56	57	58	59	60	61
1868	1	1	E1	37	1	3	0	0	0.6	4	0	0	0	2	2	5	3	1	4	0
1869	1	1	E1	37	1	1	1	0	0.3	3	4	1	0	3	5	2	99	1	1	0
1927	1	2	E1	37	1	1	1	0	2.5	7	0	0	0	0	1	0	0	0	0	0
1928	1	2	E1	37	1	1	1	0	0.7	5	4	1	0	2	4	5	99	1	1	0