THE COMPARISON OF LITHICS AT THREE SITES IN THE EAST KOOTENAY AREA OF BRITISH COLUMBIA

by

Barbara Jean Bussey

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Name: Barbara Jean Bussey

Degree: Master of Arts (Archaeology)

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Examining Committee:

Chairperson: Roy L. Carlson

Knut R. Fladmark
Senior Supervisor

Philip M. Hobler

Jack D. Nance

Bjorn O. Simonsen
External Examiner
Provincial Archaeologist
Province of British Columbia

Date Approved: April 15, 1977

ABSTRACT

THE COMPARISON OF LITHICS AT THREE SITES IN THE EAST KOOTENAY AREA OF BRITISH COLUMBIA

Archaeological investigations at 3 sites in the Kootenay River Valley southeast of Cranbrook, B.C., provided the data for analysis. This thesis describes the lithic material and its known sources and studies the proportions of each lithic type per excavation unit and where possible, per level. Tool attributes are described through a classification scheme that can be readily modified as more research is completed in the area. Typological cross-dating is proposed with adjacent areas.

Continued occupation (seasonally at least) of DhPt 10B during the late prehistoric period is suggested by point typologies and there is evidence of sporadic occupation or use during the middle prehistoric at all sites. The analysis has shown an increase in the use of a non-locally available lithic material during the occupation of DhPt 10B. The hypothesis that the 3 sites were utilized for differing exploitive and occupational purposes has been supported in this study.

The analysis has also indicated the territory over which the prehistoric occupants traded/travelled to obtain raw materials. Several ethnographic and archaeological problems are discussed in the light of the information revealed through this lithic analysis.

ACKNOWLEDGEMENTS

The co-operation and assistance of many people and agencies made this thesis possible. The field work was financed mainly by the Department of Lands and Water Resources. Additional grants were extended to the project by the Archaeology Survey of Canada and the Department of Education. The project was supervised and budgeted by the Office of the Provincial Archaeologist, under Bjorn Simonsen and the Provincial Museum made the excavated material available for this analysis.

My thanks is extended to all members of the 1972 and 1973 field crews, whether they worked for one day or the whole season, as volunteers or on salary. My special thanks goes to 3 members of the crew who have continued to be of aid in the analysis; Lee Rooney assisted me for several weeks with the examination of unworked flakes, Sherrill Kautz helped in various aspects of the thesis preparation, and Wayne Choquette provided assistance in the field, the analysis, and thesis preparation. I would also like to thank Diana French for her help in preparing many of the figures and the many people who imparted their knowledge and thoughts or supplied moral support. A roof over my head and moral support **were** supplied by my parents whom I would also like to thank.

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CHAPTER 1 BACKGROUND TO ANALYSIS

INTRODUCTION

This thesis is concerned with the analysis of the lithic cultural material recovered from 3 sites, DhPt 1, 4, and 10B, in the Kootenay River Valley of southeastern British Columbia (Fig. 1). These excavations were part of the Libby Pondage Salvage Project, initiated in 1971 due to the construction of a dam at Libby, Montana, and the extension of the reservoir into southern British Columbia. The Libby Project, directed by Wayne Choquette, was concerned with survey and excavation within the proposed bounds of the reservoir.

The majority of the data were slated for analysis by Choquette, but the lithic material from 3 sites was made available to the author for analysis. A discussion of the distribution of the lithic material within and between these sites comprises a major portion of this thesis. The results have indicated an increase in the use of a non-local lithic type through time and a corresponding decrease in a local type. The increase is basically limited to later periods of occupation in the area, as early materials in stratigraphic context are scarce.

The analysis of artifacts forms the other major portion of this study. Prior to the receipt of dates based on charcoal samples taken at DhPt 10B cross-areal comparisons supplied the only chronological controls. It appears that 2 periods of time are indicated; the early

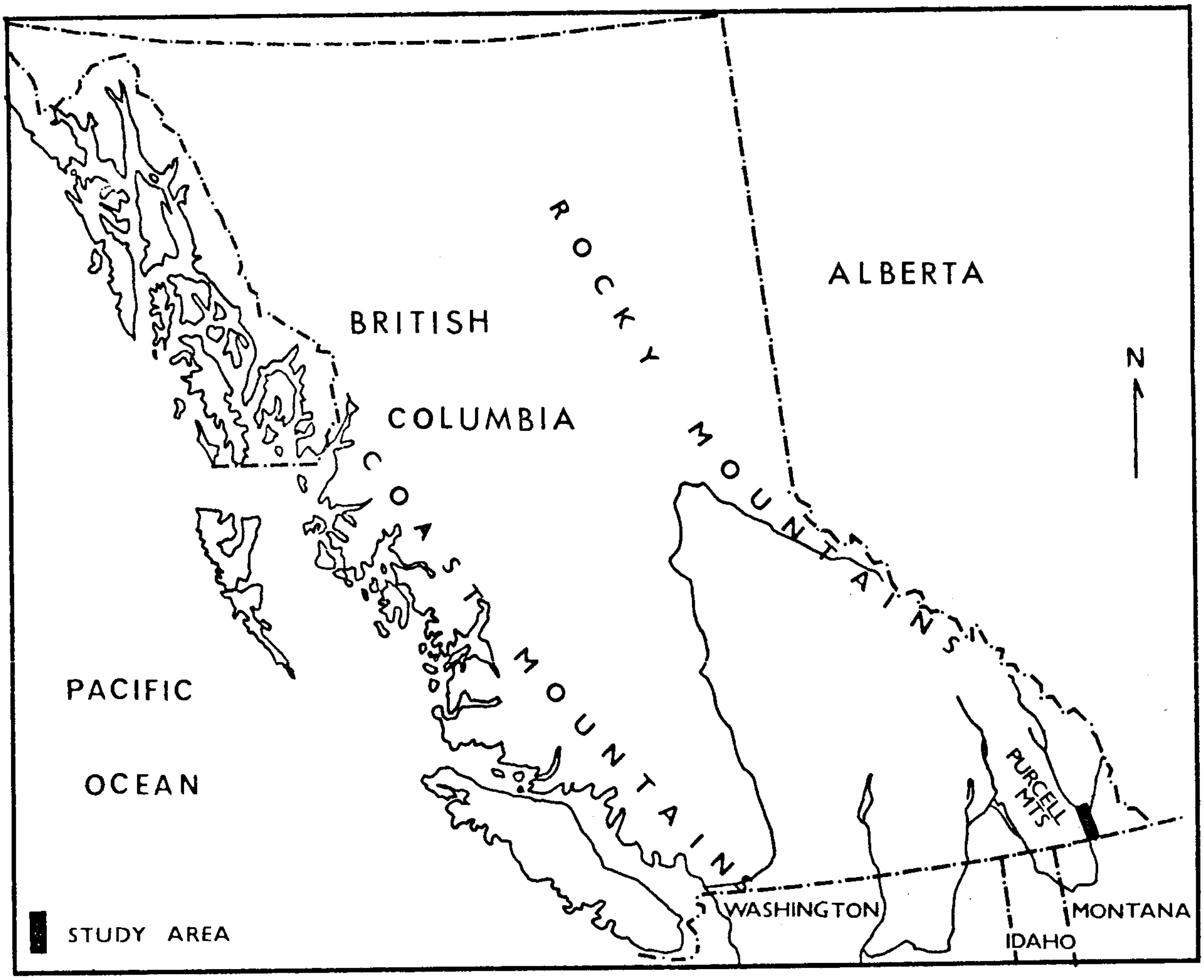


Figure 1 Location of the study area

period is estimated to be around 3000 - 1500 B.C., but is poorly represented at the 3 sites, while the later period may begin as early as A.D. 1 and continues until contact. Late period materials are present at 2 sites, but are only well represented at DhPt 10B. Artifact classification has indicated varying functions for the sites as well as temporal differences. Comparisons with the Columbia Plateau, the Interior Plateau of British Columbia, and the Northwest Plains have indicated shared characteristics with all 3 areas.

LIBBY PONDAGE SALVAGE PROJECT

Initiated in 1971, the Libby Project of southeastern British Columbia was an attempt to salvage archaeological data threatened by the proposed reservoir of the Libby Dam in Montana. The reservoir was expected to extend 52 km into Canada which would directly affect an estimated 40 sites (Choquette pers. comm. 1973). This project was concerned with an inventory of sites and the testing or excavation of as many sites as time and money would permit. Three seasons were expended in this attempt.

Choquette's survey of the southern Kootenay Valley in 1971 revealed a concentration of sites in the southernmost 36 km of the proposed reservoir. This portion was chosen by Choquette as the main study area (Fig. 2). The first season was spent in recording sites and in limited excavation. DhPt 9 was one of the sites first excavated and was sampled more extensively in 1972.

In 1972 the excavation of DhPt 9 was completed; DhPt 10B, 10C, 11, 3,4 and 5 were tested and a 5% random sample of DhPt 10A was initiated.

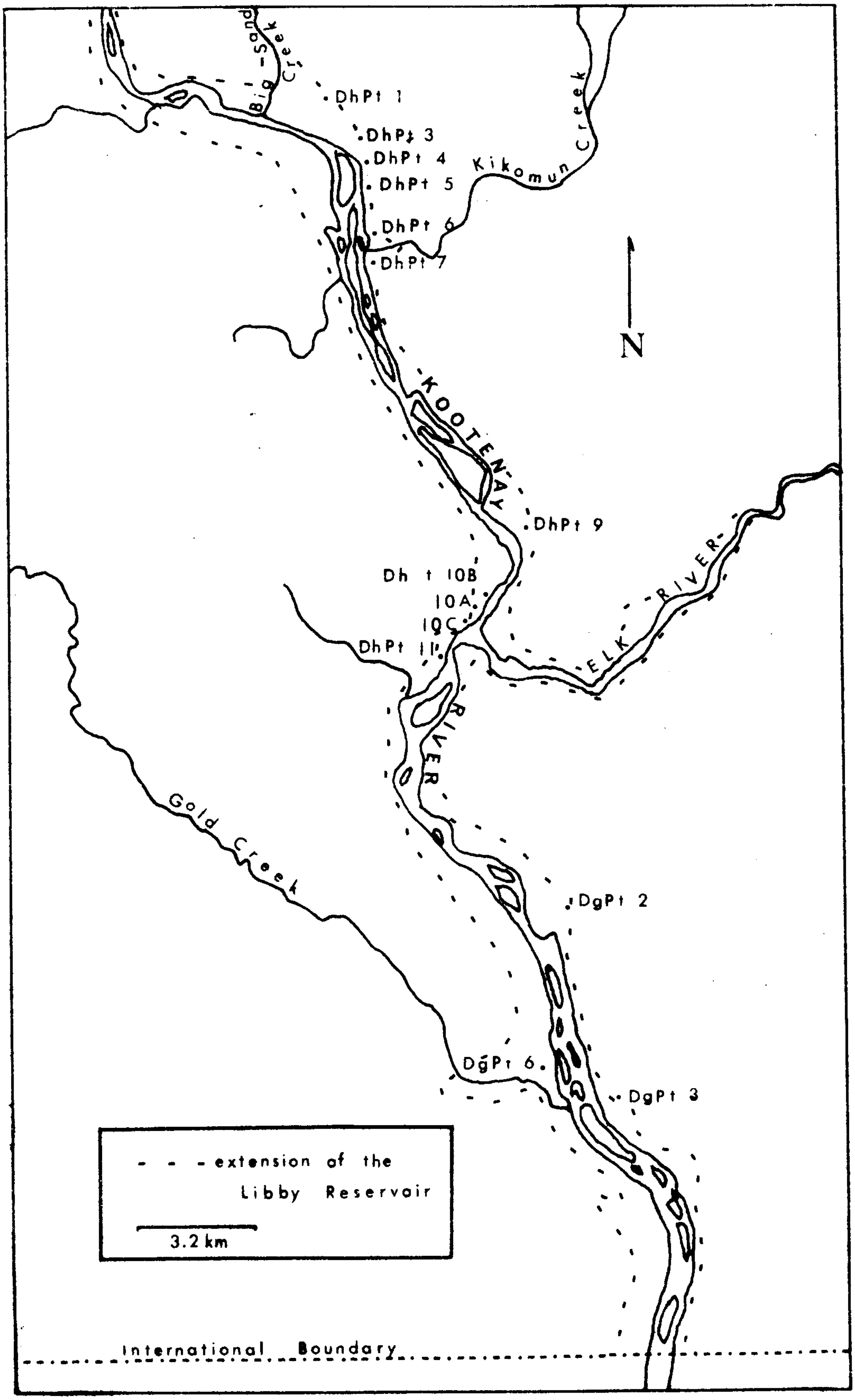


Figure 2 Study area

Choquette continued to survey the area to complete an inventory of site locations. The final 1973 season saw the completion of the DhPt 10A excavation, the 5% random sampling of DhPt 10B, 1 and 4 and the testing of several sites.

The author served as a field assistant in the excavation of DhPt 9, 10A and 10B in the 1972 season. During the 1973 season she was mainly involved as field supervisor at DhPt 1 and 4 and occasionally in the excavation of DhPt 10B. The lithic materials were made available for analysis, but the faunal material was not. Field techniques were determined prior to excavation by the field director, Wayne Choquette, and the Provincial Archaeologist, Bjorn Simonsen. Although there was no opportunity to change the field techniques the author has utilized her own plan of anlysis. These methods are explained in the introduction of each chapter concerned with analysis. A brief explanation of the original research design and the field techniques and their limitation for this study follows.

FIELD TECHNIQUES AND RESEARCH DESIGN

The research design for the Libby Project was hypothesized after the 1971 archaeological data was collected (Choquette, 1972a). These data suggested a change in spatial relationships sometime around 2000-5000 B.C. with projectile points exhibiting increasing formal and stratigraphic parallels to the east on the Plains. It was suspected that this shift may have been a result of environmental changes. These changes may have been specific such as the loss of salmon runs or more generalized, such as a reduction in rainfall followed by a recession of forests and expansion of grasslands. A number of hypotheses were advanced to explain this apparent change in projectile point styles: 1) a subsistence-exploitive lifestyle change was necessitated by the environmental shift, 2) with the increase in grasslands the eastern Plains oriented groups may have utilized the area after its abandonment by more forest-river oriented groups, or 3) population pressures may have pushed groups of the Plains culture pattern westward, displacing or absorbing the local population (Choquette, 1972a).

In order to determine the possibility of climatic change and its effect, if any, on cultural shifts, emphasis was placed on the recovery of data relating to the paleo-environment. Random sampling was chosen as a method of providing a statistical approach to the data recovery.

All sites discovered in the survey of the study area were evaluated by Choquette and Simonsen, who chose the sites to test and excavate. Generally, those sites in greatest danger of destruction were chosen. A further consideration was the choice of sites which displayed differences in surface collected material and which occupied different microenvironments (Choquette, pers. comm. 1973).

The excavation of DhPt 9 in 1971 and 1972 was based on a judgmental sample selected by the field director. Another judgmental sample was the 1972 test of DhPt 10B by Choquette which led to the 5% random sampling of that site in 1973. In 1972 the Provincial Archaeologist introduced random sampling in order to standardize excavation, to allow more equal comparison between sites, and to facilitate the use of statistical methods (Simonsen, pers. comm. 1972). Size difference between sites would thus, theoretically, be eliminated as the excavators would be dealing with 5% of the surface areas of each site, and random selection of the excavation units was intended to assure that the excavators would not allow personal bias to influence the allocation of units (Yeates, 1974).

The extent of each site was first determined and mapped. Then, each site-universe was divided into numbered 2 m squares and a table of random numbers consulted to select 5% of the units for excavation. Only those portions of the sites that had not been extensively disturbed were included in the sample universes. At DhPt 10B the test excavation of 1972 revealed that one area exhibited a greater density of cultural material and only this area was contained within the sampled universe of this site. There were thus 2 biases introduced at this point; (1) exclusion of disturbed areas from the sample and; (2) the arbitrary definition of the universe at DhPt 10B. This destroys the unbiased and supposedly representative nature of the samples and makes comparisons of the 3 sites difficult.

Another problem that arises with the sample is that it only represents 5% of the surface area of the site and does not necessarily represent 5% of the site at any other depth, (Nance, pers. comm. 1976) since the site could have been larger or smaller in earlier times.

The presence of these biases and inequalities have limited comparison of the cultural remains of these 3 sites. The universe of DhPt 1 represents the portion of that site that is still intact; the universe of DhPt 4 excludes a large portion of the site that has been extensively disturbed by clearing operations; and the universe of DhPt 10B is limited to the portion of the site that appeared to contain a greater density of cultural material based on test excavation. The universes of the sites are thus invalidly defined and the 5% random sample does not represent comparable proportions of the 3 sites. The location of the excavation units within the chosen universe is random, however.

Arbitrary 10 cm excavation levels were utilized in 1971 and 1972, but arbitrary 5 cm levels were initiated in 1973. The 5 cm levels provided more sensitive control at DhPt 10B where the archaeological deposits were denser than at the previously excavated sites. Vertical measurements were taken from the highest corner of each pit, which was established as a local datum, and the levels were excavated below "surface at datum". This system was satisfactory at DhPt 10B as the site was relatively flat, but it should not have been used at DhPt 1 and 4 where there was considerable slope and the levels varied greatly in volume. A better method at these sites would have been to follow the contours of the site, as this would have been more sensitive to the cultural strata which paralleled the natural depositional sequences. Ten cm contour levels were used in the judgmental sample of DhPt 10B, making comparison to the 1973 excavation of that site difficult. The use of the arbitrary excavation levels below "surface at datum" has made valid comparisons of the cultural strata at the 3 sites impossible.

Comparisons have been further limited by the fact that time and money were not available for the trenching of the 3 sites to ascertain the stratigraphy between the often widely separated units.

Shovels were used in the silty-sandy matrix of DhPt 1 and 4. Two to 3 cm of earth could be removed with care and many artifacts were found in situ. When concentrated cultural material was observed the excavator would switch to a trowel, brush, or similar small tool. DhPt 10B was almost completely excavated by trowel as the soil was "saturated" with fire-broken rock, flakes, faunal remains, and tools in the upper levels and large cobbles in the lower. Whenever possible the exact provenience of artifacts was noted, but, unfortunately, this was not done for debitage or faunal material. Features and profiles were drawn to scale and photographed, and soil samples were collected. Fire-broken rock was counted and/or weighed, but was not collected or identified.

Although the field techniques fall short of ideal, they are satisfactory for limited analysis of the culture history of the sites and the lithics utilized. The latter is the major concern of this thesis.

PREVIOUS RESEARCH IN THE EAST KOOTENAY REGION

Prior to the Libby Project, archaeological work in the East Kootenays had been initiated by Dr. C.E. Borden (1956). He surveyed the area briefly in 1954 in response to the first dam proposal on the Kootenay River. Borden recorded 25 sites in the southern Kootenay Valley and the Columbia-Windemere area. Wayne Choquette surveyed in the Libby Pondage during 1971, 1972, and 1973 and found 30 additional sites in the reservoir area (Choquette, pers. comm. 1973). Choquette also surveyed in the adjacent mountains and the Rocky Mountain Trench to the north (Choquette, pers. comm. 1973).

Survey in the Montana portion of the Libby reservoir was undertaken by the Smithsonian Institute in 1950 and 11 sites were located (Taylor 1969). In 1966 and 1967, 23 more sites were added to the inventory in another survey supervised by Taylor (1969)

Both Borden and Taylor noted that the occupation of the valley did not extend into Paleo-Indian times and was typified by a small percentage of non-lithic cultural remains. The research initiated in 1971 with the Libby Project was an attempt to salvage the threatened data and determine a culture-history for the area.

PRESENT RESEARCH

The original research goals postulated by Choquette (1972a) were only partially tested in this study as faunal material and matrix samples were not available for analysis. As discussed previously, descriptive statistics were utilized as it was felt that sample inequalities limited the use of inferential statistics in this study. The data recovered from the excavation of DhPt 1, 4, and 10B revealed that some projectile point styles exhibited formal and stratigraphic parallels with the east, but other styles and tool types suggest increasing Plateau influences through time.

Lithic data are the portion of material culture that is best represented in the study area; although ethnographic reports note the use of a wide variety of bone, wood, antler, vegetal materials and hides in this area these are scarce or absent from the sites under analysis. The goals of this lithic analysis were threefold; 1) to identify the lithic materials used and their known or probable sources, 2) to determine if the frequency of their use varied through time or space, and 3) to relate lithic material use to artifact types. The artifact classification was intended to aid in the identification of possible site functions and determine site age to permit reconstruction of a basic culture history. A detailed description of artifacts was presented as an aid to future comparisons as well as providing information necessary for this analysis.

A lack of stratified sites and diagnostic tools has limited interpretation of the culture history of the study area. Lithics have been viewed as a possible alternative source of temporal context in that they are postulated to have changed through time (Choquette, pers. comm. 1973). This hypothesis has been tentatively supported in this study, but should be tested further. In order to attain the goals of the lithic analysis the following procedures were undertaken. The first step was to examine the lithics in order to determine how many different types were evident. The horizontal distribution of the lithic material was then determined for each site, but only DhPt 10B provided information on vertical distributions. Changes through time and space were noted and possible explanations offered. Proportions of local and non-local resources are compared regarding spatial location, function, and chronology. Feature analysis is not included in this study as faunal material was not available and lithic detritus was not individually recorded. They were investigated as to changes in vertical and horizontal distribution, but revealed no significant results.

CHAPTER 2 THE STUDY AREA

This section provides a summary of the environment and ethnography of the project area and a description of the 3 sites excavated which provide the data base for this analysis.

ENVIRONMENT

Geology

The Rocky Mountain Trench runs southeast to northwest for over 1448 km from Montana to the Yukon. In the Kootenays it lies between 2 mountain ranges: the Purcells to the west and the Rockies to the east (Fig. 1). Both are formed of folded and faulted sedimentary and metamorphic rock with some igneous intrusions (Holland 1964). The bedrock of the study area is composed mainly of sedimentary and metamorphic rocks such as argillite, sandstone, siltstone, limestone and dolomite and igneous rocks such as gabbro and diorite. The nearby Elk Valley (Fig. 2) is formed in cherts, argillites and intrusive rock such as andesite. These lithics have been transported glacially and/or fluvially to the study area (Clague 1974).

The Rocky Mountain Trench is a flatbottomed, sinuous valley approximately 5 to 22 km wide with its floor between 760 and 910 m a.s.l. (Clague 1974). The valley has been modified by glaciers which occupied it numerous times during the Pleistocene. Ice was apparently directed by the major topographic features along the axis of the Trench, with only the highest peaks showing above the maximum ice. Final deglaciation occurred by approximately 12,000 B.P. (Clague 1974). Ice remained longer in the Trench than in the tributary valleys and glaciers occasionally dammed tributaries of the Kootenay River, forming lakes in the side valleys (Clague 1974).

The Kootenay River enters the Trench at Canal Flats and meanders southward to Montana. The river is still downcutting through the sediments, resulting in a series of terraces, some of which are fairly continuous, while others are dissected by tributary streams. Choquette (1972a) has noted that a series of 3 terraces are visible at elevations of approximately 3, 12, and 25 m above the river in the study area.

Climate

The climate of the study area is semi-arid, with precipitation ranging between 25 and 38 cm annually. Maximum rainfall is in early spring. Summer temperatures of over 18° C. are average, with 36° not unusual (Climate of British Columbia 1971). Continental influences can be noted in the movement of air masses within the Trench; both warm air from the south and Arctic cold. However, the western Pacific Maritime air masses often enter the Trench as storm tracks through gaps in the Purcell Mountains (Kelly and Sprout 1956).

Flora

Portions of three biotic zones in the study area were affected by the inundation of the Kootenay River. The major affect was upon the floodplain containing numerous pasture grasses, a variety of forbes and shrubs, and deciduous trees such as silver willow (Salix sp.), trembling aspen (Populus tremuloides), and cottonwood (Populus trichocarpa). The second zone, present on the slopes and terraces, is dominated by hardier grasses such as speargrass (Stipa commata), and several species of wheatgrass (Agropyron sp.). Some of the forbes and shrubs from the floodplain extended into this grassland zone, but new types were also apparent. Coniferous trees such as ponderosa pine (Pinus ponderosa), fir (Pseudotsuga menzosii), larch (Larix sp.), and spruce (Picea glauca) were noted, although forestation is generally not heavy. Portions of this zone were inundated, while others were eroded by the reservoir. The tendency to erode was emphasized by the sandy nature of some of the terraces and slopes. The third zone was dominated by coniferous forests, shrubs like saskatoon (Amelanchier alnifolia), numerous forbes, and the speargrass and wheatgrass of the second zone (Shannon, pers. comm. 1973).

Fauna

Rather than listing the present fauna of the Trench the author has chosen instead to present a list of fauna noted in the excavation of DhPt 9. The faunal remains were identified by P. Schibli of the Office of the Provincial Archaeologist and represent a sample of the fauna from the occupation of that site which is similar in age to DhPt 10B. This indicates to some extent the type of environment present prehistorically.

Big Horn sheep (*Ovis canadensis*)

Rocky Mountain goat (*Oreamnos americanus*)

Mule deer (*Odocoileus hemionus*)

Whitetail deer (*Odocoileus virginianus*)

Elk (*Cervus canadensis*)

Wolf (*Canis lupus*)

Coyote (*Canis latrans*)

Muskrat (*Ondatra zibethica*)

Ground squirrel (*Spermophilus sp.*)

Weasel (*Mustela sp.*)

Beaver (*Castor canadensis*)

Mink (*Mustela vison*)

Marten (*Martes americana*)

Otter (*Lutra canadensis*)

All these mammals are still present in the Kootenay Valley and the study area. The faunal material from the 3 sites dealt with in this thesis were not available for analysis and have not as yet been identified.

The life of the aboriginal occupants of the Kootenay Valley was centered around the resources of the area. The preceding has given an indication of what their environment may have been like. The discussion now turns to the people who were the ethnographic occupants of the study area.

ETHNOGRAPHY

The study area was occupied historically by the Kutenai Indians, who have been investigated by numerous ethnographers starting with Chamberlain (1892). Fur trade reports and early explorers briefly refer to the Kutenai and missionaries, such as Father De Semt, left records about the area and its Indians (Chitterdon and Richardson 1905 and Coues 1965). A later study was undertaken by Turney-High (1941) at a time when the Kutenai had been greatly effected by Euro-Canadian contact and traditional cultural behavior may have been lost. The ethnographers are often contradictory and it is possible that archaeological research may one day help to clarify these contradictions. A brief summary of some aspects of the ethnography of the historic Kutenai is presented here.

Territory

During the early contact period the Kutenai occupied southeastern British Columbia and parts of Idaho and Montana. There is some disagreement as to how far south and west they actually extended. Turney-High (1941:2) shows their territory reaching as far as the Arrow Lakes (Fig. 3), while others such as Ray (1939) map Kutenai territory only as far west as Kootenay Lake. Turnbull (1973) argues that the Arrow Lakes area was the territory of a peripheral Columbia Plateau groups, thus disputing Turney-High's territorial boundaries. The Kutenai are usually divided into "Upper" and "Lower" subtribes, with the latter occupying the

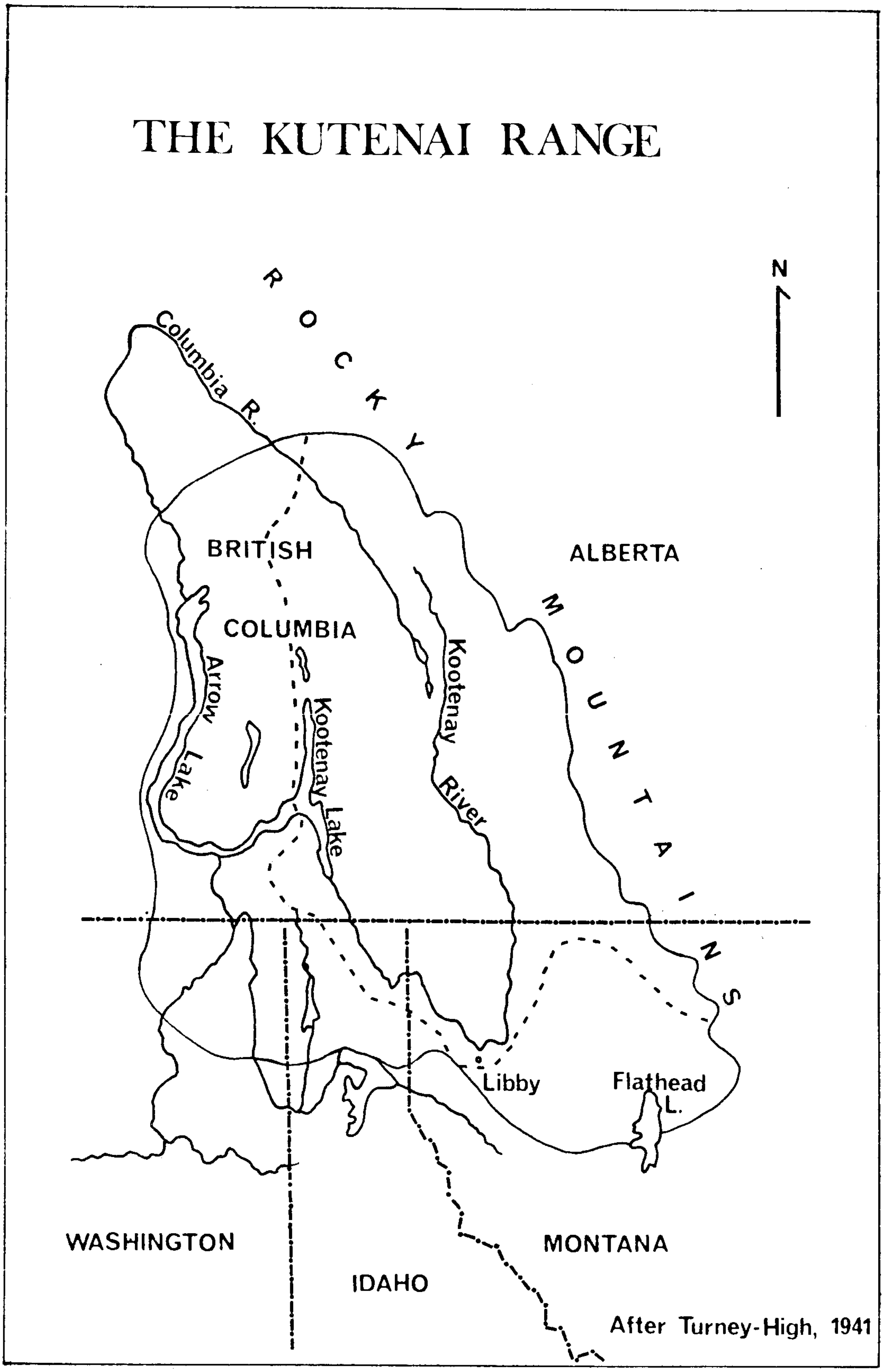


Figure 3 The ethnographic Kutenai territory

the area downstream from Libby, Montana, and the former upstream. It was the Upper Kutenai who occupied the area studied in this thesis.

Subsistence

The Kutenai had a pattern of seasonal transhumance, moving to wherever resources were available. According to Turney-High (1941) the Rocky Mountains were traversed 3 times a year to hunt bison on the plains, with the first hunt taking place in summer. Prior to the introduction of the horse, meat was packed back over the mountains by men, women, children and dogs. The second hunt, in the fall, was similar to the first, while the winter hunt was usually accomplished by the men alone.

Deer, elk, moose, mountain goat, mountain sheep and bear are also noted as important resources. Meat was eaten, bone was shaped into a variety of implements or boiled for marrow, antler was made into tools, and hides were used as clothing, tipi covers, bedding, pouches and bags. Small mammals and birds were also hunted throughout the year. The tools and raw materials utilized are generally not described in detail by the ethnographers, although Turney-High does note the use of "flint" for arrows, axes, and knives. Two sources are noted; one used intensively by the Lower Kutenai is near Missoula Montana and the other attributed to the Upper Kutenai was near Fernie, British Columbia (Turney-High 1941).

Although the Upper Kutenai did not depend on fish to the extent that the Lower Kutenai did, they nevertheless did utilize this resource. They used composite bone hooks, weirs, and horn-pointed spears to capture fish, which were dried and stored in leather or basketry containers (Turney-High 1941). Ethnographers do not agree on the use of nets for fishing, but archaeological evidence in the form of "net-sinkers" has been recovered. During their seasonal subsistence round the Kutenai would gather for spring fishing and bison hunts and would divide into smaller, probably family groups, to hunt other game and gather vegetal foods (Turney-High, 1941).

Women are reported to have used digging sticks to gather a variety of roots that were baked or dried before storage. Berries were also gathered and stored, and other vegetal resources were eaten when in season, or were preserved for the winter. Wooden bowls, bark containers, baskets, and hide objects were used to prepare, serve, and store food.

Transportation

The horse was rapidly adopted by the Kutenai. More important to the Upper Kutenai than to the Lower Kutenai, it was more than just a form of transportation; it was also a sign of wealth, source of great pride, and a medium of exchange (Turney-High 1941). Selective horse breeding was practiced and horses were a frequently sought prize during raids on other groups (Walker 1971). Antler and buckskin saddles and rawhide bridles and trappings were utilized; the Plains travois was not used. The horse was both ridden and used as a pack animal, allowing the Upper Kutenai to be even more nomadic than they were prior to its adoption.

Other forms of transportation included snowshoes, a distinctive sturgeon-nosed bark canoe and a Plains-like hide "bullboat" (Turney-High 1941 and Curtis 1911). The dog was used as a pack animal prior to the arrival of the horse (Johnson 1969).

Structures

Ethnographic reports by Turney-High (1941) and Walker (1971), state that prior to the introduction of the horse, both the Upper and Lower Kutenai built semi-subterranean mat-covered lodges of the Plateau type. Careful survey revealed no evidence of this form in the study area (Choquette, pers. comm. 1976). Curtis (1911) notes the use of tipi frames covered with rush matting, rather than animal skins. In historic times the Upper Kutenai used a highly portable Plains-like skin-covered tipi (Walker 1971). Four main poles, 15 to 17 secondary ones, and 8 elk or bison hides were needed for each tipi (Turney-High 1941). All parts of the tipi were moved by horse from one camp to another. The only other structure noted for the Kutenai was a sweat lodge formed of willows and covered with skins or matting (Curtis 1911).

Burials

Ray (1939) notes the Kutenai used talus slopes for extended burials. According to Johnson (1969) warriors were buried between trees that were stripped of their bark and painted red. Johnson also suggests that a minimum of ritual was involved and that the bodies were dressed and wrapped in a blanket or hide, with hair from the mourners included in the grave. Tro (1968) notes that valuables were often placed with the body and a horse killed in honor of the dead.

Origins

One theory of the origin of the Kutenai sees them as a recently displaced Plains tribe. A westward moving trend of stronger tribes is believed to have forced the Kutenai to the south and west (Turney-High 1941). Another theory infers a Plateau origin (Curtis 1911). Archaeological evidence indicates the presence of both Plains and Plateau traits and does not clearly support either theory over the other. Ethnographic information suggests that the Tobacco Plains of Montana were the center of Kutenai territory and the site of the oldest and possibly the largest village, from which the Kutenai spread north, south and west (Johnson 1969). However, archaeological investigations in this region have failed to produce evidence of a large village site (Taylor 1969).

This briefly summarizes the ethnographic Kutenai material culture, but has not attempted to present the social behavior. The lithic analysis of DhPt 1, 4, and 10B represents an endeavor to interpret the prehistoric occupation of southeastern British Columbia and its relationship to the historic Kutenai.

SITE DESCRIPTIONS

DhPt 1

Location

DhPt 1 was located on a sand hill near the east bank of the Kootenay River, at the northern end of the study area (Fig. 2), near Big Sand Creek, one of the major tributaries in the research area. Rising approximately 8 m above the floodplain, the hill affords a good view of the surrounding area.

Environment

On-site vegetation consisted of grasses, such as timothy (*Phleum pratense*), fescue (*Festuca idahoensis*), and bluegrass (*Poa sp.*) which were common to the surrounding floodplain zone, but also contained speargrass (*Stipa commata*) and wheatgrass (*Agropyron sp.*), more common to the grassland zone. Forbes were typified by wild strawberry (*Fragaria vesca*), salsify (*Tragopogon dubius*), and dandelion (*Agroseris sp.*) (Shannon, pers. comm. 1973). There were no shrubs and only the trunks of several trees remained due to the clearing operations in preparation for the reservoir. The presence of blow-outs in the southwest portion of the site and redeposited soil to the northeast indicated that southwest winds were dominant.

Soil

A compact, mottled soil of dark-brown, grey-brown, and yellow-brown sandy-silt and silty-sand (Fig. 5) appears to have once covered the whole site, but has been wind-eroded from much of the southwest end of the site, leaving blowouts and depositing an overburden of sand on portions of the site. The soil was approximately 40 cm deep in undisturbed areas and contained most of the cultural material. Beneath this soil was a very loose grey sand, easily shifted by the wind. Deposits of this sand covered the mottled soil to depths of from 5 to 80 cm over much of the site.

Archaeological Yield

A total of 314 - 2 m squares comprised the universe, of which 16, or 5% were excavated (Fig. 4). Sixteen tools were surface collected and 36 were recovered during excavation in 1973. One feature was uncovered during excavation. There were 570 unworked flakes collected; faunal material was also collected and fire-broken rock weighed.

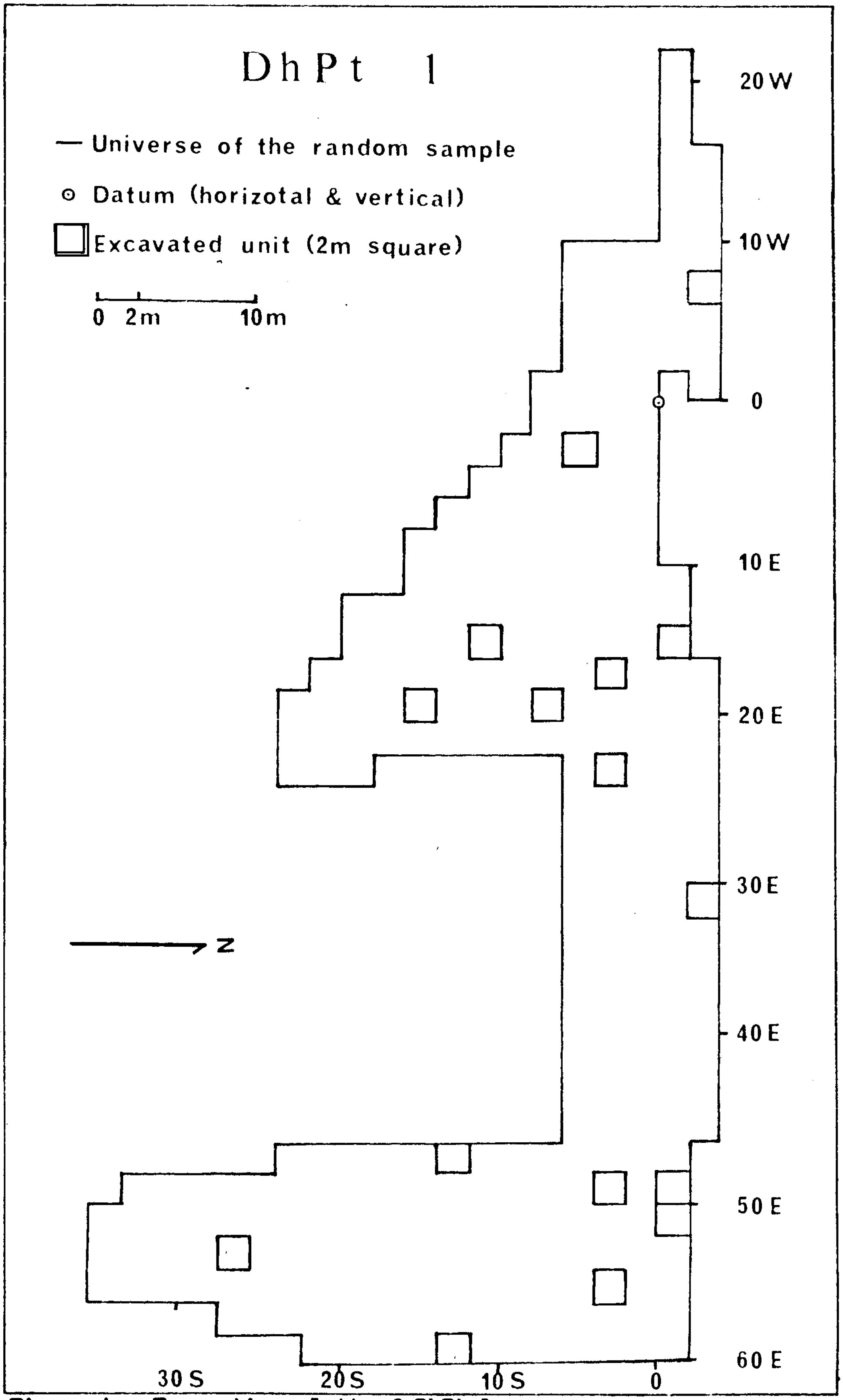


Figure 4 **Excavation platt of DhPt 1**

LEGEND FOR PROFILE (Fig. 5)

Sod-Grass

A. Grey sand (10YR 7/2)

B. Dark brown sandy silt (10YR 4/3)

C. Yellowish-brown silty sand (10YR 5/3)

D. Dark greyish-brown sandy silt (10YR 4/2)

E. Very dark grey sandy silt (10YR 3/1)

F. Brownish grey sand (10YR 5.5/2)

G. Brown sand (10YR 6/3)

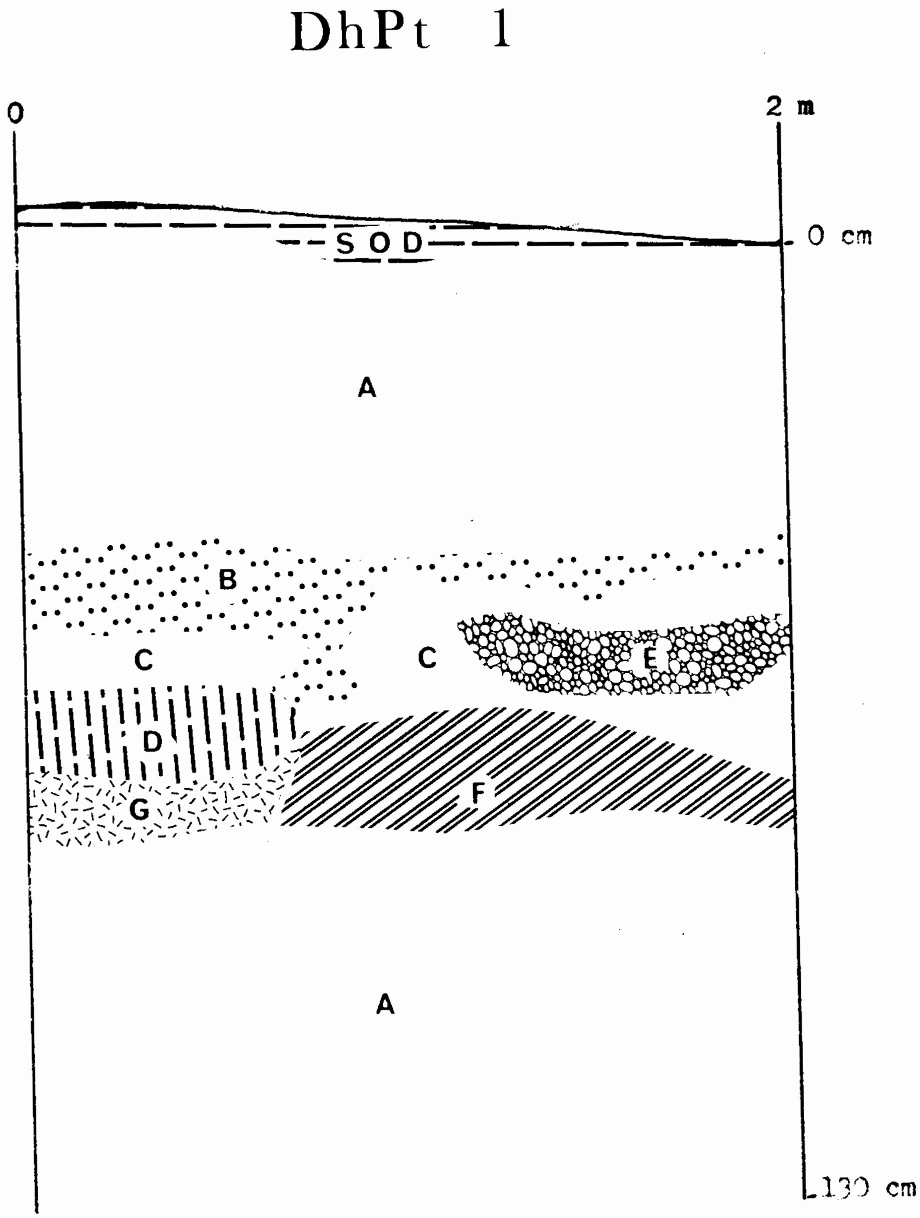


Figure 5 Composite soil profile from DhPt 1

DhPt 4

Location

DhPt 4 was located on the eastern bank of the Kootenay River, on a 8 m high sand-ridge which covers part of a nearly continuous 12 m terrace flanking much of the eastern edge of the study area. This site is approximately 2 km south of DhPt 1. DhPt 3 was located immediately to the north and DhPt 5 to the south of DhPt 4, separated from each other by stream gullies (Fig. 2). For part of the site's 440 m length, the Kootenay River flows at the base of the terrace.

Environment

On-site vegetation consisted of speargrass and wheatgrass and forbes such as pearly everlasting (Anaphalis margaritacea), Oregon grape (Berbis aquilfolia), yarrow (Achillea millefolium), and spreading phlox (Phlox diffusa). There were also numerous shrubs, including wild rose (Rosa nutkana), juniper (Juniperus sp.), bitterbrush (Purshia tridentata), and flat top spirea (Spirea lucida) (Shannon, pers. comm. 1973). Pine and fir occured occasionally along the eastern edge of the ridge. The vegetation was generally heavier at this site than at DhPt 1. Since the ridge was above the reservoir level it was not cleared by the forestry crews and was left relatively undisturbed.

Soil

The major portion of this site exhibited a soil profile similar to the composite one shown in Figure 7. Only the southern third of the site showed evidence of yellow-brown compact sandy clay (Stratum "D") and around 300S in the sampling grid the soil appeared as a dark grey silty sand changing to a grey sand, with no brown shades evident. The majority of the cultural material appeared in the silty-sand and sandy-silt, with pure sand being virtually sterile.

Archaeological Yield

DhPt 4 was 426 m long and 4-16 m wide (Fig. 6). The 27 excavated units yielded 104 artifacts and 1332 unworked flakes. Fire-broken rock was noted and faunal material collected, but was not analyzed here. A further 192 artifacts were surface collected.

DhPt 10B

Location

DhPt 10B was located on a 3 m terrace on the west side of the Kootenay River, approximately 13 km south of DhPt 4 (Fig. 2). The site area, designated by Borden, in 1954 was divided by Choquette into DhPt 10A, 10B, and 10C on the basis of the discontinuous nature of surface material and differences in topography (Choquette 1973a). DhPt 10A and DhPt 10C were

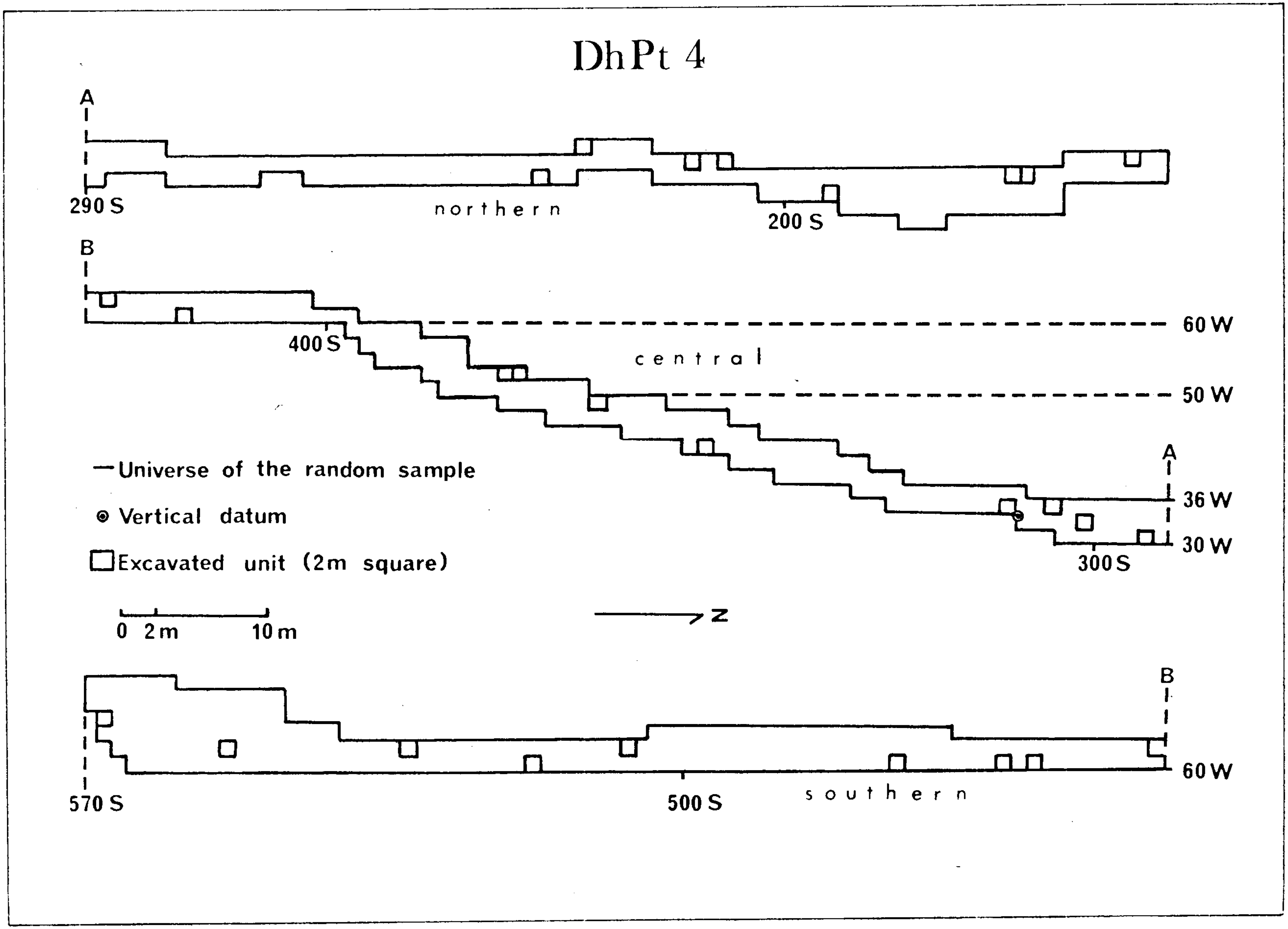


Figure 6 Excavation platt of DhPt 4

LEGEND FOR PROFILE (Fig. 7)

Sod–Dark grey–brown sandy silt and grass (10YR 4/2)

A. Grey–brown sandy silt (10YR 6/2)

B. Vague transitional zone—brownish silty sand (10YR 5/3)

C. Grey sand (10YR 6/1)

D. Yellow–brown sandy clay (10YR 6/4)

DhPt 4

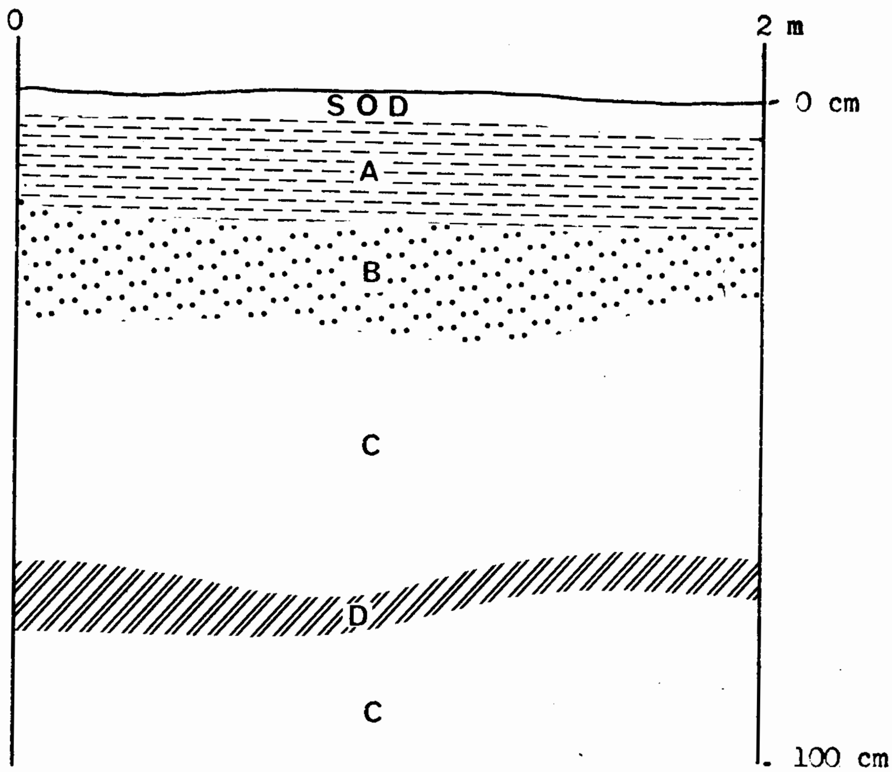


Figure 7 Composite soil profile from DhPt 4

on higher terraces to the south and west of DhPt 10B. DhPt 10B was situated north of the confluence of the Elk and Kootenay Rivers (Fig. 2).

Environment

The 3 m terrace on which DhPt 10B was located was covered mainly with pasture grasses, such as timothy (*Phleum pratense*), fescue (*Festuca idahoensis*), and bluegrass (*Poa sp.*). A few shrubs existed on the margins of the site and the stump of one large tree was evident on the river edge.

Soil

The majority of the cultural items recovered from DhPt 10B was found within dark grey-brown silty soil (Fig. 9). Underlying yellow-brown silt contained a large proportion of river laid cobbles and gravel and some cultural material. The cobbles in the lower deposits and the profusion of fire-broken rock in the upper levels made excavation proceed at a slower pace than at DhPt 1 and DhPt 4, where the soil was sandy, with no naturally deposited rock.

Archaeological Yield

Four units were excavated in 1972 and 15 in 1973 (Fig. 8). All yielded cultural material in the form of fire-broken rock, lithic detritus, faunal remains, and tools. A total of 980 tools were recovered from excavation in 1973 and 8 features were uncovered. The 1973 sample

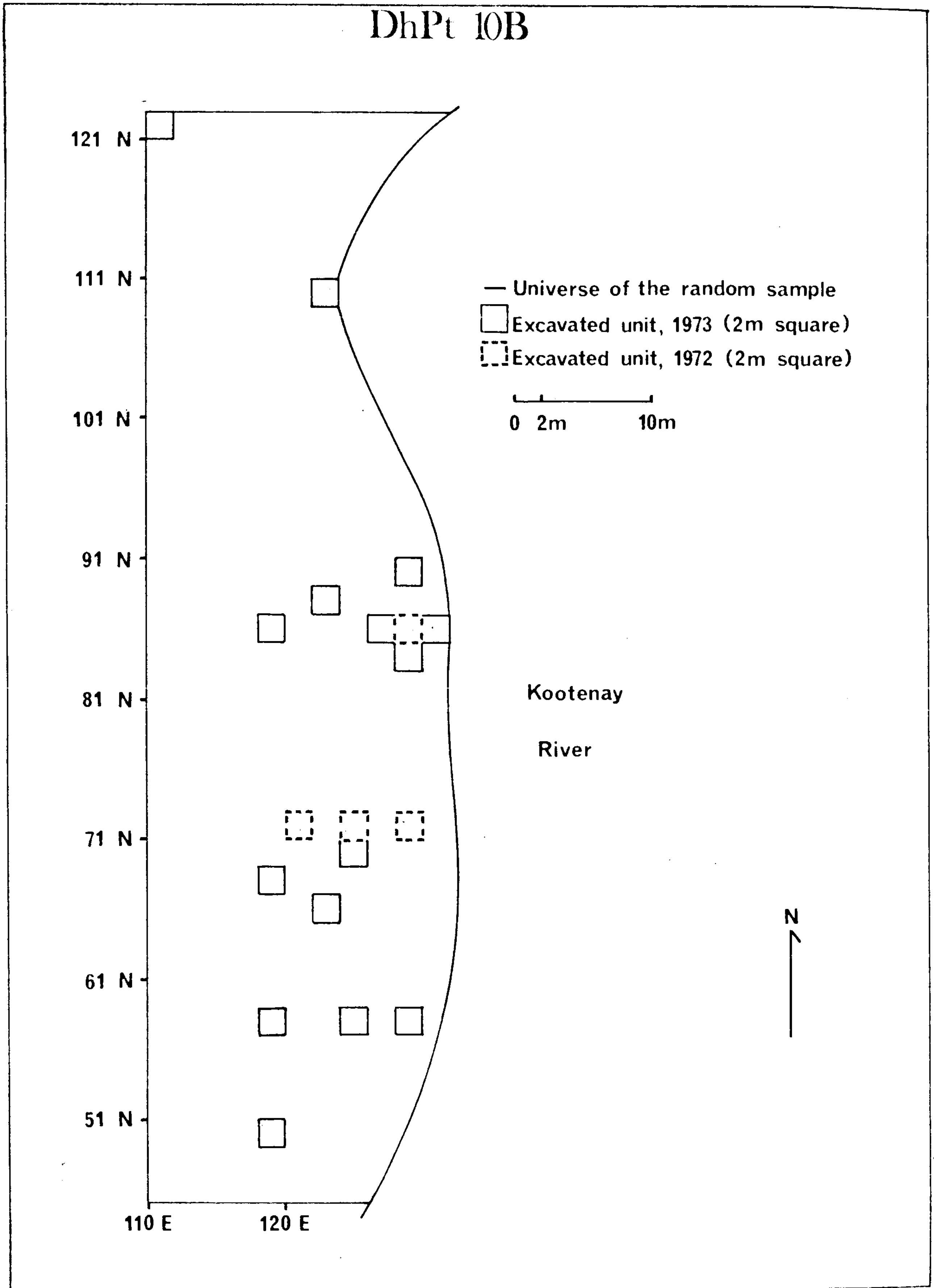


Figure 8 Excavation platt of DhPt 10B

LEGEND FOR PROFILE (Fig. 9)

Sod-turf and very dark greyish-brown silt (10YR 3/2)

A. Dark greyish-brown silt (10YR 4/2)

B. Dark brown silt (10YR 4/3)

C. Yellowish brown silt and gravel with concentrated large cobbles (10YR 5/4)

DhPt 10B

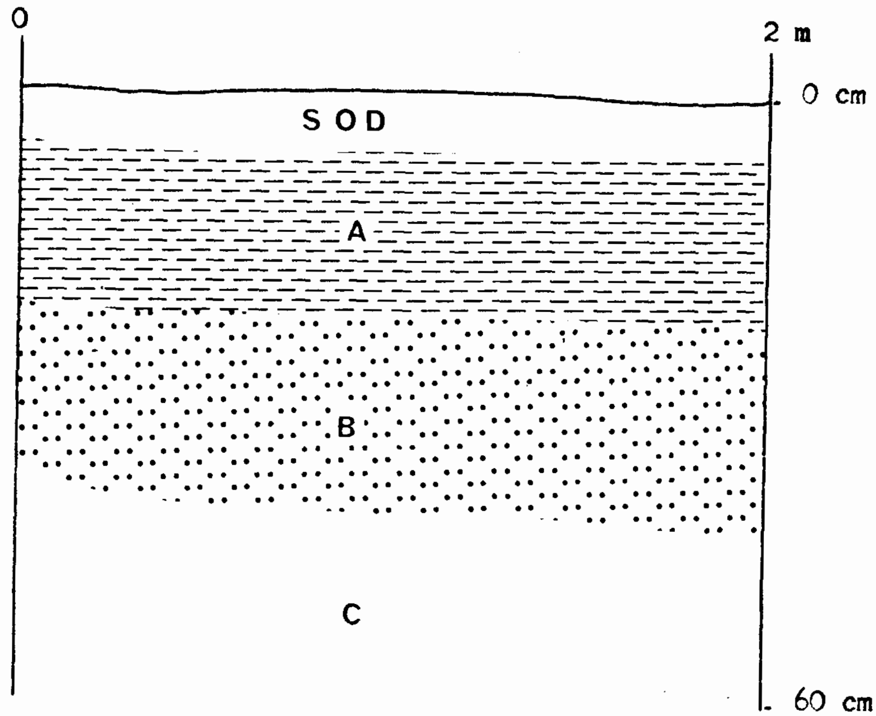


Figure 9 Composite soil profile from DhPt 10B

also contained 9027 unworked flakes. DhPt 10B-1972 yielded 179 tools and 1890 unworked flakes from 4 excavation units. The total yield of excavated lithics from all of DhPt 10B was 1159 tools and 11,082 unworked flakes.

The preceding discussion has served to introduce the study area, the known occupants, and the content of the 3 sites under analysis. The investigation of the artifacts forms the basis of the next section.

CHAPTER 3 ARTIFACT CLASSIFICATION

INTRODUCTION

This chapter is concerned with the lithic artifacts since, as previously noted, faunal material was not available for analysis. In addition, this study is further restricted to excavated materials as provenience of the surface collected material is often unknown. The aim of this analysis is to provide a descriptive artifact classification to permit comparisons and provide a relative chronology. Ethnographic analogies were employed to help determine possible site function.

The artifacts are classified in 2 main categories based on primary techniques of manufacture: 1) Chipped Stone and 2) Ground, Pecked and Incised Stone. The 2 main categories have been subdivided on the basis of type of retouch or general tool form. The scheme is intended to be flexible and primarily descriptive. The term "type" is used here to identify descriptive sub-classes and is not intended to connote temporal or spatial context. No attempt is made to define formal types in this study since the data are inadequate for this purpose.

The descriptive types used in this study have been compared to formal types from other areas (eg. Plains Side Notched), but to directly apply the same names to Kootenay specimens is to assume relationships that may not exist. With the absence of dates it is not known whether these types 1) developed in the Kootenay area first, 2) were adopted at the same time as an adjacent area, or 3) reached the Kootenays much later than other regions. For the purposes of this analysis it has been assumed that the second possibility is most likely.

The following terms are used to describe the attributes of each type.

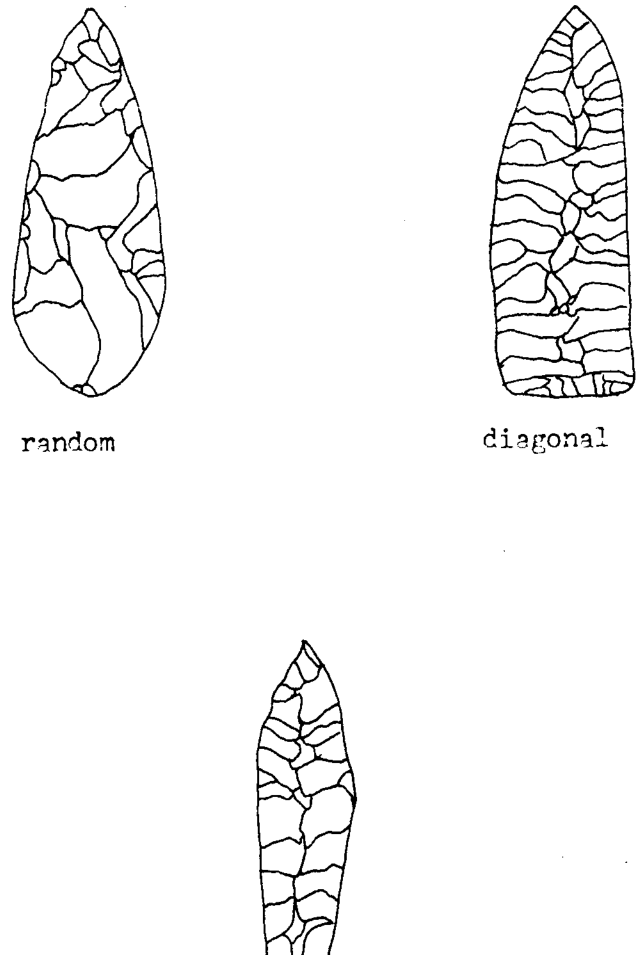
length:	maximum length of the artifact
width:	maximum width of the artifact
$width_2$:	minimum width of certain tools that are bilaterally notched or retouched (ie. "netsinkers"), pebble tools, Class 2
width (neck):	width of the neck of notched and stemmed bifaces
thickness:	Maximum thickness of the artifact
width of notch:	width of the notch(es) on pebble tools, Class 1 (ie. "netsinkers")
length of retouch:	length of the retouched edge on pebble tools, Class 2 (ie. "netsinkers")
weight:	weight of the artifact in grams

Measurements are included in the type description if it is represented by only 1 or 2 specimens. Metric attributes for types comprising larger samples are listed in Appendix 1 (Tables 1 to 31). Photographs are shown in Appendix 2 (Figures 1 to 13).

Each type description includes the materials utilized which are listed as Group 1 through 20 rather than being described. The lithic materials represented in this analysis are described and classified in Chapter 4. The number of specimens of each lithic group for each artifact type is noted, except for fragments, small flake tools, and debitage which, for the sake of brevity, are given as either predominantly "local" or "non-local". A more detailed analysis of the lithic distribution within the artifact classes and types is presented in Chapter 4.

Terms used for describing artifacts are partially borrowed from Sanger (1972:37), Crabtree (1972) and Loy (n.d.). "Extensive unifacial retouch" was chosen to describe tools that are completely worked over one face and "extensive bifacial retouch" describes those worked completely on both faces. "Marginal retouch" does not extend more than 0.5 cm from the edge(s) of a tool. "Random flaking" refers to extensively worked artifacts whose flake scars are randomly located with no evident pattern; diagonal and collateral are patterned (Crabtree 1972)(Fig. 10).

The artifacts have been compared to certain assemblages from the Interior Plateau of British Columbia, the Columbia Plateau, and the Northwest Plains. If the class or type under consideration can only be associated spatially with 1 or 2 of these comparative areas, or if it is limited in its temporal distribution within an area, it is noted in a "comments" section. If, however, it is found in all 3 areas and is not temporally diagnostic its distribution will not be described. Many of the artifacts described herein, such as utilized flakes, are not spatially or temporally distinct and it is not considered necessary to comment upon them. A discussion of the results of cross-cultural comparisons follows the artifact classification.



(after Crabtree 1972)

Figure 10 Schematic diagram of random, diagonal, and collateral flaking

CHIPPED STONE

Flake-and-core tools produced by percussion and pressure flaking techniques are dealt with in this section. Further divisions are made on the basis of the amount and type of retouch or utilization and the general form of the artifact.

FORMED BIFACES - CLASS 1

This class is composed of complete and fragmentary artifacts that are extensively bifacially retouched with prepared bases. The term "formed biface" indicates that the finished shape of the tool is probably a preconceived form in the eyes of the toolmaker (Sanger 1970:71). No attempt is made to distinguish knives from projectile points. The subdivisions within this class are based primarily on outline, presence and type of notching, base form and size.

1. Unnotched biface, type ai

Figure: 1 a-c, **Appendix** 2

Number of specimens: 5

Description: These large, sharp-pointed bifaces are ovate in general outline with no evidence of notching on any edge. They range from 3.33 to 5.08 cm in length. Most have asymmetrically convex lateral edges and biconvex cross-sections. Bases are usually convex and thinned. The specimens are extensively bifacially retouched by random flake removal.

Material: Group 3

Dimensions: See Table 1, Appendix

Distribution: DhPt 10B

Unnotched bifaces, type aii

Figure: 1 g–i, **Appendix** 2

Number of specimens: 6

Description: These bifaces are smaller (by 1/2), thinner versions of type ai. They are ovate in general outline and show no evidence of notching on any edge. Most have asymmetrically convex lateral edges and biconvex cross-sections. Tips are sharp to rounded. Bases are generally straight and all are thinned, and the tools are extensively bifacially retouched by random flake removal.

Material: Group 1 (5), Group 2 (1)

Dimensions: See Table 2, Appendix

Distribution: DhPt 10B

Unnotched bifaces, type bi

Figure: 1 d–f, **Appendix** 2

Number of specimens: 6

Description: These unnotched bifaces are asymmetrically triangular in outline and range from 3.68 – 4.41 cm in length with straight lateral edges. Cross-sections are generally biconvex and the thinned bases are straight to slightly convex. Tips on complete specimens are rounded. These bifaces are generally extensively bifacially retouched by random flake removal.

Material: Group 1 (1), Group 2 (2), Group 3, Group 5 (1) Group 12 (1)

Dimensions: See Table 3, Appendix

Distribution: DhPt 4 (1), DhPt 10B (5)

Unnotched bifaces, type bii

Figure: 1 j-n, **Appendix** 2

Number of Specimens: 19

Description: These are small bifaces less than one-half the size of type bi. They are thin, triangular in outline and show no evidence of notching on any edge. Both asymmetrical and symetrical specimens are present. Cross-sections are generally biconvex and all possess thinned, straight bases. Tip forms are sharp and random flaking covers both faces.

Material: Group 1 (12), Group 2 (1), Group 4 (1), Group 5 (2), Group 6 (1), Group 9 (1), Group 12 (1)

Dimensions: See Table 4, Appendix

Distribution: DhPt 10B

Comment: The small ovate and triangular unnotched bifaces are similar to forms found on the Northwest Plains referred to as Plains Triangular Points associated with the Late Prehistoric Period (A.D. 600-1750) in that area (Mulloy 1958).

Unnotched bifaces, type c

Figure: 2a , **Appendix 2**

Number of specimens: 1

Description: Although this specimen is fragmented and only the basal portion was recovered, it is evident that it is significantly different from the other large bifaces to be discussed separately. The general outline of the fragment suggests that this specimen was originally lanceolate in form. The lateral edges are slightly concave near the base and appear to become convex towards the fractured end. The base is concave and thinned. It is biconvex in cross-section and flaking is random.

Material: Group 2

Distribution: DhPt 10B

Comment: This biface is similar to some styles of lanceolate points evident on the Plains during the Paleo-Indian or Early Prehistoric Period (9000-5500 B.C.) (Irwin-Williams 1973). As the biface in this study appears to have been randomly flaked it would seem most similar to the Lusk point (6000-5500 B.C.) which is often characterized by "more haphazard and less well controlled" (Irwin-Williams 1973:51) chipping than others of similar form. The Lusk point is described as

> lanceolate in form with a concave base and is frequently somewhat constricted along its lower third... (Irwin-Williams 1973:51)

Although the forms are similar the biface from DhPt 10B was found in the upper component and cannot be used to suggest a Paleo-Indian occupation. It may be an intrusive element, a result of localized distrubance, or a trait that continued through time. If this style of point is found repeatedly in a late context it may become necessary to re-evaluate the importance of some point styles as time diagnostic elements. For the purposes of this study and because of the fragmented nature of the specimen, this biface is considered an anomaly whose validity as either a spatial or temporal element is questionable.

Fragments of bifaces

Number of specimens: 142

Description: These are fragments of apparently unnotched bifaces, but the original outline is not evident. One hundred and seven are end fragments, 15 are medial portions and 19 are lateral edge fragments.

Material: non-local lithic groups dominate

Distribution: DhPt 1 (6), DhPt 4 (19), DhPt 10B (117)

2. Basally notched bifaces

Figure: 2 b,c, **Appendix** 2

Number of specimens: 2

Description: These are lanceolate in outline with a single centrally located basal notch. Lateral edges are convex and cross-sections are biconvex. The one complete specimen has a rounded tip. The bases are thinned and flaking is collateral or random.

Material: Group 12

Dimensions: Length: 3.31 cm

width: 1.45 cm

thickness: 0.57 cm

weight: 2.80 gr

Distribution: DhPt 4 (1), DhPt 10B (1)

Comment: These bifaces resemble Plains-Great Basin McKean points described by Mulloy (1954:44-445) as

> a lanceolate blade, usually with blade edges incurved toward tip and tapering toward base about midway between tip and base....base is usually sharply concave, though sometimes concavity is slight or absent...

Mulloy suggests this is a variant of a continuous range of point shapes. McKean points are known from approximately 3000 B.C. in the Northwest Plains, although Reeves (1972a) suggests they may be as late as 1500B.C. at Waterton and they are also noted as late in Manitoba (Wormington and Forbis 1965).

3. <u>Corner notched bifaces, type a</u>

Figure: 2 d-g, **Appendix** 2

Number of specimens: 9

Description: These bifaces are corner notched with medium to long barbs and expanding stems. Blade outlines are triangular, with maximum width at the barbs. Edges are straight and cross-sections biconvex. The bases are thinned with evidence of grinding and the flaking is random.

Material: Group 2 (2), Group 3 (5), Group 5 (2)

Dimensions: See Table 5, Appendix

Distribution: DhPt 10B

Comment: These specimens are comparable to points described by Sanger (1970) from his Upper Middle Period (1500 B.C. to A.D. 1). Similar styles are present in the Columbia Plateau around A.D. 500 to 1300 as part of Leonhardy and Rice's Harder Phase (1970).

Corner notched bifaces, type bi

Figure: 2 j,k, **Appendix** 2

Number of specimens: 5

Description: These are corner-notched bifaces with small barbs, an expanding stem and straight base. Blade outlines are generally triangular, but slightly ovate outlines are present. The maximum width occurs at the barbs and cross-sections are biconvex. The bases are thinned. The flaking ranges from random to irregularly diagonal.

Material: Group 1 (3), Group 2 (1), Group 3 (1)

Dimensions: See Table 6, Appendix

Distribution: DhPt 1 (1), DhPt 4 (2), DhPt 10B (2)

Comment: **Bifaces** similar to these are present by 1500 B.C. in all 3 comparative areas and continue to be found in conjunction with later corner-notched and side-notched styles in both the Columbia and Fraser Plateaux (Sanger 1970; Leonhardy and Rice; 1970). It appears that they are virtually replaced by side notched points on the Plains by A.D. 500 (Lahren and Sorrels 1970).

Corner notched bifaces, type bii

Figure: 2 l,m, **Appendix** 2

Number of specimens: 8

Description: These are corner-notched bifaces with small barbs, expanding stems and convex bases. Some specimens show evidence of basal grinding and all bases are thinned. Outlines are triangular to ovate with maximum width at the barbs. Cross-sections are biconvex and flaking is usually random, although 2 specimens are parallel to collateral.

Material: Group 1 (3), Group 3 (3), Group 6 (2)

Dimensions: See Table 7, Appendix

Distribution: DhPt 10B

Comment: See type bi

Corner notched bifaces, type biii

Figure: 3 a,b, **Appendix** 2

Number of specimens: 4

Description: These are corner notched bifaces with small barbs, expanding stems, and concave bases. Outlines are triangular and blade edges are straight, with maximum width at the barbs. Cross-sections are biconvex, bases are thinned, and flaking is random to diagonal. The concavity of the base produces basal ears on 2 of the specimens.

Material: Group 1 (1), Group 9 (1), Group 12 (1)

Dimensions: See Table 8, Appendix

Distribution: DhPt 1 (1), DhPt 4 (1), DhPt 10B (2)

Comment: Two of the specimens within this type are similar to Hanna points of the Plains, dated around 1500 B.C. A comparable form is present in Sanger's Lower Middle Period (3000 B.C. to 1500 B.C.) (Sanger 1970) of the Interior Plateau. They are often found with the McKean point type (Wheeler 1954). The other 2 specimens in this type exhibit a similar spatial and temporal distribution to type bi.

Corner notched bifaces, type c

Figure: 2 h,i, **Appendix** 2

Number of specimens: 6

Description: These are triangular to ovate corner-notched bifaces, with shoulders, rather than barbs. They have expanding stems and thinned convex bases with maximum width at the shoulders. Cross-sections are biconvex and flaking is random to diagonal.

Material: Group 1 (2), Group 3 (1) Group 5 (1) Group 6 (2)

Dimensions: See table 9, Appendix

Distribution: DhPt 4 (3), DhPt 10B (3)

Comment: See type bi

4. Stemmed bifaces

Figure: 3 c-f, **Appendix** 2

Number of specimens: 11

Description: Extension of notching, from the corner of the biface up the lateral edges, has produced a longer stem in this type than evident on the other corner-notched specimens. These are triangular or ovate in outline with small barbs or shoulders. Bases are thinned and generally straight although some convex specimens are present. Cross-sections are biconvex and flaking is random to diagonal.

Material: Group 1 (2), Group 2 (4), Group 6 (2)
Group 9 (1), Group 12 (2)

Dimensions: See Table 10, Appendix

Distribution: DhPt 4 (1), DhPt 10B (10)

5. Side notched bifaces, type a

Figure: 3 g-l, **Appendix** 2

Number of specimens: 14

Description: These triangular to ovate bifaces are generally larger than the other side notched specimens. They have shallow side notches, bordering on corner-notching, located close to the bases. The bases themselves are straight or convex. Cross-sections are biconvex and random flaking is predominant, with some diagonal flaking evident.

Material: Group 1 (7), Group 3 (1), Group 5 (4)
Group 6 (1), Group 7 (1)

Dimensions: See Table 11, Appendix

Distribution: DhPt 10B

Comment: Large bifaces with wide side-notches are found in Sanger's Upper Middle and Late Periods in the Interior Plateau (Sanger 1970). Reeves notes a variety of large side-notched points in his late Middle period (1500 B.C. to A.D. 400)(1972a).

Side notched bifaces, type b

Figure: 3 m,n, **Appendix** 2

Number of specimens: 10

Description: These side-notched bifaces have an eared effect formed by symmetrical shallow notches close to the basal end and thinned concave bases. Outlines are triangular and cross-sections are biconvex. These are thin, finely flaked specimens and the bilateral notches are small and U-shaped. Greatest width is generally at the base.

Material: Group 1 (8), Group 6 (2)

Dimensions: See Table 12, Appendix

Distribution: DhPt 10B

Comment: These resemble Avonlea points of the Plains, dated from A.D. 1 to 700. Turnbull (1973) notes the presence of a similar point in the Arrow Lakes region, an area he believes to be peripheral to the Columbia Plateau.

Side notched bifaces, type c

Figure: 3 o,p, Appendix 2

Number of specimens: 6

Description: These small thin triangular bifaces have fine narrow notches near the basal end producing basal edges that are narrow and rounded. Cross-sections are biconvex to plano-convex. The widest point is at the shoulders and they are finely worked with small randomly or diagonally patterned flakes removed. Bases are thinned and are straight or concave.

Material: Group 1 (5), Group 3 (1)

Dimensions: See Table 13, Appendix

Distribution: DhPt 10B

Comment: Although these bifaces are similar to Prairie Side Notched points of the Late Prehistoric Period on the Plains (A.D. 700 to 1350), comparable forms are found in the Interior Plateau in Sanger's Late Period (A.D. 1 to 1800)(Sanger 1970), and the Columbia Plateau (Collier et al, 1942; Butler 1962). The small point was predominant in these areas during the late prehistoric period.

Side notched bifaces, type d

Figure: 3 q–u, **Appendix 2**

Number of specimens: 44

Description: These small triangular bifaces have symmetrical narrow notches one-quarter to one-third the distance along the blade producing wide basal edges. Basal edges are square and most specimens are widest at the base. Concave and straight bases are present in equal numbers; all are thinned. Lateral edges are straight and cross-sections are generally biconvex. These points are thin and worked randomly or diagonally.

Material: Group 1 (38), Group 2 (1), Group 4(2) Group 6 (3)

Dimensions: See Table 14, Appendix

Distribution: DhPt 4 (6), DhPt 10B (38)

Comment: Although these bifaces are similar to Plains Side Notched points of the upper Late Prehistoric Period (A.D. 1350 to 1750), comparable forms are found in the Interior Plateau in Sanger's Late Period (A.D. 1 to 1800) (Sanger 1970; Wilson, per. comm. 1975) and the Columbia Plateau (Collier et all 1942; Copp, pers. comm. 1976; Gunkel 1961; Turnbull 1973). A variety of small notched points appear to be common elements of the late period in these areas. It appears, however, that small stemmed points are more predominant in the central and southern plateau than the north (Warren 1968; Leonhardy and Rice 1970).

Fragments of corner notched, stemmed and side notched bifaces

Number of specimens: 53

Description: These are fragments that show evidence of some form of notching or stemming, but which cannot be classified into specific types, although 18 appear to be side notched varieties.

Material: predominantly non-local Group 1

Distribution: DhPt 1 (1), DhPt 4 (4), DhPt 10B (48)

FORMED BIFACES - CLASS 2

This class is composed of formed bifaces that do not belong to the hafted point/knife types. Included are bifacially worked "preforms" and "perforator/drills". Although functional terms are generally avoided in this analysis they are used here as an aid to comparative identification.

1. Biface preforms

Figure: 5 a,b, **Appendix** 2

Number of specimens: 39

Description: These whole and fragmentary specimens retain some small area of cortex and/or an edge that has not been thinned or shaped. They are assumed to be preforms for bifacial knives or projectile points on the basis of their form and lack of utilization. Biconvex and plano-convex cross-sections are evident. Outlines are ovate or rectangular and asymmetric and symmetric forms are equally represented. Sides and base are convex to straight and the flaking is random.

Material: Group 1 (11), Group 2 (16, Group 3 (19), Group 5 (1), Group 6 (1), Group 7 (1)

Dimensions: See Table 15, Appendix

Distribution: DhPt 1 (1), DhPt 10B (38)

2. Perforators/drills, type a

Figure: 4m,n, **Appendix** 2

Number of specimens: 5

Description: These have elongated bifacially retouched points and wide bases, which are marginally to extensively worked and usually thinned. Bases are convex to straight and diamond-shaped cross-sections are predominant for the elongated points, although one is biconvex. Sides are straight and parallel with an abrupt point or straight and taper to a gradual point. Flaking is generally fine and collateral.

Material: Group 3 (1), Group 6 (3), Group 9 (1)

Dimensions: See Table 16, Appendix

Distribution: DhPt 4 (1), DhPt 10B (4)

3. Perforators/drills, type b

Figure: 4 l,m, **Appendix** 2

Number of specimens: 4

Description: These have bifacially worked elongated points and unmodified bases. Points are biconvex and bases plano-convex in cross-section. Outlines vary and are determined in part by the shape of the original flake. Only 2 specimens are complete.

Material:	Group 1 (1), Group 3 (2), Group 6 (1)		
Dimensions:	Length:	2.45	2.92
	width:	1.58	2.12
	thickness:	0.21	0.40
Distribution:	DhPt 10B		

FORMED UNIFACES

The tools of this class are based on flakes unifacially shaped into a presumably predetermined form. Included are artifacts usually functionally referred to as "end-scrapers", "side scrapers", and "gravers", as well as fragments of these. The subdivisions of this class are based primarily on outline and the location and type of retouch. The terminology used is after Crabtree (1972).

1. <u>Formed unifaces, type a</u>

These have steep unifacial retouch on one convex end and are commonly referred to as "end-scrapers". Varieties of this type of tool, with similar and different outlines, material types, and flaking are found throughout the Plateaux and Plains (Copp, pers. comm. 1976; Taylor 1969; Reeves 1972a; Butler 1962; Mulloy 1954; Sanger 1970). It was probably used for numerous purposes, including hide-preparation, working wood and antler and as a generalized cutting implement (Ham 1975). Those with thinned proximal ends were likely hafted. Three categories are described; 1) those based on blade-like flakes; 2) those produced from a variety of flakes and 3) fragments that are too small to specifically identify.

Formed unifaces, type ai

Figure: 4 a, **Appendix** 2

Number of specimens: 5

Description: This sub-type is based on blade-like flakes dorsally retouched on both straight edges and steeply retouched on one end. These specimens are triangular to plano-convex in cross-section and possess dorsal ridges.

Material: Group 1 (2), Group 6(3)

Dimensions:	length:	2.23	4.92
	width:	1.30	2.26
	thickness:	0.53	0.61

Distribution: DhPt 4 (1), DhPt 10B (4)

Formed unifaces, type aii

Figure: 4 b-e, **Appendix** 2

Number of specimens: 26

Description: This sub-type is composed of flakes unifacially worked on the dorsal surface of the distal end to produce a convex edge. Outlines are ovate to triangular. Extensive dorsal retouch and marginal dorsal retouch are equally represented and all specimens are worked on at least 2 edges. Cross-sections are plano-convex and triangular and lateral edges vary in shape. Proximal ends are generally unworked or fragmented, although some are thinned. One unique specimen is corner notched with an expanding stem.

Material: Group 1 (7), Group 3 (4) Group 4 (3),
Group 6 (8), Group 9 (2), Group 12 (2)

Dimensions: See Table 17, Appendix

Distribution: DhPt 1 (1), DhPt 4 (2), DhPt 10B (23)

Formed unifaces, fragments

Number of specimens: 15

Description: These specimens are fragments that feature a steeply retouched convex end and a plano-convex or triangular cross-section. It is not possible to determine whether they are based on flakes or blades.

Material: non-local lithics are dominant

Distribution: DhPt 10B

2. Formed unifaces, type b

Figure: 4 f, **Appendix** 2

Number of specimens: 6

Description: The primary feature of these specimens is a marginally retouched lateral edge(s). The dorsal surface of all unfragmented edges are unifacially worked to form the tool. Outlines vary and cross-sections are plano-convex or triangular. They are commonly referred to as side scrapers.

Material: Group 3 (2), Group 4 (3), Group 6 (1)

Dimensions: See Table 18, Appendix

Distribution: DhPt 1 (1), DhPt 10B (5)

3. Formed unifaces, type c

Figure: 4 g-k, **Appendix** 2

Number of specimens: 17

Description: These are flakes with pointed unifacial projections. Retouch is usually limited to the edges of the projection, although some specimens are extensively worked and 2 are partially bifacially retouched at the base. Retouch is generally dorsal and the outline is determined by the shape of the original flake preform. Cross-sections are plano-convex or biconvex. These tools are commonly referred to as "gravers".

Material: Group 1 (6), Group 2 (1), Group 3 (2), Group 4 (1), Group 6 (7)

Dimensions: See Table 19, Appendix

Distribution: DhPt 10B

The major criteria for determining the remaining class divisions are the types of resource used (ie. core, pebble, flake, slab, or spall) to produce the tool. The type of flaking (bifacial or unifacial) becomes a secondary consideration. These criteria enable the grouping of artifacts similar in form, rather than arbitrarily separating them on the basis of amount and type of retouch.

CORES

These artifacts served as a source of flakes, but were themselves not utilized. Cores are divided into types on the basis of size.

1. Cores, type a

Figure: 5 f, **Appendix** 2

Number of specimens: 14

Description: Most of these cores retain some cortex. The number of flakes removed ranges from 2 scars to scars covering the entire surface area. The cores are generally amorphous in shape, with flakes removed multidirectionally, although some specimens feature flake scars removed from one or two directions.

Material: Group 1 (2), Group 3 (1), Group 7 (2)

Dimensions: See Table 20, Appendix

Distribution: DhPt 1 (2), DhPt 10B (12)

2. Cores, type b

Figure: 5 e, **Appendix** 2

Number of specimens: 16

Description: These are characterized by their small size (less than 3 cm in maximum dimension). They appear to have been fragments discarded during flake removal, ormay be remains of exhausted cores. The presence of hinge fractures, material faults, and diminutive striking platform areas, reinforce the idea that these are exhausted cores (Crabtree 1972).

Material: Group 1 (6), Group 3 (8), Group 6 (2)

Distribution: DhPt 4 (1), DhPt 10B (15)

SLAB TOOLS

This class includes tools produced from slab-like fragments of rock, rather than flakes, cobbles or pebbles. Material types are those with a natural tendency to cleave into sheets or layers, including slate, metamorphosed argilliceous shales and micaceous schists. All cross-sections are therefore flat. Types are based on the formed outline of the tools and small fragments are discussed as a separate group.

1. Slab tools, type a

Figure: 9 a, **Appendix** 2

Number of specimens: 4

Description: These are characterized by irregularly oval outlines and marginal retouch on most edges. Bifacial retouch is typical, although some areas exhibit unifacial retouch. Wear is generally evident on all worked edges.

Material: Group 13 (1), Group 18 (3)

Dimensions: See Table 21, Appendix

Distribution: DhPt 10B

2. <u>Slab tools, type b</u>

Figure: 8, **Appendix 2**

Number of specimens: 21

Description: These tools have a square or rectangular shape formed by marginal bifacial retouch. Portions of some slabs have an unretouched edge, but most are completely worked. Wear is evident on 2, 3 or 4 edges.

Material: Group 11 (6), Group 16 (1), Group 17 (10), Group 18 (4)

Dimensions: See Table 22, Appendix

Distribution: DhPt 4 (3), DhPt 10B (18)

3. <u>Slab tools, fragments</u>

Number of specimens: 27

Description: These specimens are fragments of marginally retouched slabs, whose original outline is not discernable. Most are bifacially marginally retouched although some are unifacially worked and most worked edges show wear.

Material: Group 11 (8), Group 17 (11), Group 18 (8)

Distribution: DhPt 4 (2), DhPt 10B (25)

The slab tools are all made of locally available raw materials. It is possible that these materials were used exclusively because of their availability, but it is more likely that they were chosen for their physical characteristics, particularly their tendancy to fracture easily along planes and thus produce a thin, flat tool which is easily flaked. It has been suggested that the rather dull edge of this type of tool would be less likely to damage a hide when used as a scraper (Gunkel 1961).

It is suggested that these tools may have been used to process fish and/or hides and the edges may have served cutting and/or scraping functions. These tools are found at DhPt 4 and DhPt 10B, two of the sites in the study area which also contain other evidence that fish may have been seasonally exploited.

Turnbull (1973) notes the use of a similar type of artifact hafted as a hide flesher in the Arrow Lakes area. The worked slabs he describes, however, are not usually rectangular in outline, but unformed, oval, or triangular and are often only unifacially worked. French (1973) also records the presence of worked slabs at DiQi 1 in the Lakes territory of the Upper Columbia and these tools were identified by an informant as hide scrapers. French (pers. comm. 1976) adds that several of the specimens from this site are rectangular in form. Copp (pers. comm. 1976) recovered identical slabs from the southern Okanogan in British Columbia and Keeler (1973) has comparable forms from his excavations in north-central Idaho. Gunkel (1961) notes their use as hide-fleshers or "scrapers" and the possibility that they also functioned as knives. He states that as "one moves south from British Columbia, cobble spall hide-fleshers decrease in number, while tabular hide-fleshers increase" (Gunkel 1961:188).

The Plains literature makes no mention of similar tools and it appears that they are a Columbia Plateau trait. Slab tools outnumber spall tools in the study area, suggesting an affinity with the Columbia

Plateau in that respect. These tools are associated with point styles generally considered to be late in the study area.

PEBBLE TOOL - CLASS 1

This class consists of worked pebble tools, further sub-divided into large and small types. The outline of these tools is obviously determined by the shape of the original pebble.

1. Pebble tools, type a

Figure: 6 c, **Appendix** 2

Number of specimens: 11

Description: This tool type is composed of large flattened pebbles marginally flaked on one or more "edge", usually an end. The maximum dimension of the tools in this type are greater than 10 cm and less than 15 cm. Flake removal is generally unifacial and 2 or 3 edges are left unworked. Cross-sections vary. They are similar to tools usually referred to as choppers and are inferred to have been used as heavy duty wood or bone working tools.

Material: Group 11 (9), Group 17 (2)

Dimensions: See Table 23, Appendix

Distribution: DhPt 10B

2. Pebble tools, type b

Figure: 5 c,d, **Appendix** 2

Number of specimens: 12

Description: This includes pebbles with a maximum diameter less than 10 cm. They are worked more extensively than the large pebble tools, but most specimens still retain over half of their original cortex. Bifacial retouch on 2 or more edges is predominant and cross-sections are biconvex or plano-convex. Use wear is evident on some specimens.

Material: Group 3 (3), Group 11 (2), Group 13 (2)
Group 14 (1b, 1d), Group 16 (2), Group 19 (1)

Dimensions: See Table 24, Appendix

Distribution: DhPt 1 (1), DhPt 4 (1), DhPt 10B (10)

Comment: The size of the pebbles and of the flakes removed, plus the evidence of utilization on some edges, make it unlikely that these tools were primarily intended as cores.

PEBBLE TOOLS - CLASS 2

These are pebbles of a comparable size to those in Class 1, but worked only along their long-axis. Retouch on opposing lateral edges produced a centrally located constriction on some specimens and bilateral notches on others. The pebbles are typically flat and have a flat cross-section. The division of this class into types is based on the type of constriction or notching.

1. <u>Pebble tools - class 2, type a</u>

Figure: 6 a, 7 b,e,f, **Appendix** 2

Number of specimens: 10

Description: One lateral edge of the pebble in this class has been retouched marginally to produce a slight constriction in the outline of the tool (Fig.**11a**). The opposing lateral edge is generally marginally worked to produce a distinct notch or concavity. Bifacial retouch is predominant. The marginally retouched edge and the opposing notch is centrally located on the pebble in most instances. The length of the retouched portion is generally greater than one-third and less than one-half the maximum length of the pebble. The notches do not extend as far along the lateral edges and produce a deeper constriction than the marginal retouch.

Material: Group 11 (5), Group 13(5)

Dimensions: See Table 25, Appendix

Distribution: **DhPt** 10B

2. <u>Pebble tools - class 2, type b</u>

Figure: 6 b, 7 a,c,d, **Appendix** 2

Number of specimens: 22

Description: These specimens (Fig. **11b**) feature bifacial retouched notches on both lateral edges, although occasionally only 1 notch will be present. The notch extends generally less than one-third the total length of the pebble.

Material: Group 11 (8), Group 13 (4), Group 14 (1b), Group 16 (5), Group 19 (4)

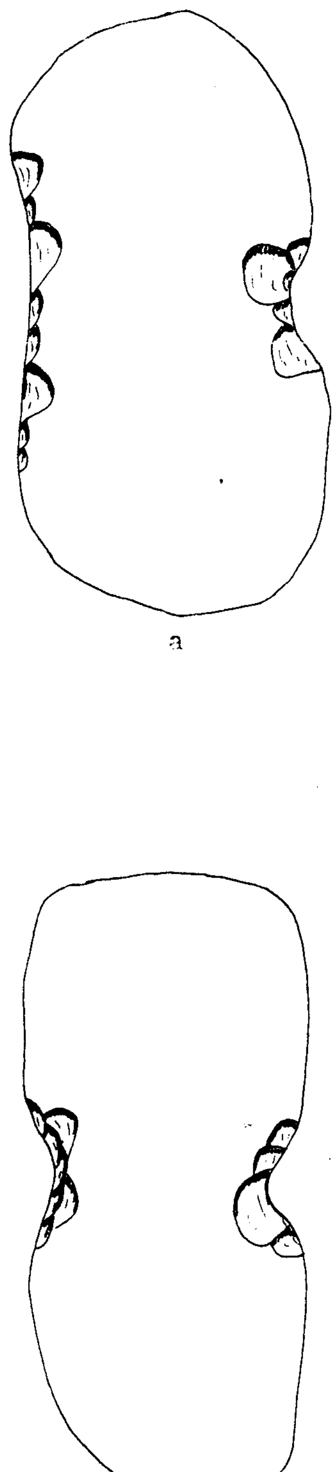


Figure 11 Schematic diagram of pebble tools - class 2, type a and b

Dimensions: See Table 26, Appendix

Distribution: DhPt 4 (3), DhPt 10B (19)

3. Pebble tools - class 2, type c

Figure: 7 g, **Appendix** 2

Number of specimens: 5

Description: Although these specimens are not visibly modified and thus do not technically belong in an artifact classification, they have been included as they represent possible blanks for one of the above types. They are of a similar size and shape as notched and/or retouched pebbles and were found in a group, in association with a number of the pebble tools. The material is the same as that used in the production of the modified pebbles.

Material: Group 11 (5)

Dimensions: See Table 27, Appendix

Distribution: DhPt 10B

These tools are usually inferred to be net-weights. Borden (1956) suggests that they may have been used as fish line weights, as the Kutenai, who were the ethnographic occupants of the study area, were not known to use nets for fishing (Turney-High 1941). The Kutenai did, however, use nets to catch birds, which could mean that these tools were used as weights for the nets. The close proximity of the Kootenay River to sites possessing "netsinkers" suggests fishing, however the vicinity of DhPt 10B, which contained the greatest number of these tools, is also a desirable location for duck and goose hunting, according to present occupants of the area.

Side-notched "netweights" or "line sinkers", such as are present in the study area, are the most common type of sinker in the Upper Columbia region, while end-notched are more frequent in the Lower Columbia (Gunkel 1961). Gunkel (1961) suggest that these tools are fairly recent in the central Columbia Plateau area, although they are reported to be as early as 4500 to 1550 B.C. in other parts of the Columbia Plateau (Browman and Munsel 1969). "Net sinkers" of a similar type have also been noted in the Interior Plateau (Rostlund 1952) and in the Great Basin "net sinkers" have been found to exhibit greater variety in the number of notches and tool forms (Tuohy 1968). Turnbull (1973) notes that "net sinkers" are not common in the Arrow Lakes region and are better represented in the Kootenay Valley. "Net sinkers" are not evident in the Plains literature cited. Milne-Brumley (1971) illustrates end and side notched specimens, the latter being identical to those in the study area, from the Waterton area.

At DhPt 10B these tools are associated with the later occupation. They are the only tools which are horizontally limited within the site. With one exception, they are found in excavation units within 8 m of the river edge in the northern half of the site.

CORTEX SPALL TOOLS

The tools in this class are large cobble spalls with cortex remaining on their dorsal surface. They are produced from a variety of lithic types and are marginally retouched or utilized. They can be divided into sub-types on the basis of utilization or retouch.

1. Cortex spall tools, type a

Number of specimens: 9

Description: These show evidence of use in the form of striations or irregular chip removal on 1 or 2 edges. The spalls are generally end-struck. Outlines are determined by the shape of the spall. Cross-sections are plano-convex.

Material: Group 7 (1), Group 11 (4), Group 13 (1), Group 15 (2e), Group 16 (1)

Dimensions: See Table 28, Appendix

Distribution: DhPt 10B

2. Cortex spall tools, type b

Figure: 10 a-c, **Appendix** 2

Number of specimens: 15

Description: These specimens have marginal unifacial retouch on 1 or 2 edges. The spalls are generally end-struck and are plano-convex in cross-section. Retouch is usually dorsal.

Material: Group 3 (1), Group 7 (2), Group 11 (3), Group 13 (7), Group 14 (1e), Group 18 (1)

Dimensions: See Table 29, Appendix

Distribution: DhPt 10B

3. Cortex spall tools, type c

Figure: 9 b, 10 d, **Appendix** 2

Number of specimens: 10

Description: These have marginal bifacial retouch on 1 or more edges. The spalls are predominantly end-struck. Outlines vary and cross-sections are plano-convex.

Material: Group 7 (3), Group 11 (2), Group 13 (2), Group 14 (1b, 1e), Group 19 (1)

Dimensions: See Table 30, Appendix

Distribution: DhPt 1 (1), DhPt 4 (1), DhPt 10B (8)

Comment: Coulson (1971) proposed the use of cortex flakes as fleshers in hide preparation, or as fish-knives, but no definite function was determined. Hamm (1975) notes a generalized use for hide preparation and for chopping in the Interior Plateau.

FLAKES

Whole and fragmentary flakes with an unformed outline are discussed in this class. Subdivisions are made on the basis of whether or not they are utilized or retouched and on the type of retouch. Magnification **of 15X was employed to discern utilization.**

1. <u>Flakes, type a</u>

Number of specimens: 270

Description: This includes whole and fragmentary flakes with use-striations or irregular chip removal on 1 or more edge and 1 face.

Material: non-local lithics are predominant

Distribution: DhPt 1 (7), DhPt 4 (23) DhPt 10B (240)

2. <u>Flakes, type b</u>

Number of specimens: 303

Description: These flakes exhibit unifacial retouch. Most specimens are worked on only 1 edge, but bilateral retouch is represented. A few exhibit retouch on 3 edges and alternate retouch occurs in a few cases.

Material: non-local lithics are predominant

Distribution: DhPt 1 (12), DhPt 4 (25), DhPt 10B (266)

3. <u>Flakes, type c</u>

Number of specimens: 38

Description: These flakes have marginal bifacial retouch. Most are worked on one edge, although some specimens are bilaterally retouched.

Material: non-local material is predominant

Distribution: DhPt 1 (1), DhPt 4 (2), DhPt 10B (35)

4. Flakes, type d

Number of specimens: 12,819

Description: These show no evidence of utilization or retouch. Primary flakes were represented by 194 specimens, secondary by 566, shatter by 473 and tertiary by 11,586.

Material: local materials are predominant

Distribution: DhPt 1 (570), DhPt 4 (1332), DhPt 10B (10,917)

GROUND, PECKED AND INCISED STONE

This category is composed of stone tools worked by grinding, pecking or incising. Very few artifacts fall within this category in comparison to flaked specimens.

PECKED STONE

1. Pecked stone tools, type a

Figure: 11 a,b, **Appendix** 2

Number of specimens: 9

Description: This class is composed of basically unmodified pebbles showing some evidence of use as hammerstones or battering implements. The battering has caused pecking on 1 end, or an end and part of a lateral edge.

Material: Group 11 (1), Group 14 (4c, 3e), Group 16 (1), Group 19 (3)

Dimensions: See Table 31, Appendix

Distribution: DhPt 1 (1), DhPt 10B (8)

2. <u>Pecked stone tool, type b</u>

Figure: 12 a, **Appendix** 2

Number of specimens: 1

Description: This specimen is an elongate pebble bilaterally constricted by pecking on opposed lateral edges. The rest of the pebble is unmodified.

Material: Group 14 (d)

Dimensions: length: 12.88 cm

width: 7.50 cm

thickness: 3.95 cm

weight: 650.00 gr

Distribution: DhPt 10B

Comment: This tool may have been intended to function as some sort of weight, or as a hafted hammerstone or club. It has no evidence of battering, however.

PECKED AND GROUND STONE

Figure: 12 b, **Appendix** 2

Number of specimens: 1

Description: This pebble is conical in shape and is smoothly pecked and ground, with evidence of battering on both ends.

Material: Group 14 (d)

Dimensions: length: 15.77 cm

diameter (base) 7.49 cm

diameter (tip) 2.15 cm

Distribution: DhPt 10B

Comment: This specimen might be functionally referred to as a "pestle", ethnographically used in western Montana to grind and pound berries (Malouf 1962a). It is similar to what Malouf (1962a) calls an "early" style in Montana. He suggests a Late Prehistoric date for their introduction into the area and indicates that they originated to the west. The study specimen is associated with the late component.

GROUND STONE

1. Ground stone, type a

Figure: 13 a, **Appendix 2**

Number of specimens: 1

Description: This is a fragment of a ground stone pipe bowl. It is too small to determine the original size, shape or style. Striations are evident on the inner area of the fragment.

Material: Group 20

Distribution: DhPt 10B

2. Ground stone, type b

Figure: 13 c, **Appendix 2**

Number of specimens: 1

Description: Functionally referred to as an adze, this tool is characterized by extensive grinding. All surfaces are ground smooth and one end of the long axis is bevelled and the other rounded. Use striations are evident on the bevelled end.

Material:	Group 15	
Dimensions:	length:	5.62 cm
	width:	4.24 cm
	thickness:	1.79 cm
Distribution:	DhPt 10B	

Comment: Adze-blades are suggestive of Plateau rather than Plains influences. In the Interior Plateau these tools are present in the Upper Middle and Late Periods (Sanger 1970). Malouf (1962b) notes their diffusion from the Columbia Plateau into western Montana as recent.

INCISED STONE

Figure: 13 b, Appendix 2

Number of specimens: 1

Description: A fragment of fire broken rock shows evidence of incising. It carries 6 parallel incised lines continous over one surface, 1.82 cm in length and 0.05 cm in width. It appears that the lines were originally longer, but have been interrupted by the fracturing of the rock.

Material: Group 16

Distribution: DhPt 4

Comment: Greer and Treat (1975) describe pebbles with similar parallel lines of incision in Texas. No other comparable forms were found in the literature consulted. This artifact does not appear to be functional.

DISCUSSION

The preceding artifact classification provides the data used in attaining 2 goals of this analysis; 1) the reconstruction of a tentative culture history for the excavated portions of the 3 sites, and 2) investigation of lithic preferences in tool manufacture. The latter is discussed with the lithic analysis in Chapter 4.

Previous ethnographic and archaeological research in the Kutenai area revealed that both Plains and Plateau characteristics are evident. The origin and cultural associations of the Kutenai have been investigated by numerous authors (Curtis 1911; Tro 1968; Turney-High 1941; Walker 1971) often resulting in contradictory conclusions. Archaeological investigations (Borden 1956; Choquette 1971, 1972a, 1972b, 1973a, 1973b, 1974; Whitlam 1974, 1976) in the study area and to the south in Montana (Taylor 1969) have revealed both Plains and Plateau traits, but cannot substantiate whether one area dominates. With the possible exception of Taylor's (1969) interpretative conclusions based on his research in the Libby Pondage in Montana, the archaeological analysis in this general area has been restricted to survey, preliminary research, and/or statistical tests of intra-site artifact distribution (Choquette 1971, 1972a, 1972b, 1973a, 1973b, 1974; Whitlam 1974, 1976). The following section of this thesis is an attempt to deal with the problems of temporal and spatial associations.

Both Plains and Plateau characteristics have been noted in the artifact classification. Cross-cultural comparison is the only dating mechanism available at this time, and the Plains point-typology offers the best dated source of comparison. The presence of an archaeological trait does not automatically infer cultural ties, but presents the possibility of such a link. Based on this premise the tool inventory is studied as a group of formal attributes and compared spatially and temporally to surrounding areas.

One unnotched biface (type 1c) from DhPt 10B is the only specimen comparable to earlier Plains styles (Paleo-Indian, 9000 to 5500 B.C.) (Irwin-Williams et al 1973). Unfortunately this Lusk-like fragment is associated with clearly late points in the reservoir and is therefore, assumed to be intrusive. The Middle Prehistoric Period (3000 B.C. to A.D. 500) on the Plains is characterized by Oxbow, McKean, Duncan, Hanna, and Pelican Lake point styles, and a few formed bifaces from the study area are similar to these points. Two basally-notched lanceolate bifaces (type 2) and 2 corner notched forms (type 3biii) are comparable to the McKean lanceolate (Mulloy 1954) and the Hanna corner notched varieties (Wheeler 1954). One McKean-like and Hanna-like biface occur in the lower levels of DhPt 10B and the other McKean-like and Hanna-like specimens are from DhPt 4 and DhPt 1 respectively.

A number of corner notched and stemmed specimens from the study area show similarities to other Plains Middle Prehistoric styles, such as Pelican Lake, but comparable forms are also found in the Plateau during this time. This suggests that these variable corner notched and stemmed specimens from the study area are not spatially diagnostic of one area, but are widespread traits. Their use as a

Middle Prehistoric indicator is also questionable in the study area as they are often found with small side notched points typical of the latest period. These corner notched and stemmed forms also continue into the late period on the Plateau (Sanger 1970; Leonhardy and Rice 1970; Warren 1968; Gunkel 1961) to varying degrees.

The Late Prehistoric Period on the Plains is characterized by a sequence of small side notched point styles: Avonlea (A.D. 1 to 700), Prairie Side Notched (A.D. 700 to 1300), and Plains Side Notched (A.D. 1300 to 1800)(Kehoe 1966; Davis 1966). Specimens similar to each of these types and others comparable to late Plains Triangular points are evident in the study area: Avonlea-like (type 5b-10 specimens), Prairie-like (type 5c-6 specimens), Plains-like (type 5d-44 specimens), and unnotched triangular (type 1d-19 specimens). Forms comparable to the Prairie and Plains Side Notched styles are also found in both the Fraser and Columbia Plateau from A.D. 1 to 1800 (Butler 1962; Collier et al 1942; Copp, pers. comm. 1976; Sanger 1970; Wilson, pers. comm. 1975). A variety of small thick side notched points with wide notches (type 5a) from the study area are also present in both the Plains and Plateau during the later period. Thus, these bifaces appear to be temporally distinct, but not spatially.

There are a number of other artifacts from the study area suggestive of temporal or spatial affinities. Although represented by only 1 specimen each, the pecked and ground stone pestle and the ground stone adze, suggest Plateau affinities. Believed to have originated in the west and spread into western Montana (south of the study area) during the late prehistoric (Malouf 1962a, 1962b) the pestle and adze blade are associated with the late occupation of DhPt 10B.

The slab tools (types a,b,c) are noted by Gunkel (1961:188) to increase in number as one moves south from British Columbia while cobble spalls decrease. No reference to slab tools was noted in the literature cited for the Plains or Fraser Plateau. Slab tools are generally late in the study area, while spall tools appear to be less temporally distinct.

The pebble "netweights" are also suggestive of Plateau affinities. Noted as being early in parts of the Columbia Plateau (Browman and Munsell 1969), they appear to be later in the Upper Columbia where notching on the long axis is dominant (Gunkel 1961). They are generally associated with the late period in the Kootenay Valley.

Leaf-shaped and lanceolate points common to the early periods of the Plateaux and Plains are virtually absent from the study sample. Large side notched forms, such as Bitteroot, that generally predate 3000 B.C. are also absent. The earliest primary components in the study area have traits suggestive of a post 3000 B.C. date, either in the Plains or Plateau. Until absolute dates are obtained it will be assumed that the point styles under discussion represent traits shared with adjacent areas during similar time periods. This suggests that the earliest main occupation of these sites occured between 3000 and 1500 B.C. As the McKean and Hanna types are best known from the Plains, it tentatively suggests relatively early Plains influences in the study area.

The late period in the study sample ended at contact, evidence by the presence of glass trade beads at DhPt 4 and 10B. The earliest temporally diagnostic point style of the late period in the study area is the Avonlea-like biface (type 5b) (A.D. 1 to 700) (Kehoe 1966). The late occupation yielded the greatest number and variety of artifacts and temporally diagnostic styles.

The cross-areal comparison of these artifacts revealed that many generalized point styles are present in both the plains and the Plateau at approximately similar time periods. The majority of the formed bifaces would fit into assemblages from the Plains or Plateau, suggesting rather widespread similarities between these areas. Such similarities require further investigation to reveal the degree to which these characteristics are related. However, the overall picture suggests that the Libby Reservoir late period is more typical of the Plateau than the Plains. This is evidenced by a variety of Plateau-linked tools (netweights, slab tools, pestle, adze) and by the variety of biface styles that are found in the late occupation. It is common for late period occupations in the Plateau to contain a variety of corner notched and stemmed styles in association with small side notched forms (Collier et all 1942: Gunkel 1961; Sanger 1970; Turnball 1973; Warren 1968). Certain lithic artifacts generally associated with earlier Plateau cultures are absent from the study area, including microblades, leaf-shaped points, certain other point styles, grinding tools and abrading tools. Instead the earlier period in the study area suggests a greater Plains orientation in biface forms, although it is represented by only a small sample.

On the basis of cross-areal comparisons 2 successive periods have been tentatively delineated for the study area. The early period contains biface forms similar to those dated between 3000 B.C. and 1500 B.C. on the Plains. At DhPt 10B tools from the early period are stratigraphically separable from the succeeding occupation. The late period is characterized by a variety of point styles that may be as early as 1500 B.C., but based on their association with later side notched styles are inferred to belong to a later time period. A beginning date for the late component is not known, although side notched styles date from A.D. 1 in adjacent areas. Two characteristics of the late period are notable; 1) A similarity of bifaces and other tool classes with materials from both Plateau and Plains comparative areas, but 2) a predominance of Plateau influences. In other words, most tool classes evident in the late period are present in both the Plateau and Plains; those tools that are not, are suggestive of Plateau affinities. A discussion of the components representing these periods will follow an investigation of the activities indicated by the artifact assemblage.

Numerous activities are suggested by the artifact assemblage from the 3 sites under analysis. However, the fact that some specimens representative of certain activities may be "curated" must be considered. Curated tools are ones that may have been used over extended periods of time and thus transported from location to location and do not necessarily represent use at the site of their discovery. The identification of of curated specimens and their effect on an archaeological assemblage such as the one represented in the study area are unknown factors. The presence of tools that may not have had a functional use at their site of discovery is difficult to discern until more is known of the culture-history and subsistence pattern of the area. Until these factors are determined it is proposed that tools that are produced from non-local materials or are representative of more manufacturing time are more likely to have been "curated". It is acknowledged, however, that this is not always the case.

Activities suggested by the excavated tools and ethnographic analogies represent a full range of pursuits: hunting, gathering, fishing (or duck hunting?), hide preparation, wood working, food preparation, tool manufacturing, and ceremonial and/or leisure activities. Not all are indicated at each of the sites under analysis, however, as evidenced by the artifact distribution (Table 1).

DhPt 10B

Components of both the early and late periods are represented at DhPt 10B and are stratigraphically separable. The early component is represented by a McKean-like biface and a Hanna-like biface in the lower levels, associated with non-diagnostic flakes. It is assumed that these artifacts represent only a temporary camp. Although represented by a small sample this period is vertically and formally distinct.

The late component yielded a wide assortment of artifact types (Table 2). The pecked and ground stone pestle, the ground stone adze and the pipe fragment from this component are suggestive of vegetal food processing, wood working, and ceremonial and/or leisure activities respectively. These could represent curated items and may not be indictative of on-site use on their own merit, with the possible exception of the pipe which is a fragment and likely to have been discarded soon

Table 1 Distribution of artifacts by site

	DhPt 1	DhPt 4	DhPt 10B	Total
Formed bifaces - class 1				
Unnotched, type ai			5	5
type aii			6	6
type bi		1	5	6
type bii			19	19
type c			1	1
fragments	6	19	117	142
Basally notched		1	1	2
Corner notched, type a			9	9
type bi	1	2	2	5
type bii			8	8
type biii	1	1	2	4
type c		3	3	6
Stemmed		1	10	11
Side notched, type a			14	14
type b			10	10
type c			6	6
type d		6	38	44
Small biface fragments	1	4	48	53
	9	38	304	351
Formed bifaces - class 2				
Biface preforms	1		38	39
Perforators/drills, type a		1	4	5
type b			4	4
	1	1	46	48
Formed unifaces				
type ai		1	4	5
type aii	1	2	23	26
fragments			15	15
type b	1		5	6
type c			17	17
	2	3	64	69

Table 1 Distribution of artifacts by site (Continued)

	DhPt 1	DhPt 4	DhPt 10B	Total
Cores				
type a	2		12	14
type b		1	15	16
	2	1	27	30
Slab tools				
type a			4	4
type b		3	18	21
fragments		2	25	27
		5	47	52
Pebble tools - class 1				
type a			11	11
type b	1	1	10	12
	1	1	21	23
Pebble tools - class 2				
type a			10	10
type b		3	19	22
type c			5	5
		3	34	37
Cortex spall tools				
type a			9	9
type b			15	15
type c	1	1	8	10
	1	1	32	34
Flakes				
type a	7	23	240	270
type b	11	25	268	304
type c	1	2	35	38
type d	570	1332	10,917	12,819
	589	1382	11,460	13,431
Pecked stone				
type a	1		8	9
type b			1	1
	1		9	10
Pecked and ground stone			1	1

Table 1 Distribution of artifacts by site (Continued)

	DhPt 1	DhPt 4	DhPt 10B	Total
Ground stone				
type a			1	1
type b			1	1
			2	2
Incised stone		1		1
Total	606	1436	12047	14089

Table 2 Distribution of artifacts in the early and late period

	early period	late period
Formed bifaces - class 1		
Unnotched, type ai		x
type aii		x
type bi		x
type bii		x
type c		x
fragments	x	x
Basally notched	x	
Corner notched, type a		x
type bi	x	x
type bii		x
type biii	x	x
type c		x
Stemmed		x
Side notched, type a		x
type b		x
type c		x
type d		x
Small biface fragments	x	x
Formed bifaces - class 2		
Biface preforms	x	x
Perforators/drills, type a		x
type b		x
Formed unifaces		
type ai		x
type aii	x	x
fragments		x
type b	x	x
type c		x
Cores		
type a	x	x
type b		x

Table 2 Distribution of artifacts in the early and late period (Continued)

	early period	late period
Slab tools		
type a		x
type b		x
fragments		x
Pebble tools—class 1		
type a		x
type b	x	x
Pebble tools—class 2		
type a		x
type b		x
type c		x
Cortex spall tools		
type a		x
type b		x
type c	x	x
Flakes		
type a	x	x
type b	x	x
type c	x	x
type d	x	x
Pecked stone		
type a	x	x
type b		
Pecked and ground stone		x
Ground stone		x
Incised stone		?

after it was damaged. Vegetal food processing, and thus indirectly plant gathering, is supported by the possible roasting pits (Turney-High 1937).

The importance of hunting to the occupants of this site is evidenced by the presence of numerous bifaces (complete and fragmentary including tip and basal portions), most of which probably served as projectile points. Hayden (1975:52) has suggested that basal fragments of hafted points are often carried back to the camp and discarded, while tip fragments are usually left where they broke. The presence of tip fragments at DhPt 10B could be indicative of 3 things; 1) the fragments were embedded in game brought back to the camp, 2) hunting or projectile throwing was carried out at the site, or 3) the bifaces were broken during manufacture at the site. Faunal remains, although not analyzed here, also provide evidence of hunting activities and butchering.

The processing of meat and hides is suggested by a number of tool types; pebble tools (class 1), spalls, slab tools, modified and utilized flakes, formed unifaces, perforators/drills, and possible knife forms. Although some of these tools were undoubtedly used for a variety of purposes they probably had some role in food and hide preparation.

It has yet to be determined if the "netweights" are indicative of fishing or some other activity such as duck hunting. However, as the ethnographic occupants were fishermen and "netweights" were used in ethnographic times in the Plateau (Collier et al 1942; Gunkel 1961; Rostlund 1952) it is suggested that fishing is a likely activity at this site.

Undoubtedly the best represented activity is chipped stone tool manufacture. Thousands of flakes, 8 probable stone hammers, 27 cores and numerous preforms and preform fragments supply abundant evidence of this activity at DhPt 10B.

The late occupation of DhPt 10B suggests intensive use of the site. The wide variety and quantity of artifact types, and the probably varied subsistence base, suggests that this site served as more than a temporary camp and may have been occupied repeatedly on at least a seasonal basis. If the site does indeed represent a fishing station the season of occupation could be spring/summer based on ethnographic evidence (Turney-High 1941) and known fish runs (Rostlund 1952). However, it is possible that the site may also have served as winter camp, since it is in a sheltered location on the valley floor. Superimposed living floors suggest repeated occupation.

DhPt 4

DhPt 4 contains tools of both the early and late periods, but with the exception of 1 McKean-like point it is impossible to definitely separate an early component. The late period is represented by small side-notched points, but placement of other artifact types (with the possible exception of slabs and "netweights" which appear to be late traits) is not possible due to the lack of stratigraphic control and the widely scattered distribution of the lithic material. Each of the major classes, except pecked and ground stone tools are represented at DhPt 4, but not all artifact types within the classes are present (Table 1).

Activities carried out at or from this site, include hunting, fishing?, hide or food preparation, and tool manufacture. A chipping station is evident with a profusion of assorted lithic detritus and a number of whole and fragmented artifacts. This is associated with a corner notched point and as no late period material, such as slabs, netweights, or side notched points are associated, the flaking station may belong to the early component. Corner notched and side notched points are found throughout the site suggesting repeated occupation of the whole site area. The ridge affords a good view of the valley and may also have served as a lookout station.

Occupation of this site appears to have been temporary, as shown by the scarcity of cultural remains. Turney-High (1941) notes that the Kutenai would gather to fish and hunt bison and then divide into smaller groups to hunt and gather, or for winter. This might account for the differences in the intensity of site use at DhPt 10B and DhPt 4 and indicate different seasonal use.

DhPt 1

Only the early component is represented at DhPt 1. All lithic artifacts were found within the same silty-sand matrix and are believed to be in the same occupational period. Tools generally associated with the late period such as, side notched points, small triangular or ovate unnotched bifaces, slabs, "netweights", etc. are absent from this site. One Hanna-like point is indicative of the early component and the other artifacts are non-diagnostic (Table 1 and 2).

Possible activities include hunting and food or hide preparation, but are only supported by 9 biface specimens (6 of which are too small to classify), 1 spall tool, and 1 small pebble tool (class 1). Tool manufacture is indicated by a hammerstone, 2 cores, and 570 unworked flakes, and a chipping station is evident in one unit where a profusion of detritus was found. This site may also have served as a lookout station and scattered fire broken rock supports its use as a camp. The occupation is assumed to be temporary on the basis of the scarcity of remains.

Through artifact classification and cross-areal comparison the possible ages and functions of the sites have been postulated. DhPt 4 and DhPt 10B appear to have been occupied during similar time periods, while DhPt 1 was probably only utilized in the early period. The number of activities undertaken at these sites varies, with DhPt 10B, inferred to be a seasonal base camp, exhibiting the greatest variety of tools. Suggested activities at DhPt 4 are similar, but are not as well represented by artifacts as at DhPt 10B. The evidence for any activities other than tool manufacture and hunting at DhPt 1 is weak.

Early research in the study area suggested the differential use of the high (DhPt 1 and 4) and low terraces (DhPt 10B)(Choquette, pers. comm. 1973). The present analysis indicates that the differences are in fact, functions of the length and age of occupation. The only other low terrace site previously analyzed, DhPt 9, also appears to be a seasonal base camp, rather than a temporary one (Choquette 1973b). The age of DhPt 9 seems to correspond with that of DhPt 10B, suggesting late period occupation was more intense on the low terraces. Further research should be directed towards searching for base camps of the early period.

To summarize, the early period in the study area is suggestive of Plains influences around 3000 to 1500 B.C., while the late component consisted of both Plains and Plateau traits with more emphasis on the latter. On the basis of the comparisons within this thesis it would appear that much of the cultural remains of the Plains and Plateau exhibit a great deal of similarity.

The artifact analysis suggests that Plains influences were felt at a relatively early date in the East Kootenays, possibly supporting the theory of a Plains origin for the occupants of the Kootenay Valley. The subsistence base represented at the sites, the tool types, and the late date of the final occupation would suggest that the late components may represent a Kutenai occupation. Although some tool forms from the early period are also present later, they are too few to suggest that both early and late occupations were by related groups.

As least is known about the early period, future research should be directed towards its investigation. Artifact types, spatial affiliations, and the dating of this period should be explored. Whether certain artifact types discussed in this analysis as possible late traits, ie. slabs, "netweights", pestles, and adzes, are indeed late characteristics should be tested. Faunal analysis will hopefully provide support for the theory of fishing and reveal the range of fauna utilized. The presence of bison remains may indicate the ethnographic Kutenai pattern of crossing the Rockies to hunt bison, although it is possible that prehistorically there was an indigenous Kootenay bison population. Finally, the author feels that comparative work within the Kootenay Valley, but outside of the study area, should be undertaken to determine the extent of the similarities and differences of the occupation of this region, in an effort to better define the archaeological characteristics of the Kutenai.

CHAPTER 4 LITHIC ANALYSIS

INTRODUCTION

This chapter is concerned with the identification and distribution of the lithic materials from DhPt 1, 4, and 10B. Lithic materials are one of the natural resources utilized by the prehistoric occupants of the Kootenay Valley. They are generally the best represented element of the cultural debris of a site and may serve as a possible indicator of subsistence patterns and territorial boundaries.

Changes in frequency and distribution of lithics within and between the sites under analysis have been presented. The results show that the 3 sites possessed 2 major lithic groups in common and that less well represented groups varied in frequency. One goal was to determine if these differences were a function of changes in site use, temporal occupations or length of site use. The abundance of lithic specimens at each site also varied and is used as a measure of the intensity of site use. When comparing numbers of lithic items per m^3, DhPt 1 yielded the smallest quantity; followed by DhPt 4 and DhPt 10B, respectively. The possibility that differences in intensity are either a result of different occupational ages, or different site-functions is discussed.

Higher yields of lithic materials revealed that certain portions of DhPt 1 and DhPt 4 were occupied more intensively than others, and tool-manufacturing areas were discerned. Vertical stratigraphy at DhPt 10B allowed the diachronic study of lithic preferences. This revealed an increase in utilization of a non-local material through time.

The sources of these lithic materials are discussed in this section. Although not all sources have been precisely located, approximate locations can be assumed, enabling an estimation of the lithic exploitation territory of the prehistoric occupants of these sites.

Reeves (1972a) researched lithic material at Waterton National Park, southwestern Alberta, and the Crowsnest area where he was able to define the range of available lithic types and some changes in lithic frequencies through time. A number of localized types, such as Avon chert, Kootenay argillite, Yellowstone obsidian, and others, are also found in the Libby Reservoir, indicating some shared characteristics between these areas. Choquette (1973b), in his analysis of DhPt 9 in the pondage (Fig. 2) also noted the presence of these lithic types, as well as some limited changes in preference through time. His original hypothesis of a decrease in local Elk River mudstone and a corresponding increase in non-local Top of the World chert through time was tested and supported in this thesis.

It thus appears that lithics may aid in assigning relative dates, within certain areas. The scarcity of deeply stratified sites containing temporally diagnostic tools and lack of absolute dates in the study area led to the hypothesis that lithics might provide a tentative chronological framework. However, other factors, such as site use and source locations, can also effect the frequency of lithics.

Terms already adopted by Choquette and Reeves were included in this analysis. Their work has been used as an aid in both the description of some lithic groups and in indicating probable source locations.

PROCEDURE

Each flake was identified as to lithic type and grouped with similar materials. Several tests were employed to determine the physical characteristics of the flakes. Hardness was determined with the aid of the MOH hardness scale, outlined below (Leet and Judson 1971) (Table 3).

Table 3. Test for hardness

H 3	will leave mark on paper; can be scratched by fingernail
2½ H 3	cannot be scratched by fingernail; can be scratched by penny
3 H 5½	cannot be scratched by a penny; can be scratched by a knife
5½ H 7	cannot be scratched by a knife; can be scratched by quartz
7 H	cannot be scratched by quartz

Lustre, the appearance of the surface of the material, was classed as dull/flat or vitreous/glassy. Color was determined by a Munsell Color Chart, and cleavage, fracture and texture were visually ascertained. Composition was based on crystal form, mineral color, and fuseability. Hydrochloric acid was used to test for calcium carbonate. The lithic groups were compiled with the aid of hand samples and the following references: Kemp (1940), Claque (1973), Pough (1953), Walker (1970) and Loy (n.d.). This, and information on known and probable source locations resulted in the formation of 20 lithic groups within the collected sample. Distances to known source locations are presented in aerial or map miles. To determine the distance on foot the topography and possible routes must be considered. Although specific trade and/or travel routes have not been definitely ascertained, the quarries are at different altitudes, have different degrees of acessibility, and are often accessible by more than one trail. Non-local sources are defined as greater than 60 km from the sites by foot which takes into account the topography and possible routes, while local sources are more readily available within the immediate vicinity of the study area (Table 4).

Discussion of the distribution of lithic groups within and between the 3 sites will follow a description of the raw material types themselves. In this analysis the frequency of occurence of local groups (LG) and non-local groups (NLG) is compared. The 4 groups best represented at each site are referred to as "major lithic groups" and are discussed individually. Choosing 4 groups that contain the largest number of specimens was an arbitrary decision supported by the fact that these groups represent betwee 87 and 93% of the total sample at these sites. These major groups vary in frequency from site to site. The less well represented specimens ("minor") are combined in local and non-local divisions.

Table 4 Local and Non-local lithic groups

local	non-local
Group 2	Group 1
Group 3	Group 4
Group 7	Group 5
Group 11	Group 6
Group 13	Group 8
Group 14	Group 9
Group 16	Group 10
Group 17	Group 12
Group 18	Group 15
Group 19	Group 20

LITHIC GROUPS

Group 1

Group 1 has been **named** by Choquette (n.d.) as"Top of the World Chert". Top of the World is an alpine plateau located in the Van Nostrand Range of the Rocky Mountains at approximately 2134 meters a.s.l. (Choquette, n.d.) and is roughly 100 km from the study area (Fig. 12). Two quarries and numerous workshop sites with Group 1 lithics lie on the plateau. The material occurs as horizontal lenses of chert embedded in limestone. It is not an easily accessible area, particularly in winter, but may have been used as a seasonal hunting and quarry site, as well as a pass, for at least the last 8000 years (Choquette pers. Comm. 1976).

The Group 1 chert is a compact, transluscent, vitreous, extremely fine grained chalcedonic silica with scattered quartz crystals and microfossils evident under magnification (Choquette n.d.). Colors in the sample range from white through grey to black with some mottling and banding (Munsell 7.5YR 2/0 to 8/0). It flakes easily and has a harness of 7.

Group 2

Group 2 is composed of opaque, flat-lustred, silicified silt or mudstone. This hard, fine grained siliceous rock ranges in color from beige to brown, with some green and grey shades (Munsell 7.5YR 3/2, 4/2, 5/2, 5/4 and 5YR 3/2). Hardness is $5\frac{1}{2}$ to 7. It is locally available and

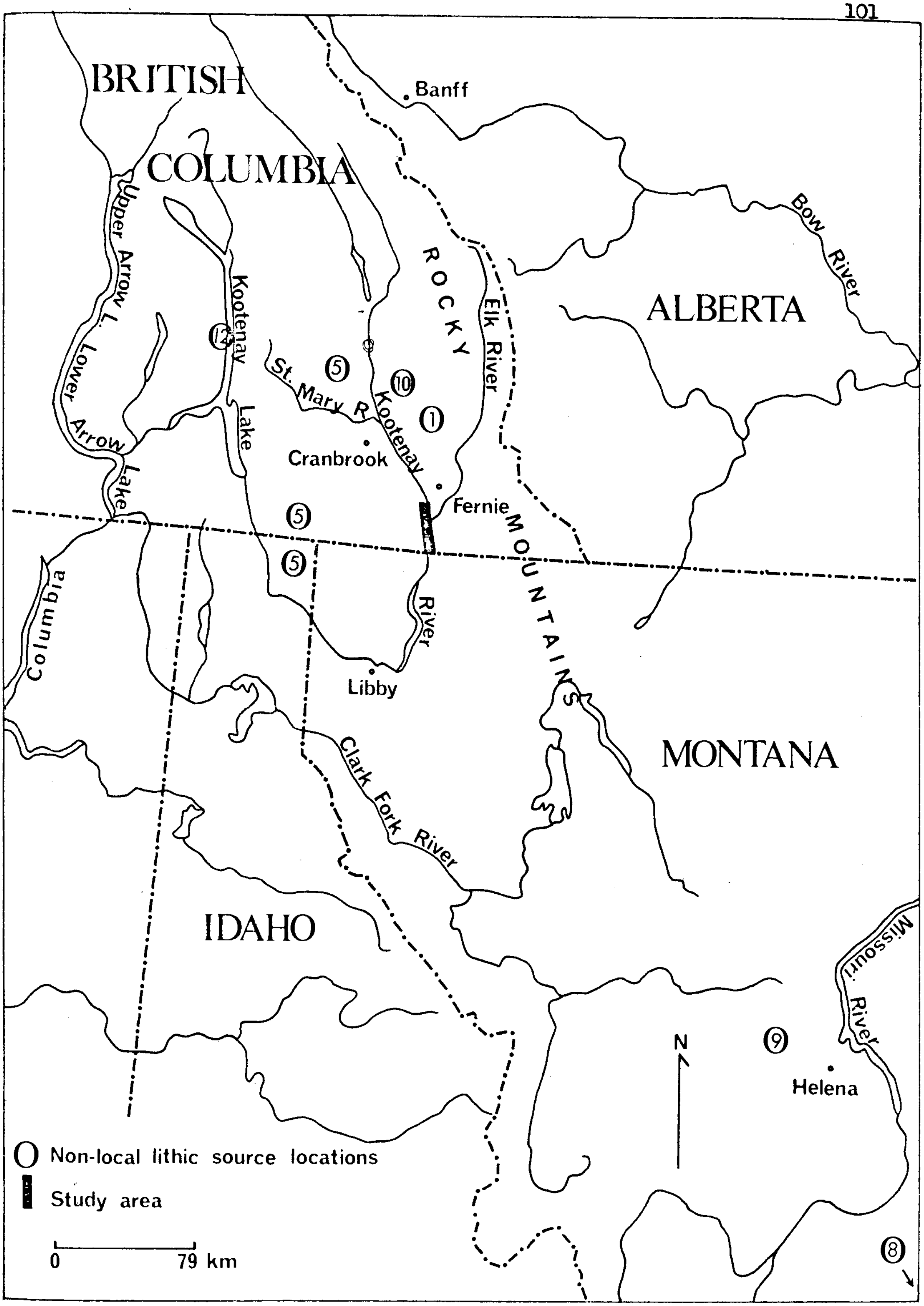


Figure 12 Known source locations for the non-local lithics

readily accessible in the form of river pebbles during most of the year.

Group 3

Group 3 is a compact, fine grained siliceous mudstone. It is opaque, flat lustred, and ranges from dark grey to black in color (Munsell 7.5 YR 2/0 to 4/0). Hardness is 5½ to 7. It is similar to Group 2, except for color and the fact that it is from a specific source at the mouth of the Elk River (**Fig.2**). It is available in pebble form and is accessible most of the year.

Group 4

Group 4 is composed of dense, brittle silicate rocks ranging from very fine-grained to fine-grained in texture. Harness is 5½ to 7. All specimens are opaque and some are flat in lustre, but most individuals are somewhat vitreous. The color ranges from grey-white to black (Munsell 7.5YR 3/0 to 5/0). Not known to be local to the study area, this group may prove to be another type of Purcell Siliceous siltstone (Group 5).

Group 5

Group 5 has been termed "Purcell Siliceous Siltstone" by Choquette (n.d.). This is a clastic rock cemented by silica. Hardness is between 5½ and 7. Individual grains are usually visible and the material is sub-vitreous to vitreous and opaque, although transluscence is sometimes evident on thin edges. The color ranges from black to olive-green to green-brown (Munsell 5Y 4/3, 4.5/3, 2.5Y 4/2, 7.5YR 2/0). Choquette (n.d.) notes 3 quarry sources in the mountains approximately 70 km to the west and to the north of the study area (Fig. 12). **Only 2 of these quarries are likely to have been accessible in the winter.**

Group 6

Group 6 consists of a number of transluscent cryptocrystalline silicates that are similar in their physical characteristics, except for variable color. Included are pink to red jasper, golden agate, and multicolored chalcedonies (Munsell 10YR 3/4, 3/3, 3/6, 5/5 and 7.5YR 4/6, 4/4, 5/6). These specimens are vitreous in appearance, flake easily, and are compact. Hardness is 7. Specimens referred to as 6a resemble Knife River Flint (Choquette n.d.) from North Dakota. The remaining lithic sources are not known, but are fairly available judging by the frequency of their occurence. Reeves (1972a) describes similar materials as being available in Central Montana. As immediate sources are not known in the vicinity of the study area this group is referred to as non-local.

Group 7

Group 7 consists of locally available quartzite. Quartzite is a metamorphic rock formed when heat and/or pressure work on sandstone to cement and recrystallize the structure. A fracture in quartzite will pass through the grains as well as through the cementing matrix. These specimens are sub-vitreous and slightly transluscent. Hardness is 7. They range from fine to medium grained in texture and grey to organge in color in the sample (Munsell 10YR 4/1, 7.5YR 5/4, 10 R 6/4, 5YR 8/2, 7/1). Quartzite is readily accessible locally.

Group 8

Group 8 is obsidian, a black transluscent volcanic glass. X-ray flouresence trace-element analysis undertaken by Erle Nelson (pers. comm. 1975) of Simon Fraser University reveals that one source is located in Yellowstone National Park and that another unknown source is also represented in the research sample.

Group 9

Group 9 is composed of a light brown siliceous sedimentary rock containing occasional gastropods and other inclusions (Reeves 1972a). This fine grained chert is found at the Avon quarry, northwest of Helena, Montana **(Fig.12).** This material often bears a distinctive chalky white cortex or weathered surface (Munsell mottled 10YR 8/2, 8/3, 6/4, 6/6). The hardness is 7.

Group 10

Group 10 is quartz-crystal. This easily identifiable transluscent to transparent glassy mineral shows conspicuous conchoidal fracture. Quartz registers 7 on the hardness scale and is brittle. It occurs as clear and cloudy white in this area. A quartz quarry was discovered in the Rocky Mountain Trench to the north of the study area (**Fig. 12**) (Choquette pers. comm. 1976), but also occurs in a number of other areas. This quarry is accessible throughout most of the year.

Group 11

Group 11 is a hard, compact altered shale. Hardness is between 3 and 5½. It is opaque, flat in lustre, and green to grey-green in color (Munsell 10YR 4/2, 7/3, and 5Y 5/1.5, 5/2). Referred to as argilliceous shale in this study, it is found in local glacial deposits. Argilliceous shale is readily accessible throughout most of the year.

Group 12

Group 12 has been called Kootenay Argillite by Reeves (1972a). This material is a fine grained siliceous rock which has undergone sufficient metamorphisis to produce a distinctive platy structure (Choquette n.d.). Kootenay Argillite is harder than shale, its sedimentary predecessor, with a reading of 5½ to 7, but does not cleave into sheets as easily as slate does. The platey structure causes step fractures during flaking.

The specimens are slightly transluscent and range from pale green to dark green in color. Sources are known on the shore of Kootenay Lake in the West Kootenays **(Fig. 12).**

Group 13

This group is composed of shale, a sedimentary rock formed of fine grained particles of mud or clay. Bedding is evident and colors range from grey, black to brown in the study sample (Munsell 2.5YR 4/2, 7.5 YR 3/0, 4/2, and 10YR 4/3). Hardness is 2½ to 3. Shale is local to the study area in bedrock outcrops and redeposited cobbles.

Group 14

Group 14 is composed of 5 types of microcrystalline rocks used infrequently for large tools; most of which exhibit limited modification and/or utilization. In groups that practice a pattern of seasonal transhumance, such as is inferred for the study area by the temporary nature of most sites, the larger tools and those that require little modification are commonly made from locally available resources rather than being carried from camp to camp. Although it is not certain that 4 of the types of rocks within this group are local it is assumed that they are.

a. Andesite: a fine-grained, pale yellow (5YR 7/3), igneous rock, composed mainly of feldspars. Hardness is 5½ to 7.

b. Phorphyry: This rock, considered by some to be a type of andesite, contains large minerals clearly visible in a fine-grained matrix. It is an igneous rock composed mainly of feldspar (the crystals are light colored transluscent feldspars) and the matrix ranges from grey to red-brown in the sample(Munsell 2.5YR 4/0, 5YR 3/2). The hardness is 5½ to 7.

c. Rhyolite: A fine-grained igneous rock composed of the same minerals as granite. It is light grey to light grey-brown in color (Munsell 10YR 6/1.5 to 6/2) and often has a banded appearance. Small crystals in a dull, brick-like groundmass are typical. Hardness is 5½ to 7.

d. Gabbro: A dark, medium to coarse grained rock formed mainly of dark colored pyroxene and feldspar (Munsell 5Y 4/1.5). It is an intrusive igneous rock which is local to the study area (Claque 1973) and has a hardness of 5½ to 7.

e. Quartz diorite: Intermediate in quartz and feldspar content between granite and gabbro, this is an intrusive igneous rock dominated by dark minerals. It is usually greyish in color (Munsell 5Y 3/1 to 5/1). It is coarse-grained, with a hardness of 5½ to 7.

Group 15

This group is composed of one specimen of nephrite, a dark green-black, fine-grained lithic (Munsell 5Y 3/1). Hardness is 6. This material is non-local and is probably from the Fraser River.

Group 16

This group is composed of sandstone. Sandstone is formed of sands consolidated by argilliceous, calcareous, siliceous, or ferruginous binding agents (Kemp 1940:165). This group varies from extremely fine-grained, (including siltstone) to medium-grained, and is usually grey or brown in color (Munsell 5YR 5/4, 7.5YR 6/4, and 10YR 4/3.5, 7/1). Sandstone is present between Big Sand Creek and the Elk River **(Fig. 2)** (Claque 1973) and is available during most of the year.

Group 17

This group is composed of schist, or metamorphosed slate, with a platy structure. Micaceous minerals are common, giving a shiny, scaley appearance to the rock. A red-brown color, with purple tinges, is dominant, but browns and greys are also present (Munsell 5YR 4/2, 5/2, 5/1, 10R 3/1, 4/2). Hardness is 3 to 5½. A possible source is a bedrock outcrop near DhPt 11 **(Fig. 2)** and was probably accessible throughout the year.

Group 18

This group is composed of fine-grained slate which cleaves easily into sheets when struck. It is commonly dark grey, or green to black, but is also red and brown in the sample (Munsell 7.5YR 3/0, 4/2, 10YR 4/3, 3/2 and 2.5YR 4/2). Hardness is 3 to 5½. Slate is local and readily accessible in bedrock form (Claque 1973).

Group 19

This group is composed of 3 specimens of limestone and 1 of dolomite. The limestone is greyish in color (Munsell 10YR 7/1 to 8/1) and the dolomite is reddish brown (Munsell 10YR 7/3). Both have a hardness of 3. They are considered to be local and readily accessible to the study area in till and glacial outwash.

Group 20

This "group" consists of 1 sample of pipestone of non-local origin. The red clay-based pipestone (Munsell 10Y 2.5/2) has a hardness of between 2½ and 3. A reddish pipestone source is reported near Libby, Montana (White 1955). Red pipestone is also available to the east in the Plains (Collier et al, 1942).

All of the lithic artifacts excavated from DhPt 1, 4, and 10B have been assigned to one of these 20 groups. The study now turns to the distribution and frequency of these lithic groups at each of the sites.

DhPt 1

The excavated area at DhPt 1 consists of 16 discrete $2m^2$ units. A total of 606 lithic specimens were recovered, or an average of 37.88 per unit. The following analysis shows the distribution of the lithic groups at this site.

As can be seen in Table 5, 12 of the lithic groups are represented at this site. Most occur infrequently due to the small overall sample size, with the most common being LG 3, followed by NLG 1, LG 2, and LG 7. The remaining groups represent a small sample of 39 specimens or 6.44% and are grouped as minor local or non-local in this analysis.

The major lithic groups contain 567 specimens, or 93.56% of the total sample. Three of these groups are locally available and represent 67.82% of the sample. The other major group is non-local and contains 156 specimens or 25.74%. Local lithics are thus dominant at DhPt 1.

The horizontal distribution of all lithics is presented in Figure 13. The area west of 30E, an arbitrary dividing line, possesses 8 pits, or 50% of the units excavated and these squares contain 533 specimens or 87.95% of the total sample. Each of the 4 major lithic groups occurs more frequently in the western half of the site, suggesting a more intensive use for that area (Fig. 14-17). One unit, 4N8W, contains a large percentage (79.74%) of the LG 3 specimens and is believed to represent a flaking area. Although only 5% of the surface area of the site was excavated, it appears that the overall area was not utilized intensively. This suggests the site was used as a temporary camp.

Table 5 Distribution of lithic groups at DhPt 1 by excavation unit

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
4N8W	4	3	248		1																256
4N30E	4		4																		8
2N14E	56		2			1															59
2N48E			1									1									2
2N50E	1																				1
2S16E	4		1			1															6
2S22E	37	1	6				5			3											53
2S48E	4	2	2										1								9
2S54E	1																				1
4S2 E	23		5	2	1	1	10														42
6S18E	1	1	2																		4
10S14E	3		1				9														13
12S46E	4	5	25		5	3		1						1a							44
12S58E			4				3														7
14S18E	13	46	10	3	8	2	15			2		1									100
26S52E	1																				1
Total	156	58	311	5	15	8	42	1		5		3	1	1							606

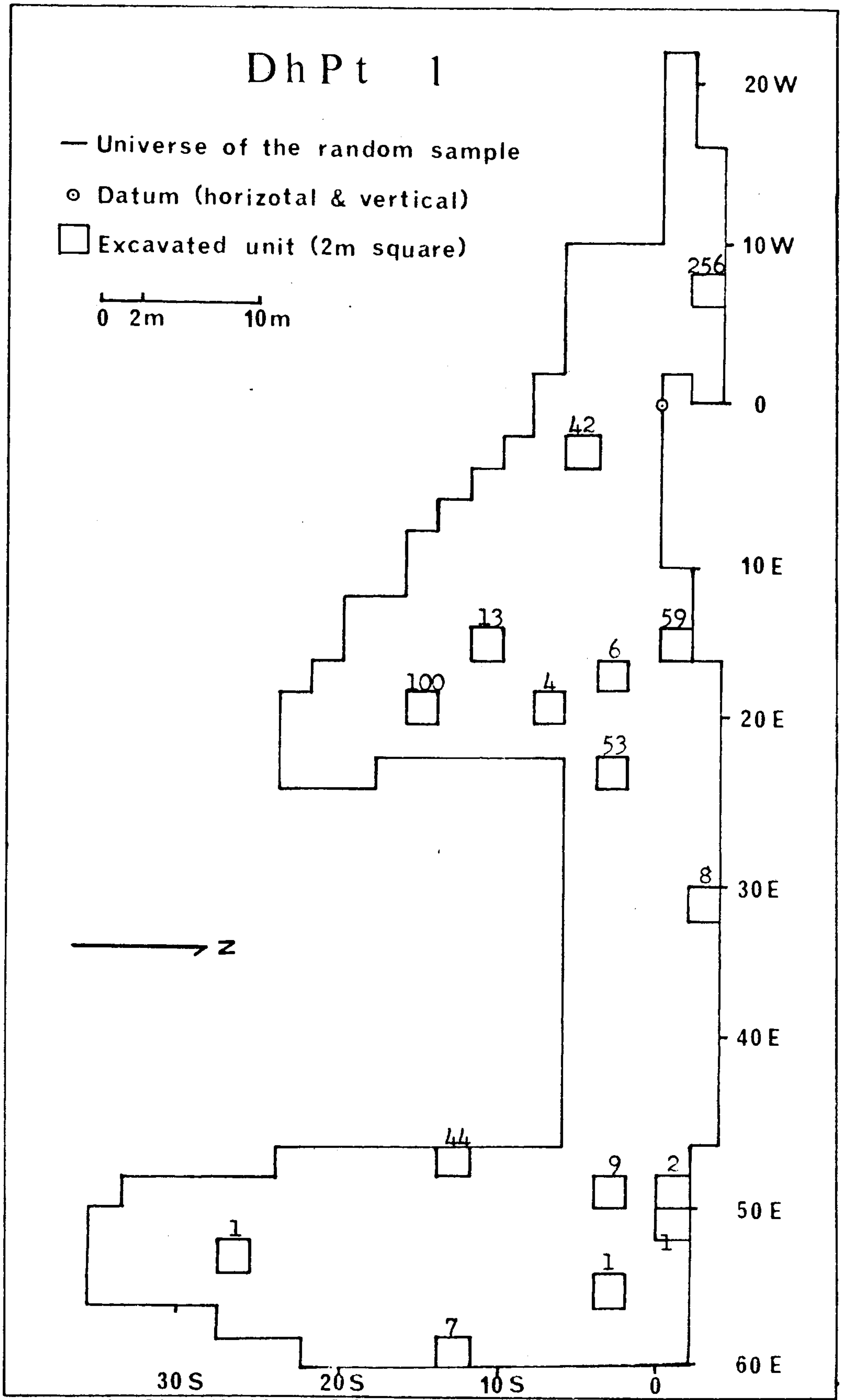


Figure 13 Distribution of lithics at DhPt 1

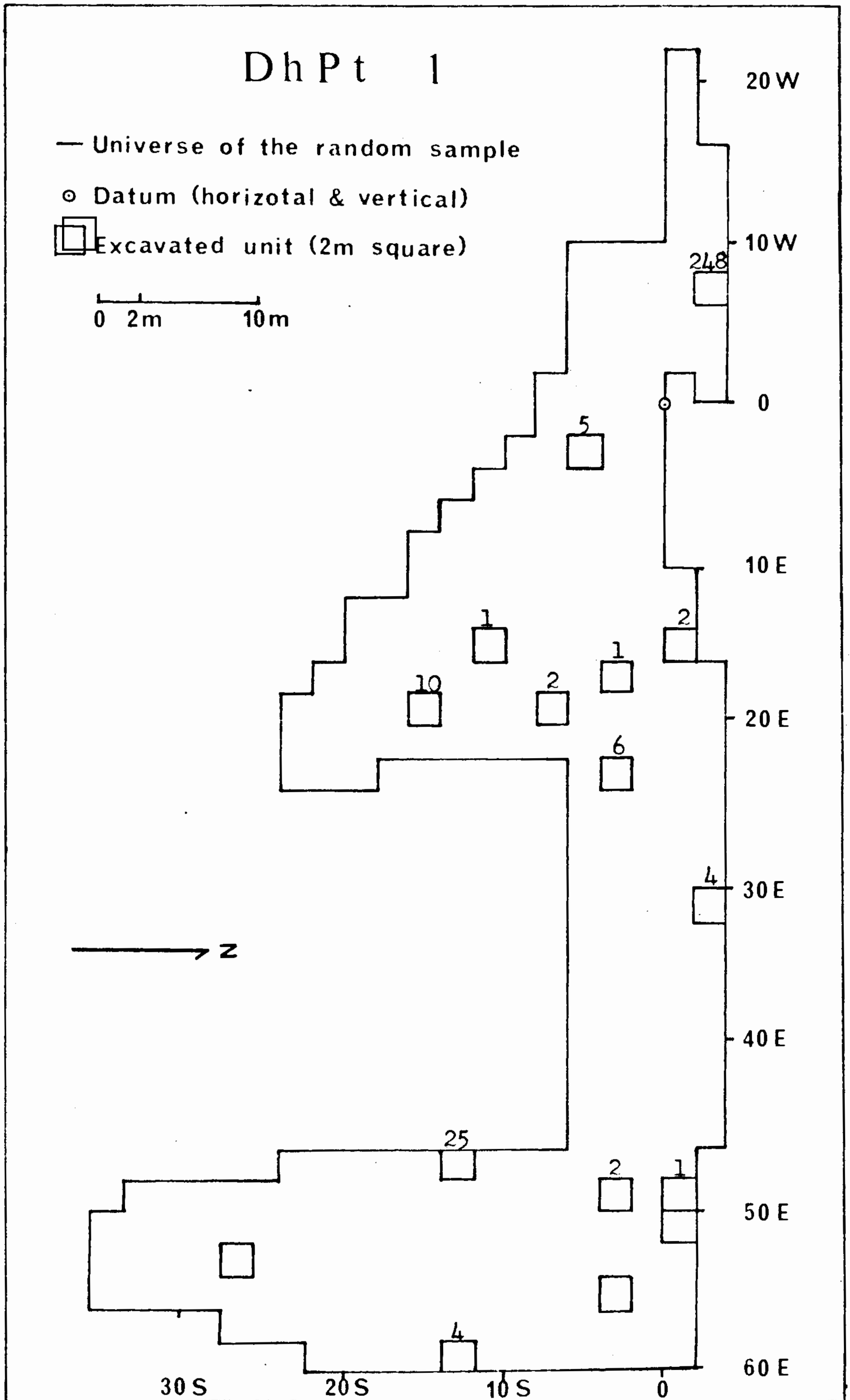


Figure 14 Distribution of Group 3 lithics at DhPt 1

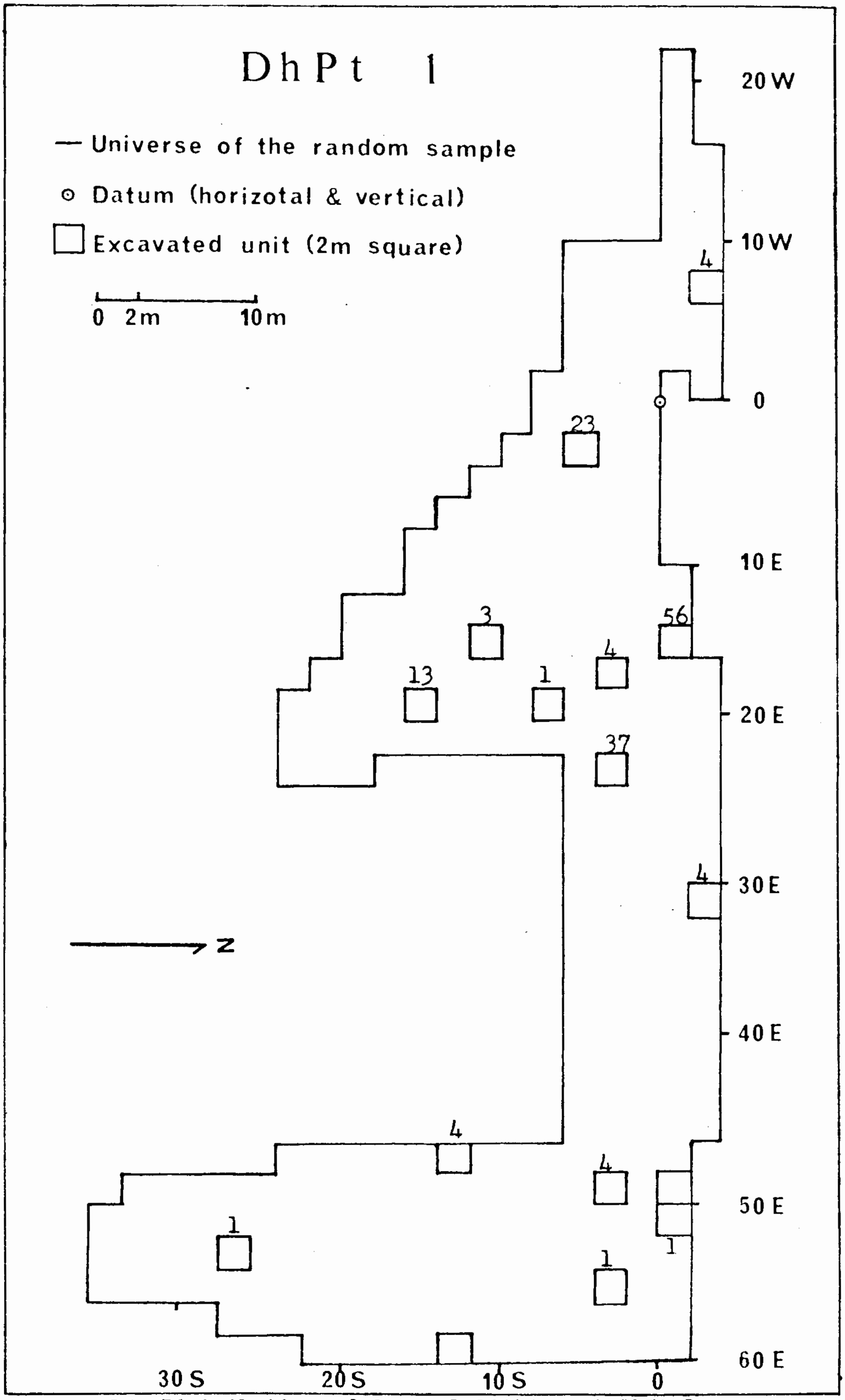


Figure 15 Distribution of Group 1 lithics at DhPt 1

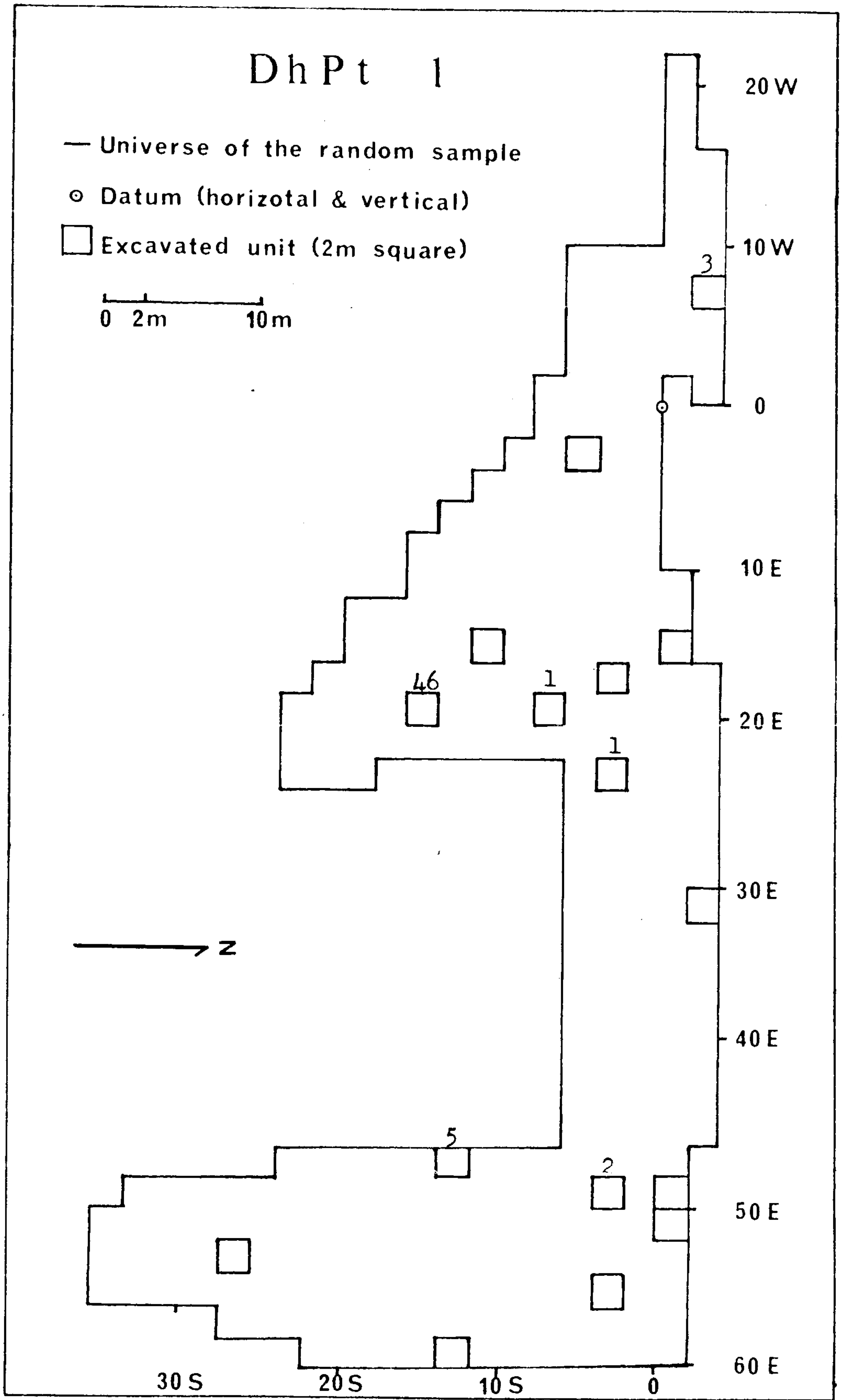


Figure 16 Distribution of Group 2 lithics at DhPt 1

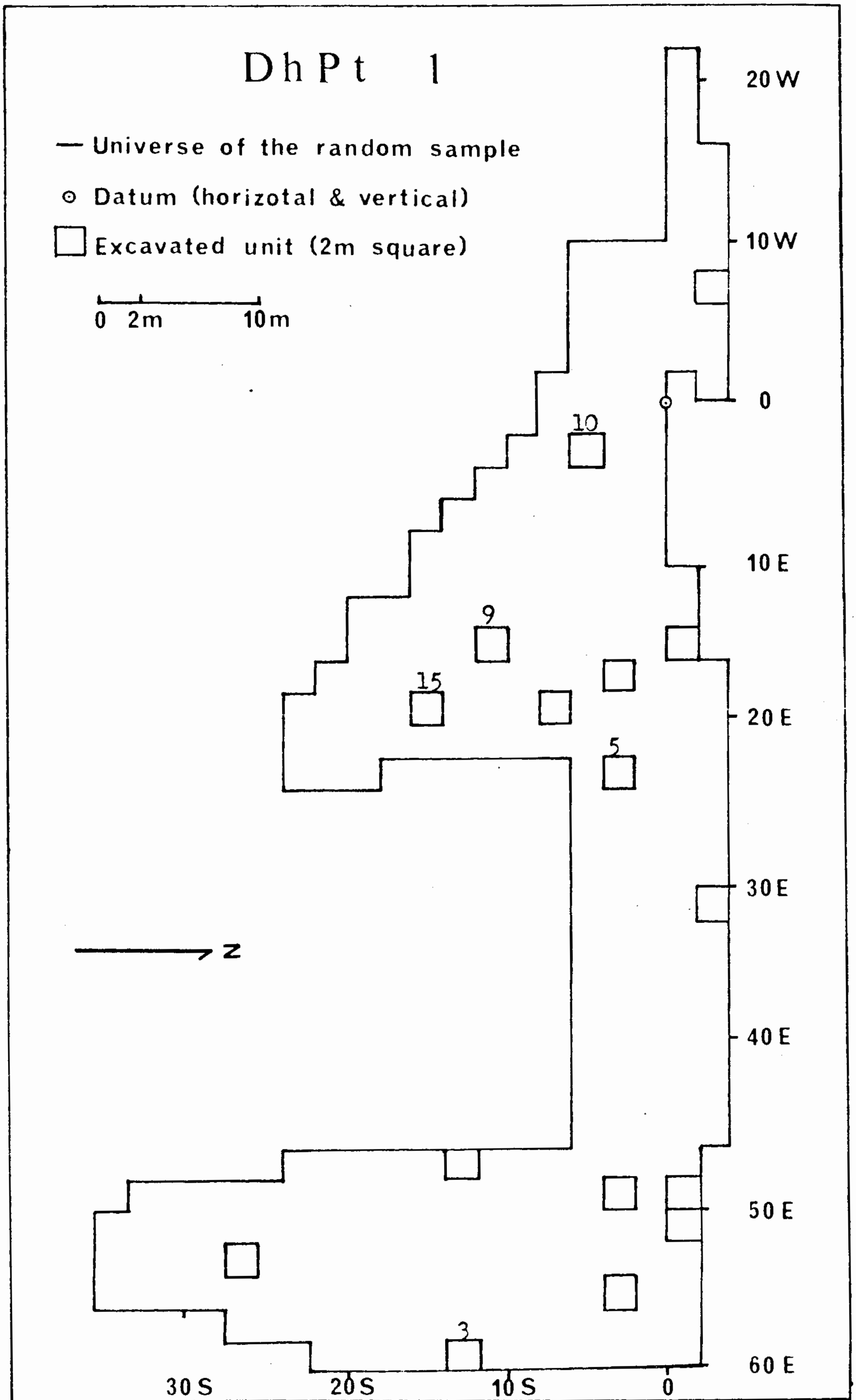


Figure 17 Distribution of Group 7 lithics at DhPt 1

Vertical analysis of the distribution of lithics at DhPt 1 was attempted, but as the exact provenience was not recorded for all specimens and arbitrary levels below "surface at datum" were utilized during excavation, it was not possible to compare the sample from unit to unit. As the artifact classification suggests that this site was occupied for only a short period it has been assumed that these groups belong to a single component. This is supported by the deposition at the site, with all cultural material found within the same silty sand matrix.

DhPt 4

Twenty-seven $2m^2$ units were excavated at DhPt 4, yielding 1436 lithic specimens, or an average of 53.19 per unit. The following analysis summarizes the distribution of the lithic groups at the site.

As can be seen in Table 6, 15 of the lithic groups are represented at DhPt 4. The most common is NLG 1, followed by LG 3, NLG 6, and NLG 9. The remaining groups are represented by a small sample of 174 specimens (12.46%) and are grouped as minor local or non-local in this analysis.

The major lithic groups contain 1257 specimens, or 87.53% of the total sample. Three of these groups are non-local and represent 55.64% of the sample. The other major group is local and contains 458 specimens, or 31.89%. Non-local lithics are thus dominant at DhPt 4.

The horizontal distribution of all lithics is presented in Figure 18 The site has been arbitrarily divided into 3 analytic segments of 142 m each to form the total 426 m length of the ridge on which the site is located. This division does not take into consideration the fact that

Table 6 Distribution of lithic groups at DhPt 4 by excavation unit

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
152S32W			3			4															7
166S30W	1																				1
168S30W												1									1
192S28W	1								1												2
206S32W	21	1																			22
210S32W	23	2	6	2		1															34
224S34W	5			1																	6
230S30W	1																				1
292S30W	14	1	1		3	5		1													25
300S32W	22	10	5			3	1		1		1	2		1e							46
304S34W	9	1	2	2	16	1	2					2									35
310S34W	15		1	1		3															20
350S44W	8		2			2						1									13
364S50W	23	2	6			40					1	1									73
374S54W	7		1			3			14			3									28
376S54W	23					12	1		16			1									53
418S60W	3				2																5
428S64W	4		1		2	2						1									10

Table 6 Distribution of lithic groups at DhPt 4 by excavation unit (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
432S64W	1		3	1					1			3									9
448S62W	1										1		2			1					5
452S62W	91	2	358	6	9	36		1	2	1	6					1					513
466S62W	4	1		2																	7
502S64W	22	1	5	1	1	12	2		1												45
514S62W	51	2	1		1	1	4		1			6									67
530S64W	117	4	59	28		68	16		72		2										366
554S64W	21	2			1																24
570S68W	8	2	4	1	1	1	1														18
Total	496	31	458	45	36	194	27	2	109	1	11	21	2	1		2					1436

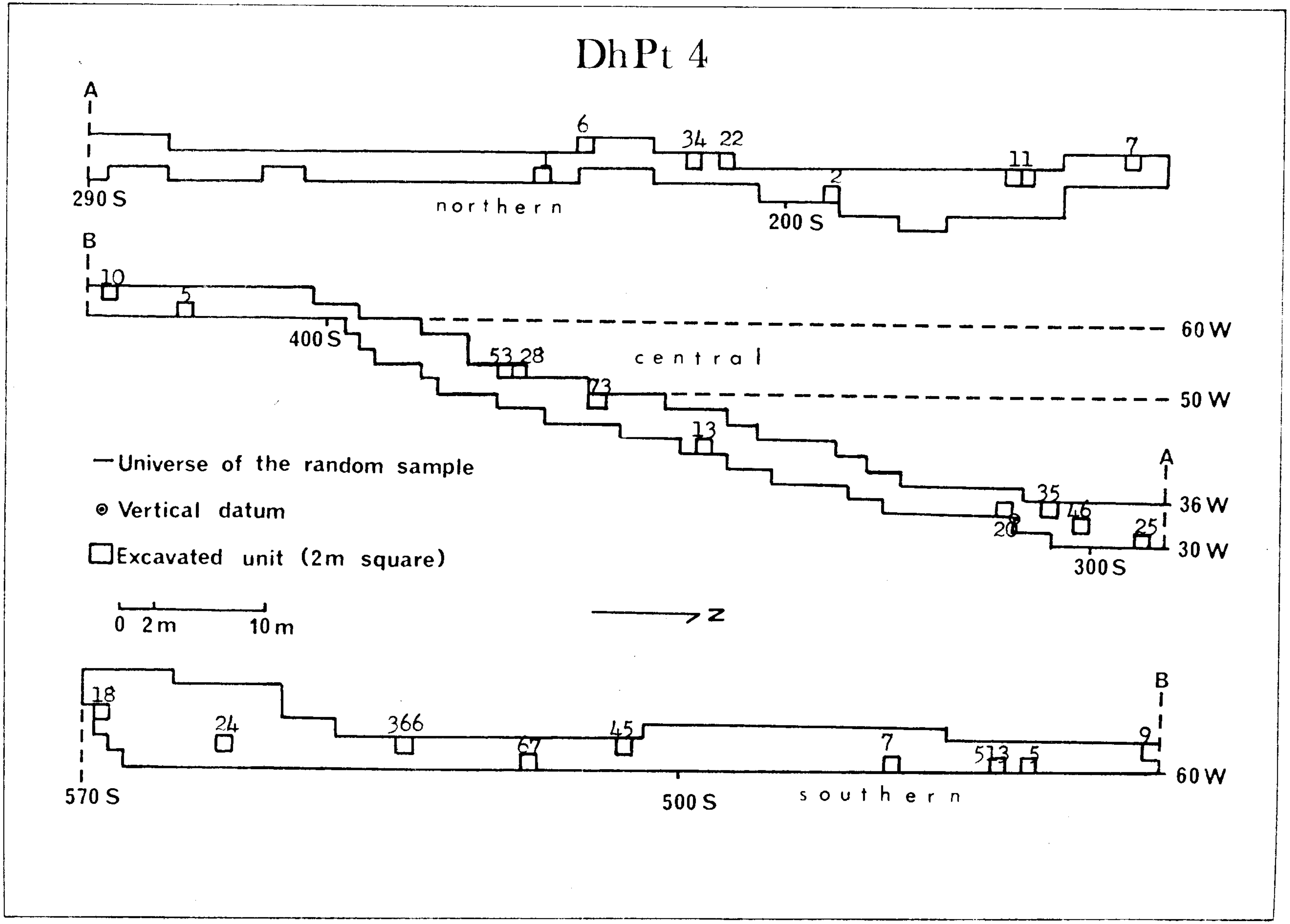


Figure 18 Distribution of lithics at DhPt 4

parts of the site are wider than others and so the segments are not of equal area. The greatest number of lithic specimens occur in the southern area of the site which contains 9 (1/3) of the excavation units, but represents slightly more than 1/3 of the site area.

The major lithic groups are present in greatest frequency in the southern portion of the site (Fig. 19 to 22). Although not shown, minor lithics show the same pattern of frequency; increasing from north to south. There is also an increase in the number of lithic groups represented with 7 occuring in the northern area, 11 in the central portion, and 14 in the southern. Local and non-local specimens occur in all 3 portions of the site. It appears that the southern area was used more intensively with its yield of 111.7 lithics per unit, the central portion was second with 30.8, and the northern third with 9.25.

Vertical distributional analysis was attempted but no conclusive results could be attained due to the excavation techniques and the varied slope of DhPt 4. The artifact classification suggests that this site was occupied more than once and vertical analysis would have been valuable as a test of the hypothesis of a change in lithic preference through time.

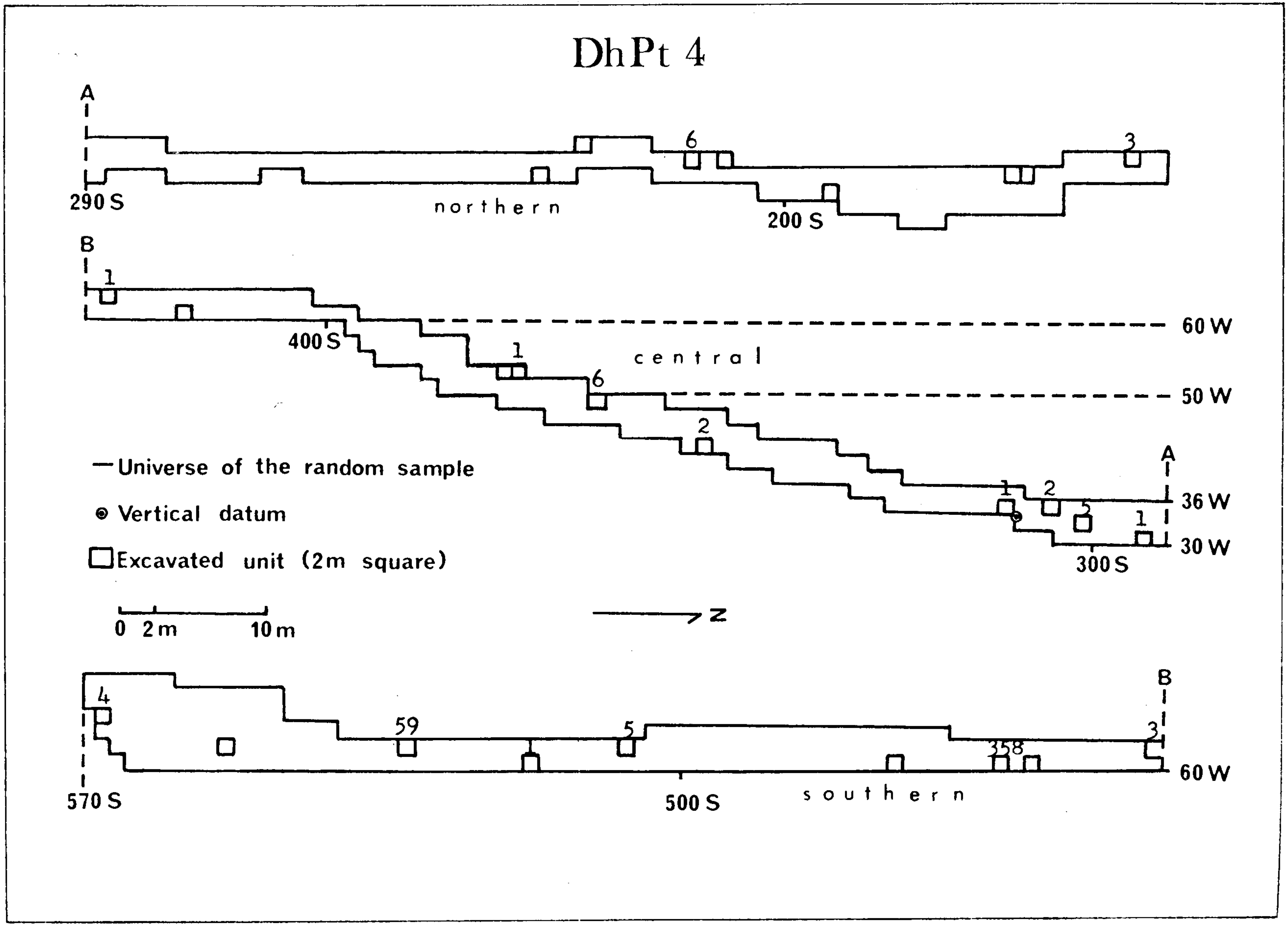


Figure 19 Distribution of Group 3 lithics at DhPt 4

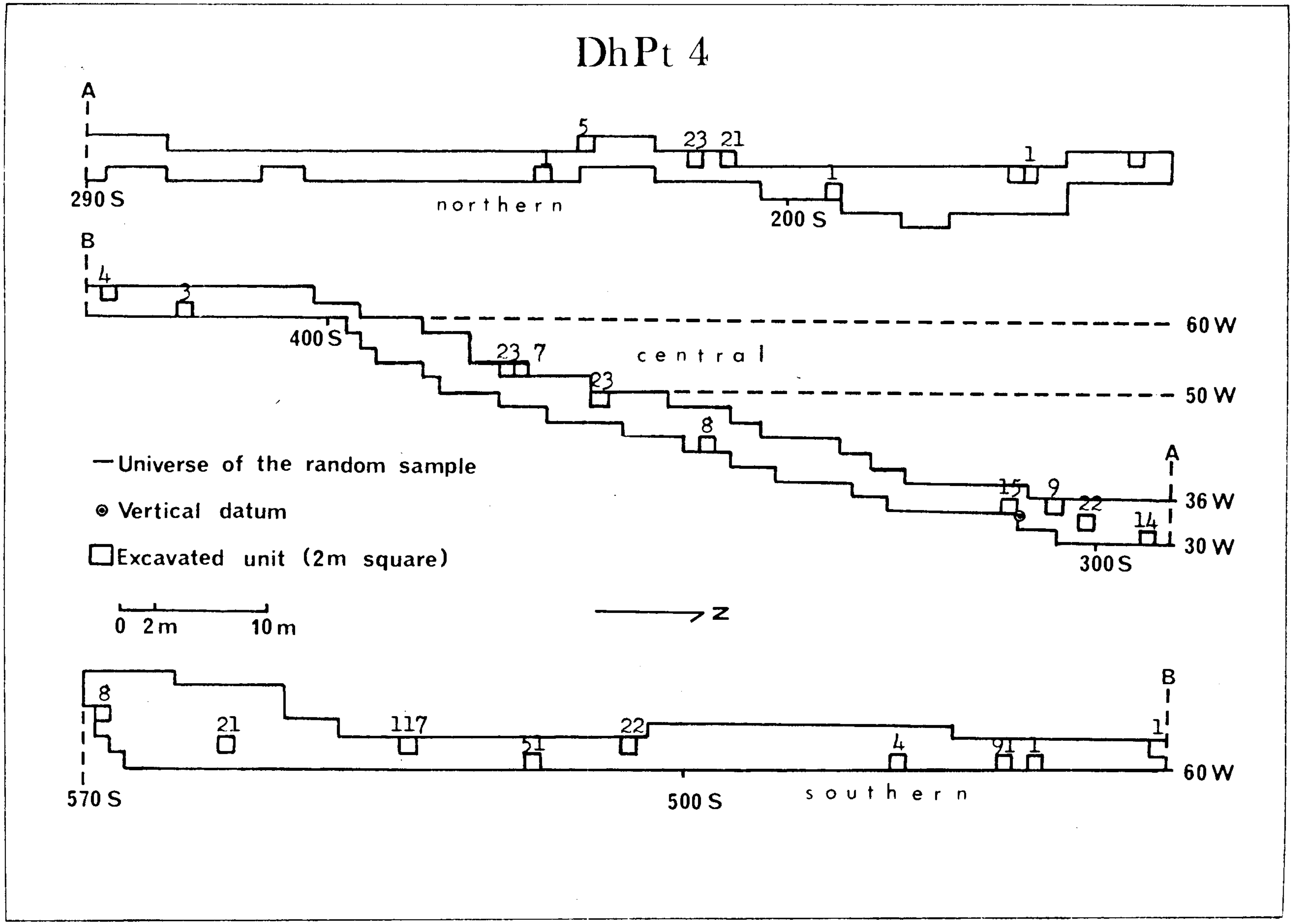


Figure 20 Distribution of Group 1 lithics at DhPt 4

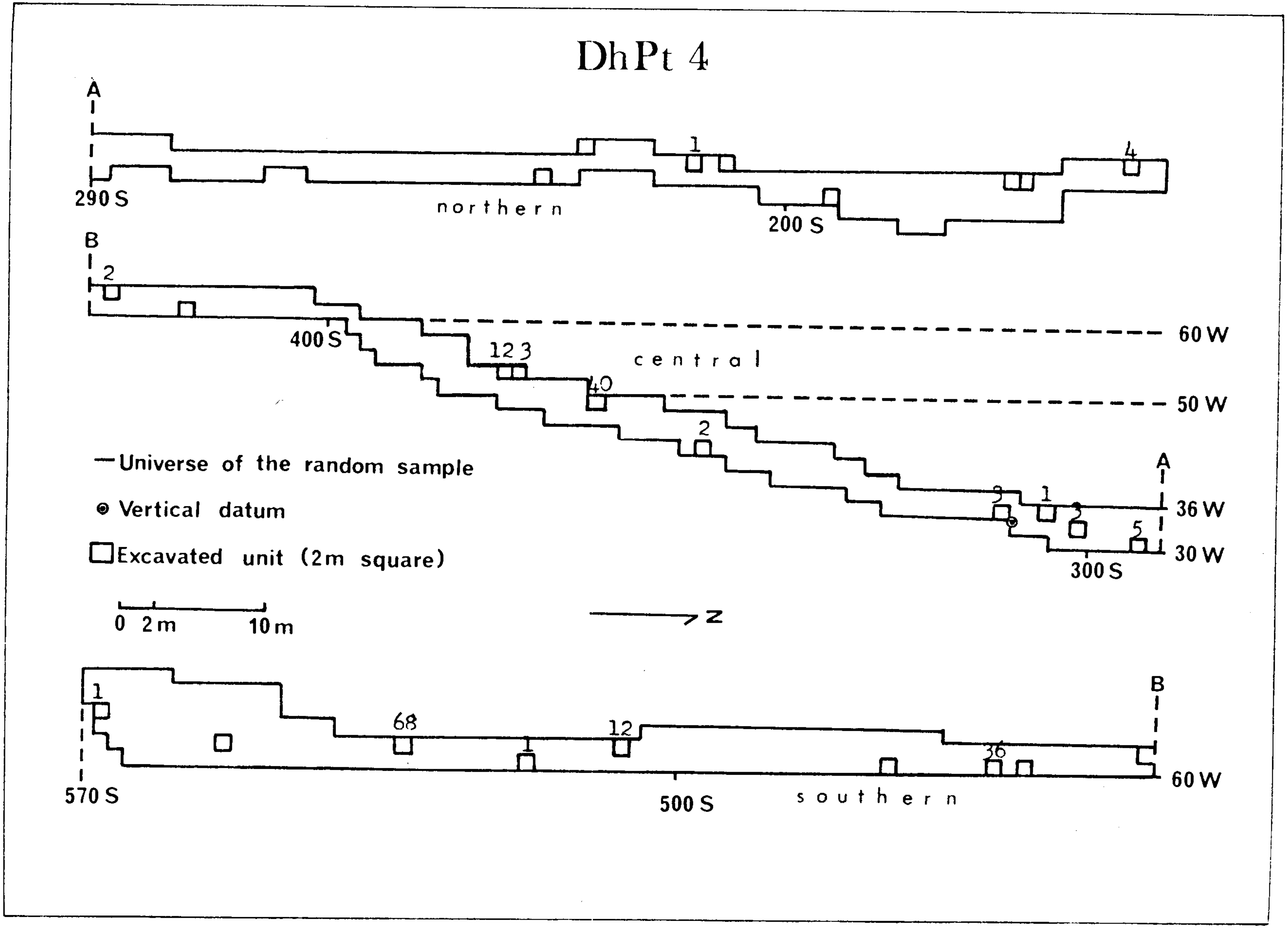


Figure 21 Distribution of Group 6 lithics at DhPt 4

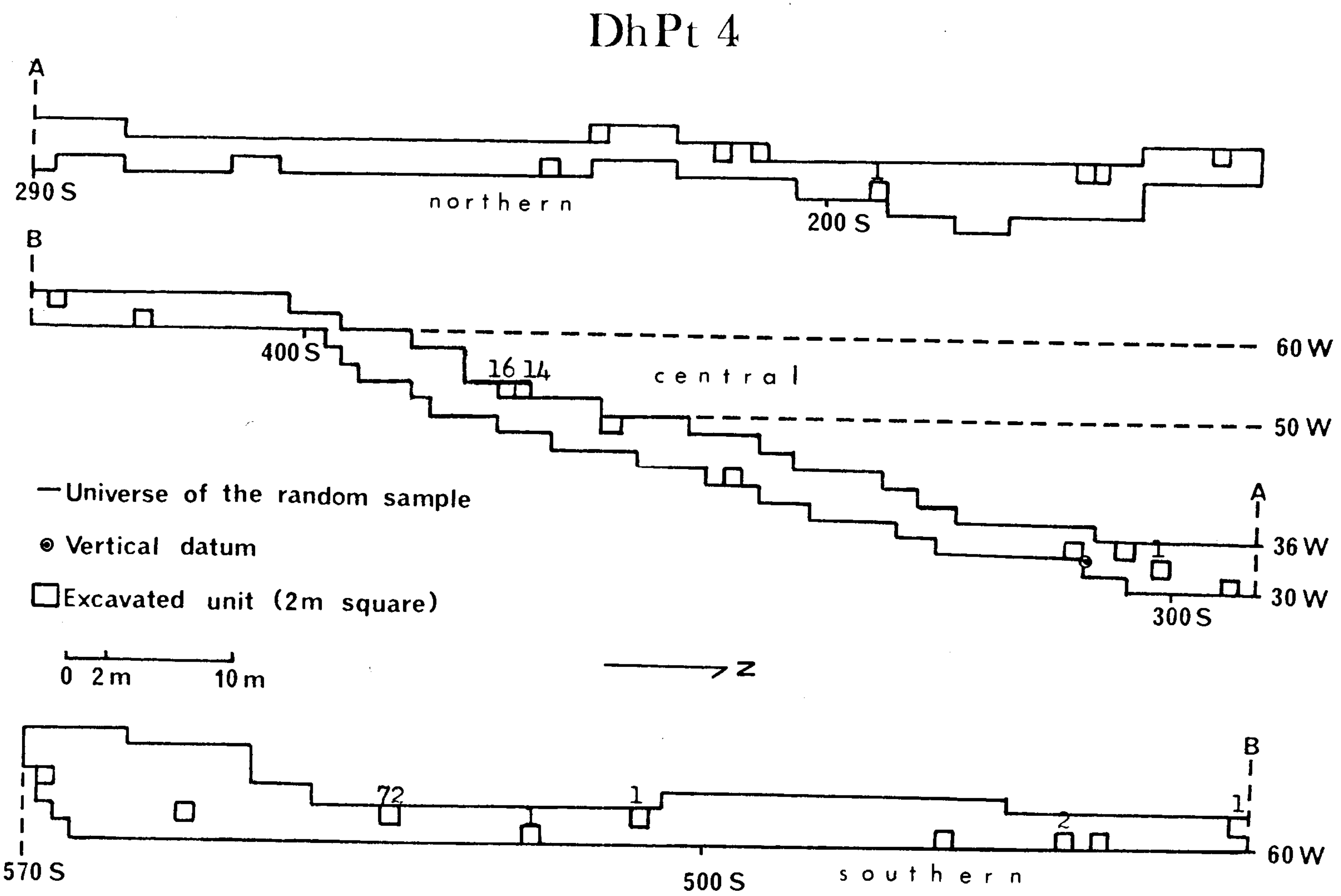


Figure 22 Distribution of Group 9 lithics at DhPt 4

DhPt 10B

The analytic procedure was slightly different with DhPt 10B, due to the fact that the site was excavated by varying procedures in 2 different seasons. In the 1972 season (referred to hereafter as DhPt 10B - 1972) arbitrary 10 cm excavation levels were employed. In the second summer (referred to as DhPt 10B - 1973) arbitrary 5 cm below "surface at datum" levels were utilized. These levels are not equal so the 2 samples have been treated separately for investigation of vertical distribution. Arbitrary levels at DhPt 10B - 1972 were discontinued at 50 cm b.s. while those at DhPt 10B - 1973 continued until 70 cm b.s.a.d. and necessitates the division of these two samples for vertical analysis. In all other aspects of analysis the 2 samples are combined.

It is interesting that these 2 samples produced very similar results, despite different recovery techniques. The 1973 excavation was intended to provide a 5% random sample for statistical purposes, but has not been analyzed as such, for reasons already stated, while the 1972 excavation units were judgmentally located. Any slight differences evident between the samples are probably a result of simple sample-size inequalities, and not sampling method, as the 1972 yield was 2040 specimens from 4 units, while 1973 produced 10,007 specimens from 15 units.

The excavated area at DhPt 10B consists of 19 - $2m^2$ units. A total of 12,047 lithic specimens were recovered, or an average of 634.05 per unit. As can be seen in Table 7, all 20 lithic groups are represented at DhPt 10B. Most frequent is LG 3, followed by NLG 1, LG 2, and NLG 6

Table 7 Distribution of lithic groups at DhPt 10B by excavation unit

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
51N118E	69	48	119	5	3	35	2	4	11		8	5	1				1	2	1		314
59N118E	156	41	195	15	3	34	3	2	4		7	9					1		1		471
59N124E	167	102	225	11	14	58	1	4	13		6	15	2	1e				1			620
59N128E	263	51	193	7	8	60	5	7	8		4	24		1e			1				632
67N122E	158	61	464	3	5	29	2	8	18	6	3	19					1		1		778
69N118E	260	154	405	18	39	74	5	20	5	1	4	28	1	2e	1	1					1018
71N124E	129	62	120	6	10	26	1	7	2	3		15		1c 1d			2				385
85N128E	270	324	343	23	73	97	29	67	18	2	15	20	3	3c		4			2		1294
87N118E	122	53	264	3	6	30	3	2	3	5	4	8		1b				1			505
87N126E	165	120	394	7	12	82	14	25	18	4	4	12	3	1d							861
87N130E	241	30	287	5	8	31	14	10	13	1	9	7	2				1				659
89N122E	174	19	428	6	9	50		2	6	4	2	13	4	1e		1	8	11	1		739
91N128E	152	161	319	12	84	49		2	8		2	4		1b			3				797
111N122E	47	26	208	4	26	15		2	2	1	5	9		1d		1					347
123N110E	198	37	256	17	6	35	3	3	3	4	5	15	1			3				1	587
73N120E	112	35	256	2	9	47	3	17	5	1		14	1					1			503
73N124E	138	20	210		9	39	3	9	7			7	1				3				446
73N128E	197	67	403	5	18	82	3	2	12		1	18	1				1				810
87N128E	50	36	143	4	1	18	8	4	1	1	5	7	1			1	1				281
Total	3068	1447	5232	153	343	891	99	197	157	33	84	249	21	15	1	11	23	16	6	1	12,047

respectively. The remaining lithic groups are represented by 1409 specimens, or 11.69% of the sample. These are grouped as minor local or non-local, with the latter represented by 1134 specimens (9.41%) and the former by 275 (2.28%).

The major lithic groups contain 10,638 specimens or 88.30% of the total sample. Two of these are local and 2 are non -local. Local Groups 2 and 3 are represented by 6679 lithics, or 55.44%, and NLG 1 and 6 have a total of 3959 items or 32.86%. Minor local lithics (275) bring the local total to 6954, while minor non-local lithics (1134) make the non-local total 5093. Local lithics are thus dominant at DhPt 10B.

The horizontal distribution of all lithics is presented in Fig. 23 and the distribution of the major groups is shown in Fig. 24-27. A statistical "runs" test was employed to determine if there was a trend evident in the horizontal distribution of the total lithic assemblage or in the individual major lithic groups. Earlier investigations by arbitrary levels indicated no changes were evident and so all levels were grouped. Both north-south and east-west vectors were tested. The results indicate no apparent trend, suggesting that within the sample universe the lithics were randomly located with no areas of significant clustering. The vertical distribution analysis of DhPt 10B is undertaken in 2 parts: DhPt 10B - 1972 and DhPt 10B - 1973.

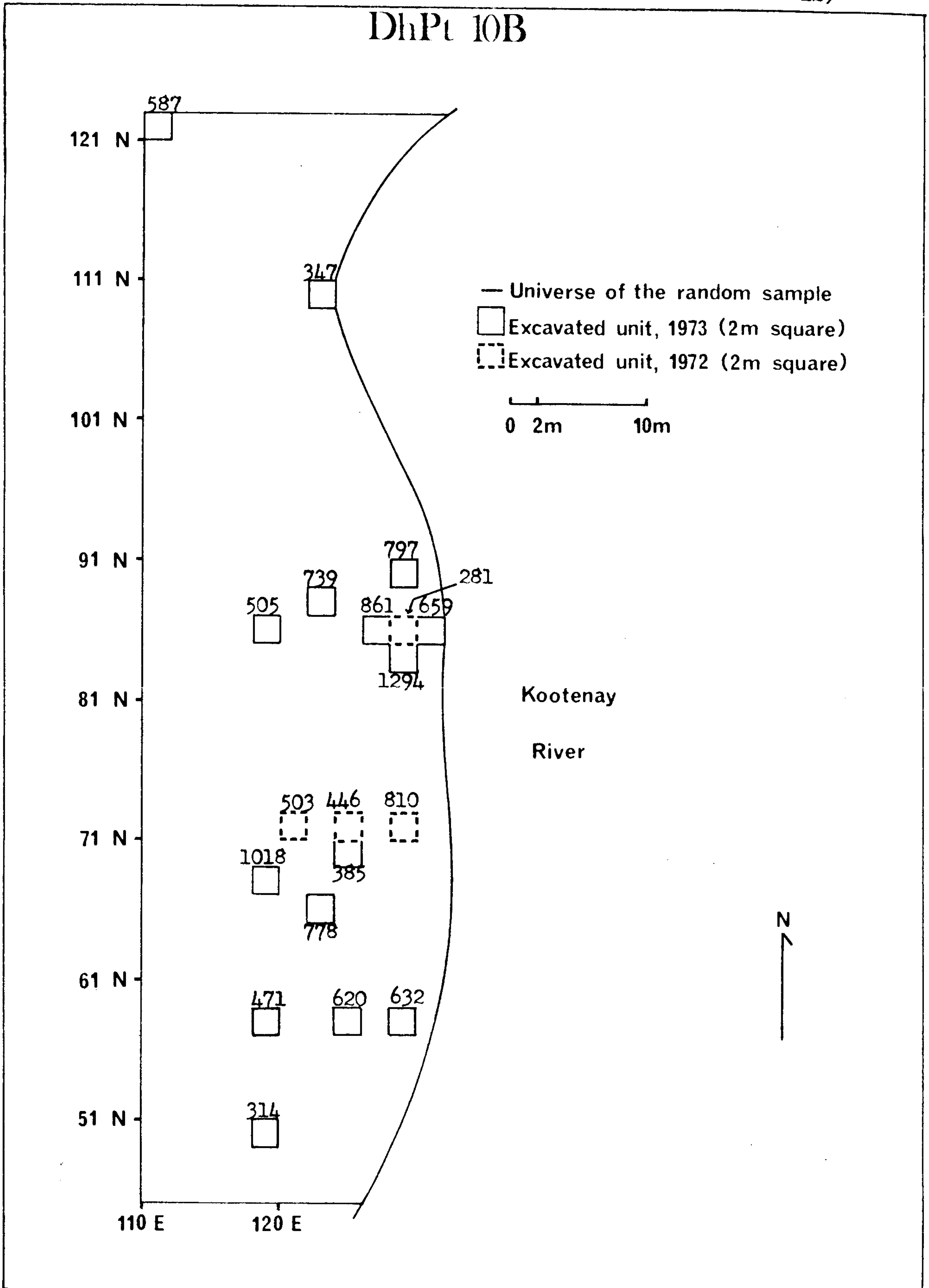


Figure 23 Distribution of lithics at DhPt 10B

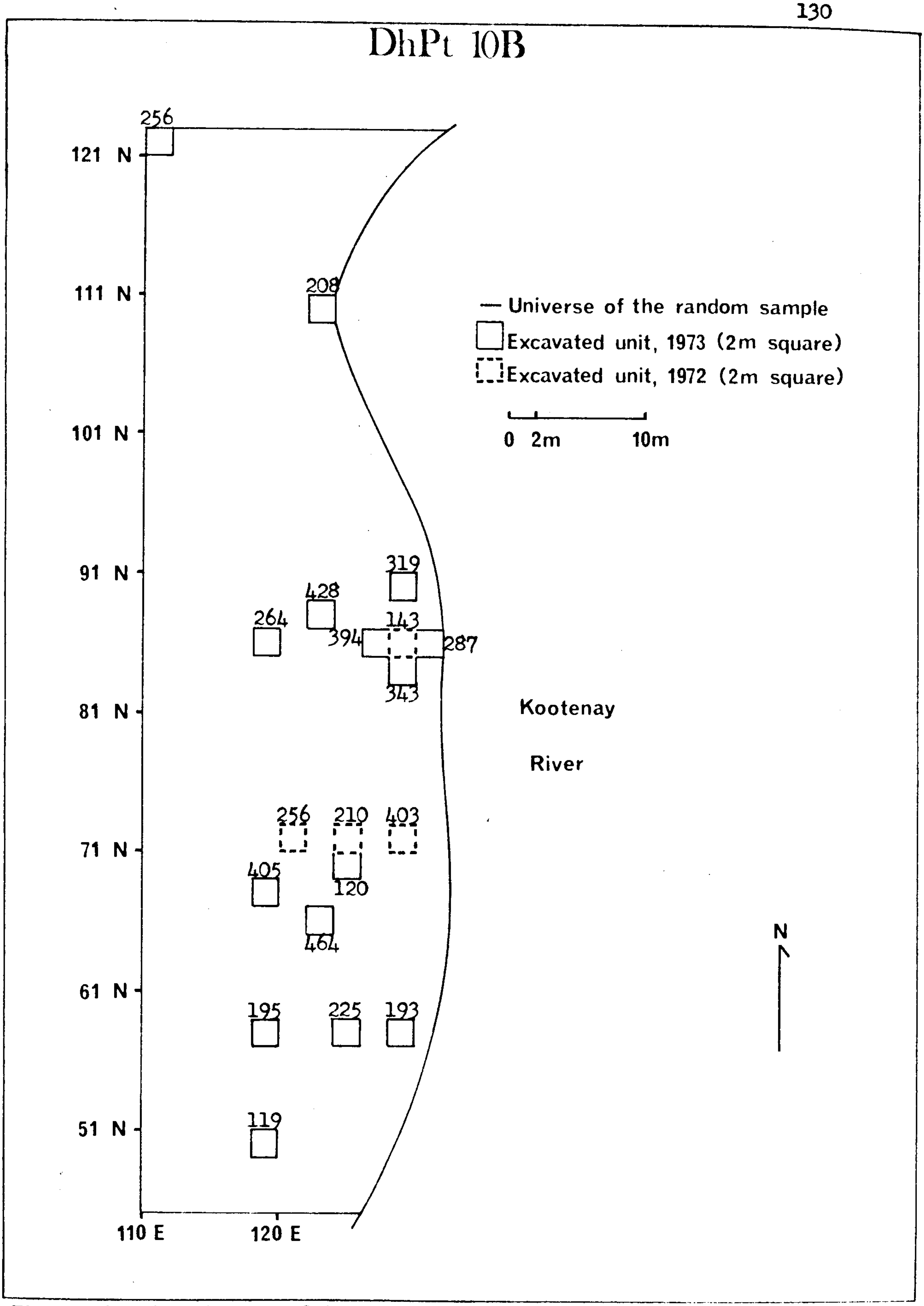


Figure 24 Distribution of Group 3 lithics at DhPt 10B

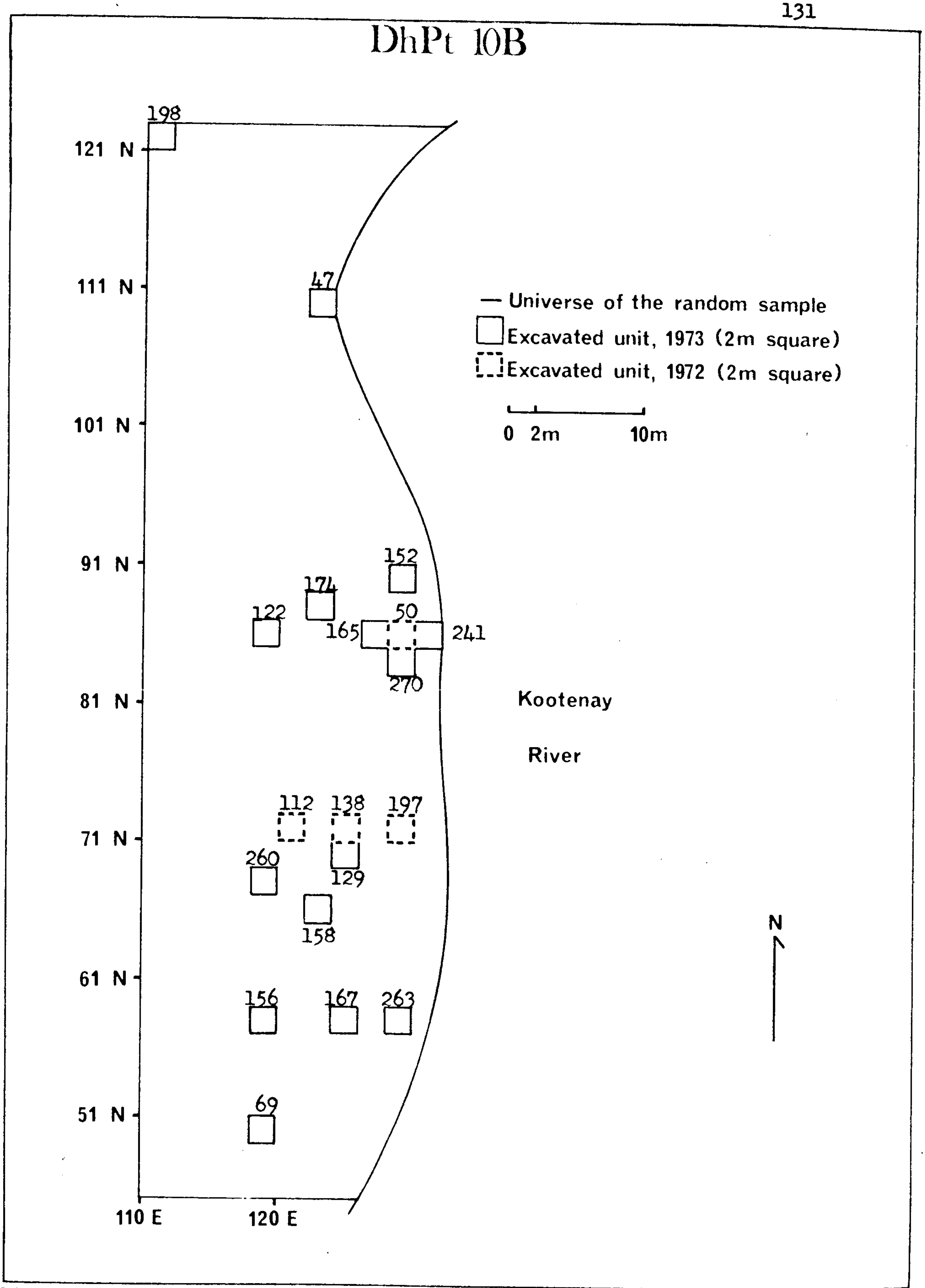


Figure 25 Distribution of Group 1 lithics at DhPt 10B

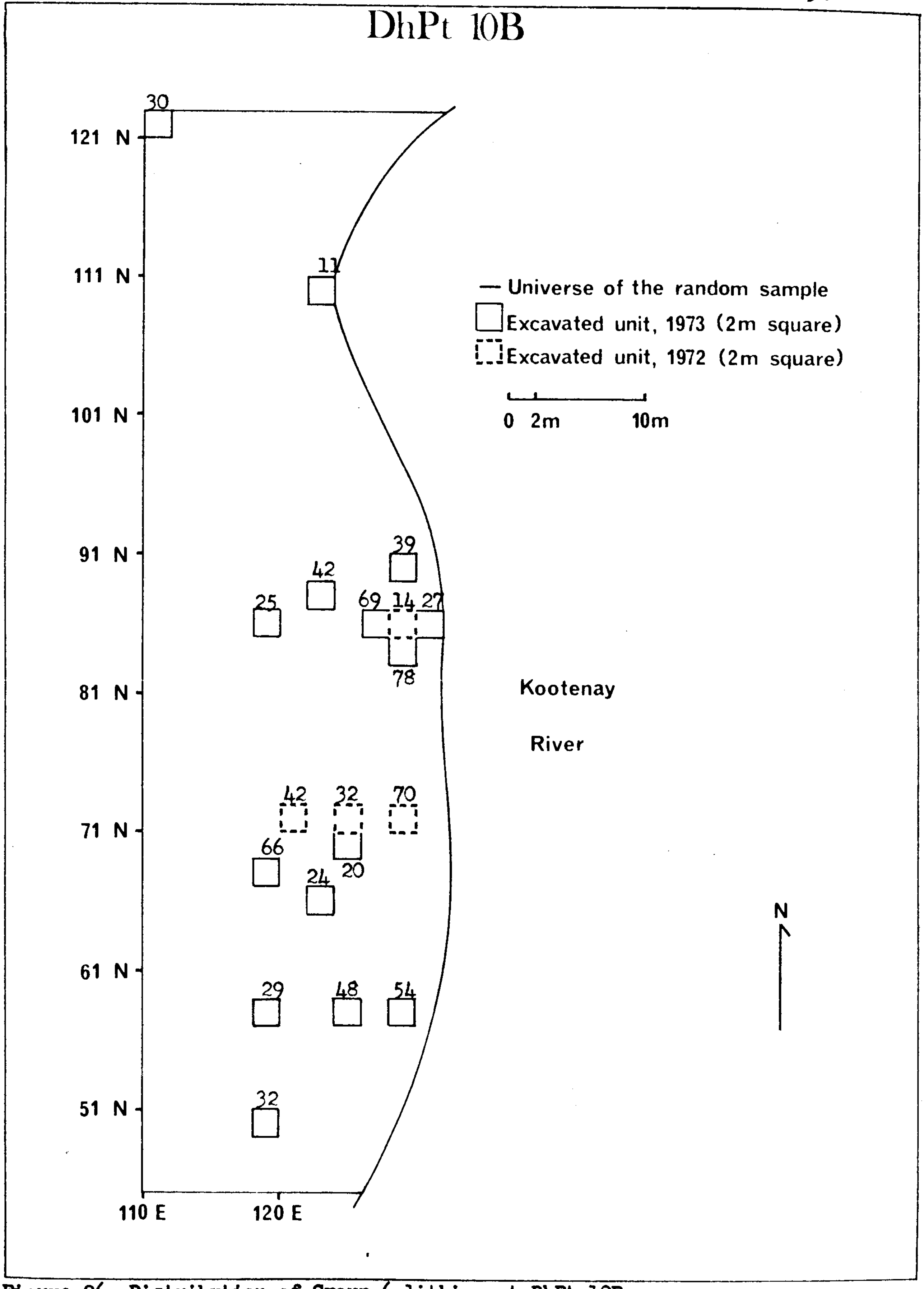


Figure 26 Distribution of Group 6 lithics at DhPt 10B

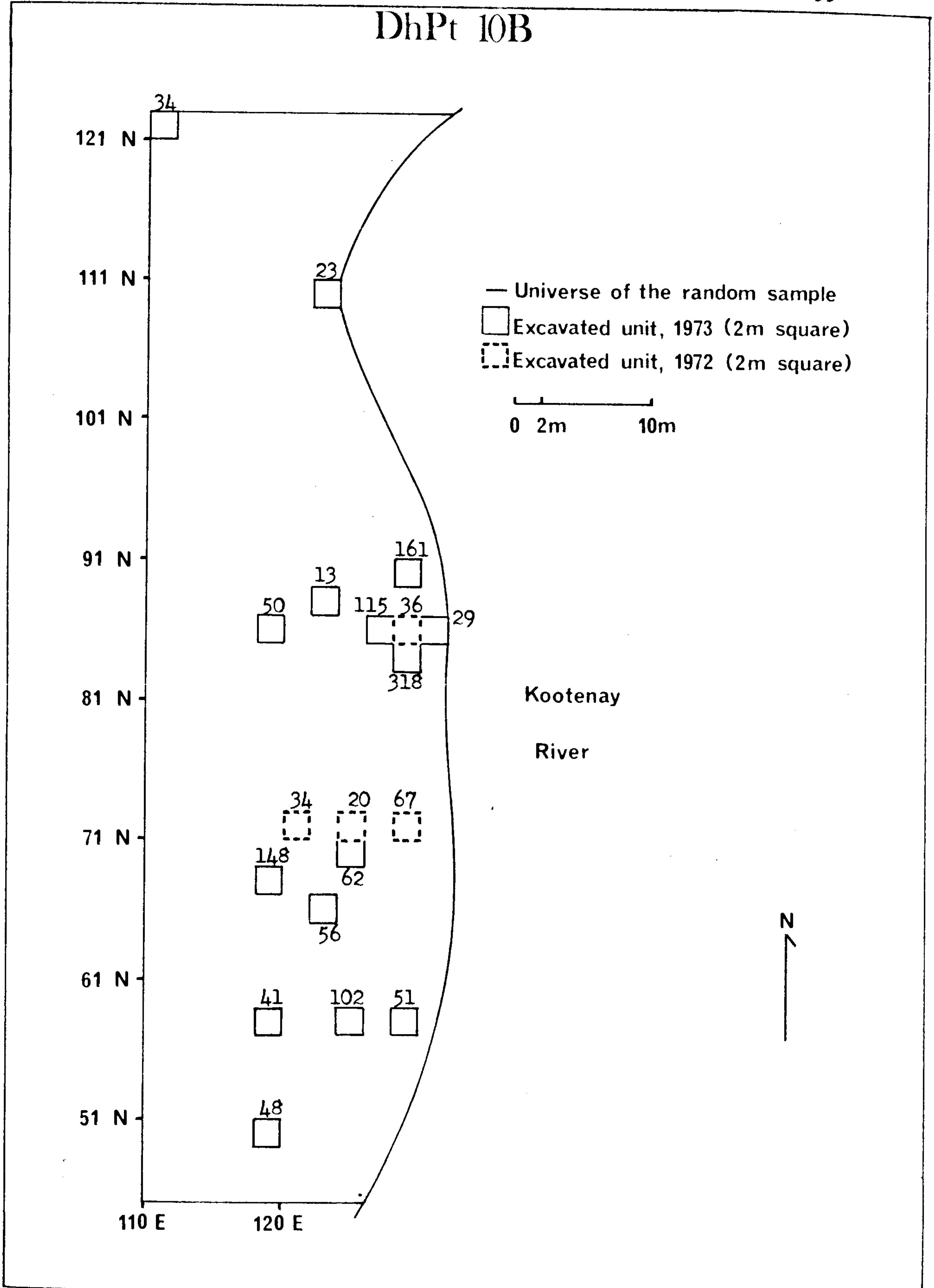


Figure 27 Distribution of Group 2 lithics at DhPt 10B

DhPt 10B - 1972

In this sample lithics occur with greatest frequency in level 1 (0–10cm) and decrease in number with depth (Fig. 28, Table 8). This would suggest that the later levels indicate more intense use of the site than the earlier, as evidenced by the greater lithic yield.

In order to determine how the frequencies of major lithics compare from level to level they have been converted to percentages of each level total (Fig. 30). The final level (40–50 cm) contained a small sample of 11 specimens (0.54%) and has been excluded from this analysis to keep small sample noise to a minimum.

As shown in Fig. 30 the percentage that LG 3 represents of each level total increase with depth, while NLG 1 decreases. This supports Choquette's hypothesis (1973b), based on his analysis of DhPt 9, of an increase in LG 3 and a corresponding decrease in NLG 1, with depth. However, his investigation did not extend to the distribution of other lithics within the sample. The minor local and non-local lithics were also converted to percentages in this thesis (Fig. 31). The local minor resources fluctuate only slightly and no change is evident.

Table 8 Vertical distribution of lithic groups at DhPt 10B - 1972

		1	2	3	4	5	6	7	8	9	10
0-10	no.	236	57	361	5	15	73	6	18	9	1
	%	29.21	7.05	44.68	0.62	1.86	9.03	0.74	2.23	1.11	0.12
10-20	no.	166	64	376	4	9	62	8	12	5	1
	%	22.93	8.84	51.93	0.55	1.24	8.56	1.10	1.66	0.69	0.14
20-30	no.	66	28	150	2	4	30	2	1	6	
	%	22.00	9.33	50.00	0.67	1.33	10.00	0.67	0.33	2.00	
30-40	no.	28	12	117		8	19	1		5	
	%	14.29	6.12	59.69		4.08	9.69	0.51		2.55	
40-50	no.	1		5		1	2				
	%	9.09		45.45		9.09	18.18				

Table 8 Vertical distribution of lithic groups at DhPt 10B - 1972 (Continued)

		11	12	13	14	15	16	17	18	19	20	Total
0-10	no.	2	21	2			1		1			808
	%	0.25	2.60	0.25			0.12		0.12			99.99
10-20	no.	1	10	1				5				724
	%	0.14	1.38	0.14				0.69				99.99
20-30	no.	1	9	1								300
	%	0.33	3.00	0.33								99.99
30-40	no.	2	4									196
	%	1.02	2.04									99.99
40-50	no.		2									11
	%		18.18									99.99

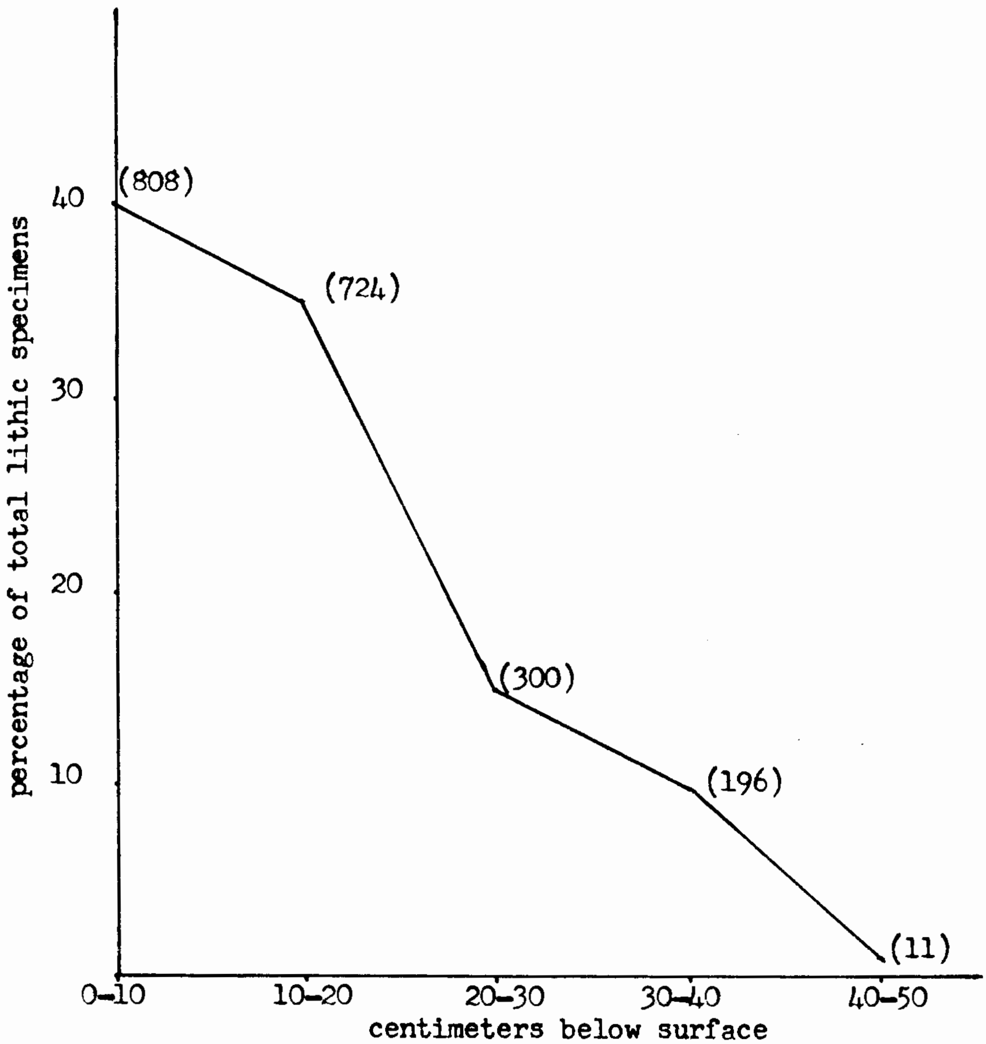


Figure 28 Vertical distribution of the lithics at DhPt10B - 1972 (raw number in brackets)

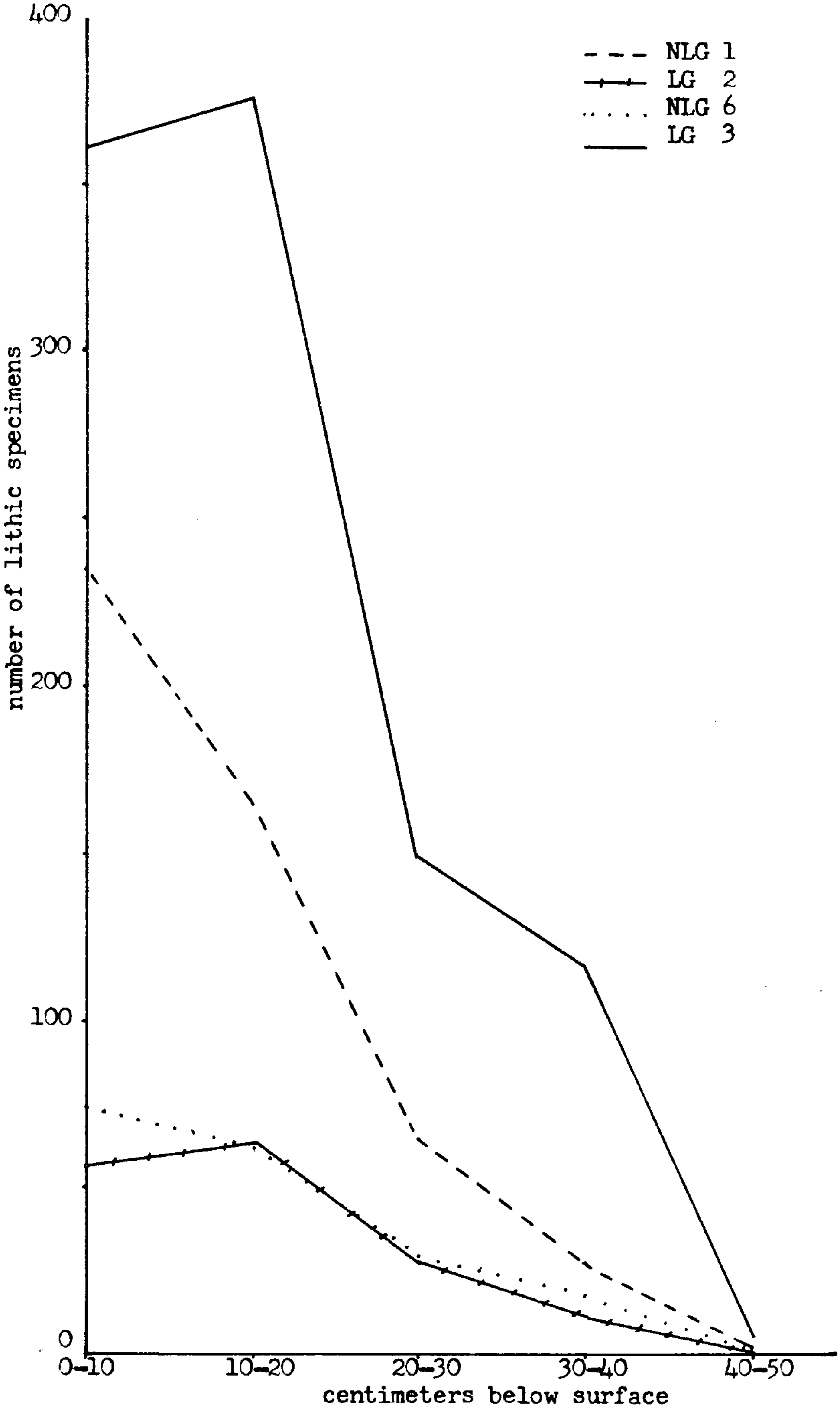


Figure 29 Vertical distribution of the major lithic groups at DhPt 10B - 1972 (number of specimens)

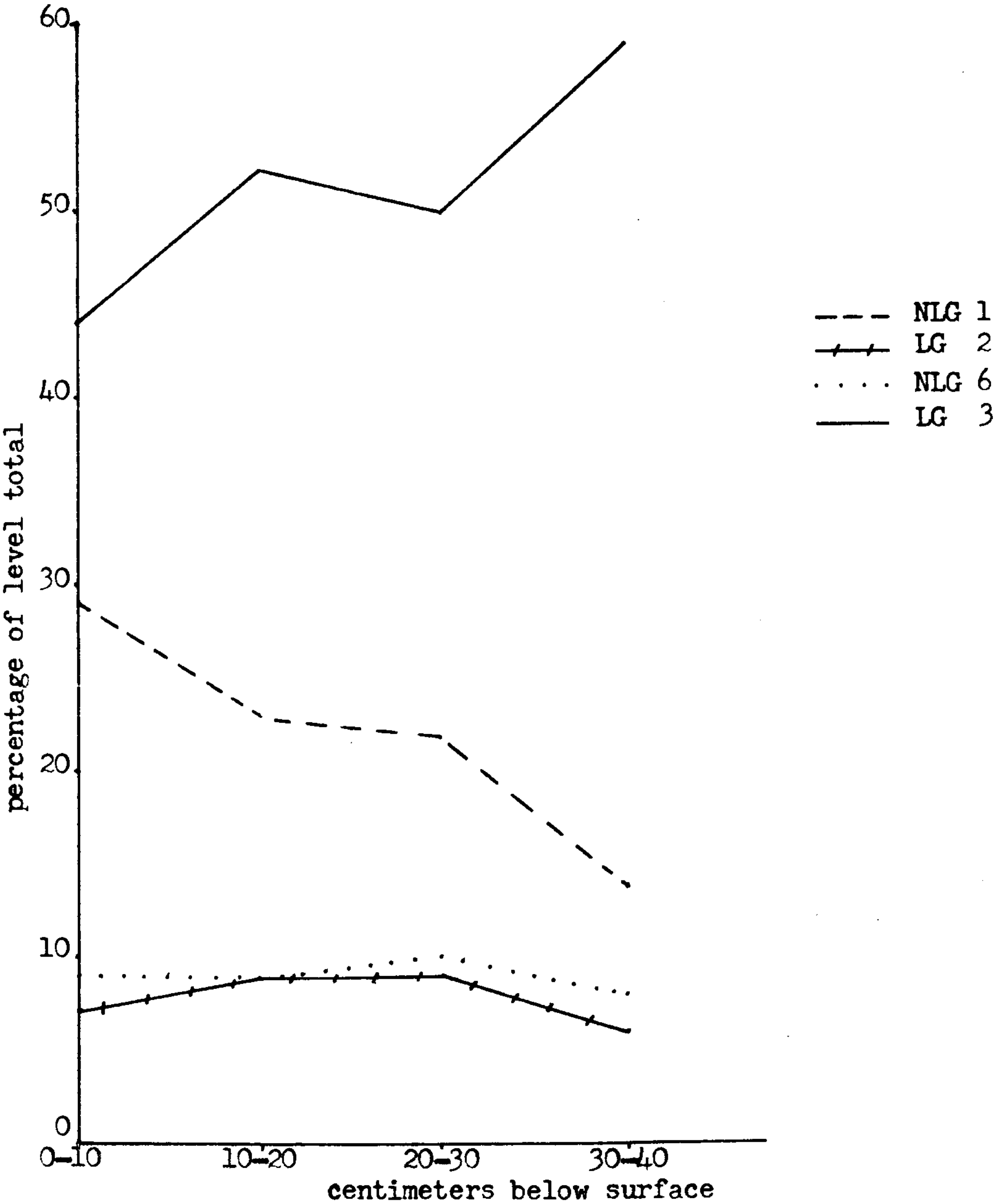


Figure 30 Vertical distribution of the major lithic groups at DhPt 10B - 1972 (percentage)

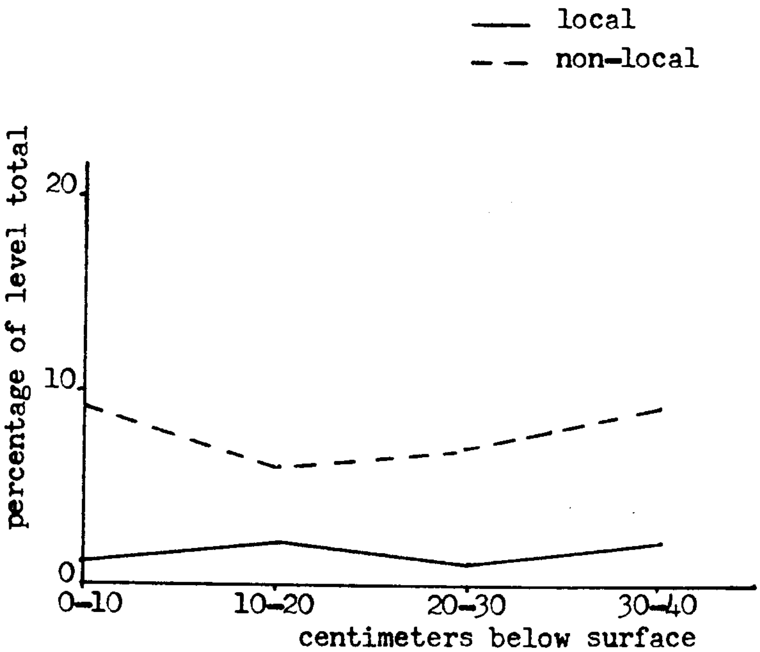


Figure 31 Vertical distribution of the minor lithics at DhPt 10B - 1972 (percentage)

DhPt 10B - 1973

In this sample lithic specimens are most frequent in level 4 (15-20 cm) (Fig. 32, Table 9). This level and the succeeding one (20-25 cm) also have more lithic groups. This pattern of increase, followed by decrease, is evident in the vertical distribution of all major lithic groups, with local groups peaking slightly earlier than non-local (Fig. 33). The final 10 cm (60-70 cm) with 42 specimens (0.42%) have been excluded from the graphs converted to percentages.

The percentages that LG 3 represents of each level total increase with depth, and NLG 1 decreases (Fig. 34). The distribution of NLG 1 and LG 3 support the previously stated hypothesis of a change in preference through time. Minor lithics were also investigated (Fig. 35), but changes are not readily evident.

Comparisons between DhPt 10B - 1972 and 1973

Comparisons of the vertical analysis of the 2 samples reveals that there are differences and similarities. In the 1972 sample all lithics seem to be most frequent in a later level than the 1973 sample. However, this discrepancy is probably a result of the different excavation levels employed. Inequality of sample sizes is believed to be the reason for differences between the frequency of LG 2 and NLG 6 in the 2 samples. In 1972 NLG 6 is more frequent in most levels and increases in relative frequency with depth while the

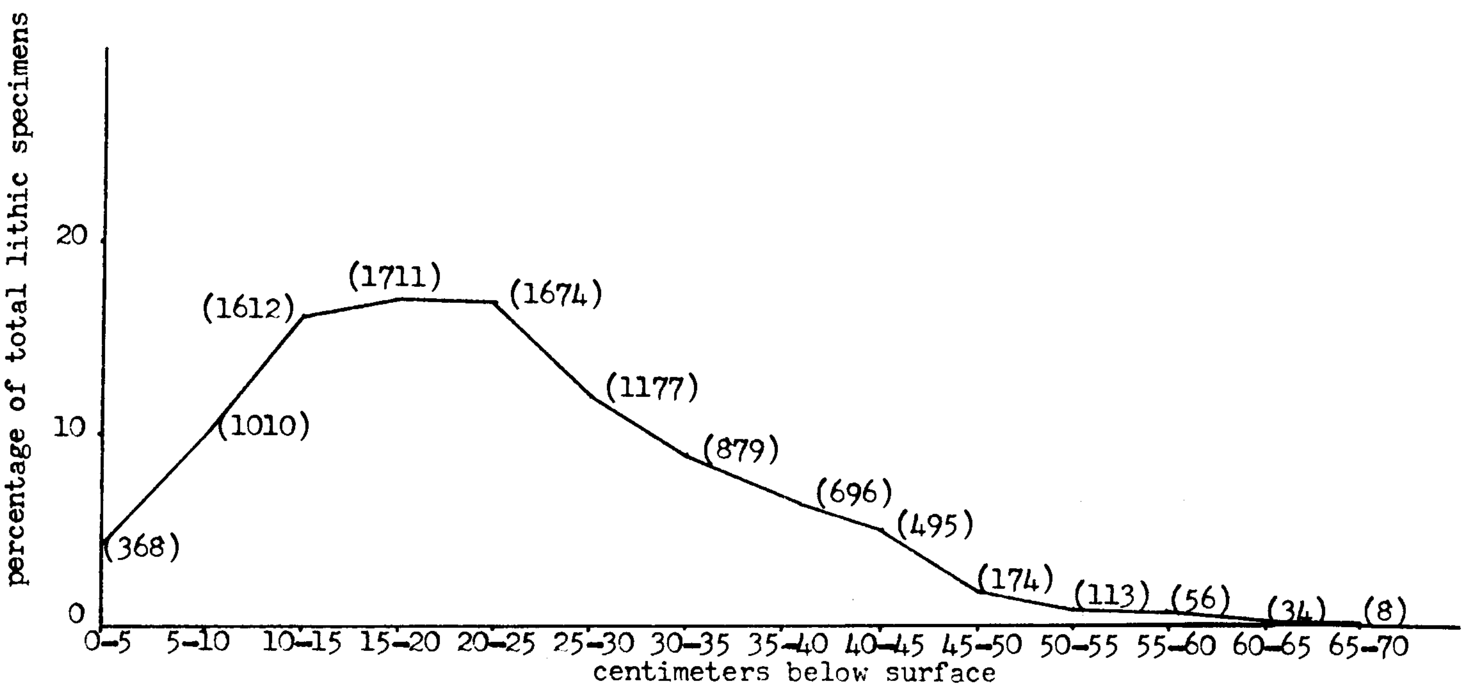


Figure 32 Vertical distribution of the lithics at DhPt 10B - 1973 (raw number in brackets)

Table 9 Vertical distribution of lithic groups at DhPt 10B - 1973

		1	2	3	4	5	6	7	8	9	10
0-5	no.	120	47	134	10	5	28		4	7	2
	%	32.61	12.77	36.41	2.72	1.36	7.61		1.09	1.90	0.54
5-10	no.	309	117	398	18	22	68	5	13	9	2
	%	30.59	11.58	39.41	1.78	2.18	6.73	0.50	1.29	0.89	0.20
10-15	no.	502	186	640	16	26	134	8	36	19	5
	%	31.14	11.54	39.70	0.99	1.61	8.31	0.50	2.23	1.18	0.31
15-20	no.	504	163	724	23	38	126	7	29	22	5
	%	29.46	9.53	42.31	1.34	2.22	7.36	0.41	1.69	1.29	0.29
20-25	no.	427	226	680	25	55	119	15	31	32	2
	%	25.51	13.50	40.62	1.49	3.29	7.11	0.96	1.85	1.91	0.12
25-30	no.	267	148	538	18	48	85	10	15	8	8
	%	22.68	12.57	45.71	1.53	4.08	7.22	0.85	1.27	0.68	0.68
30-35	no.	189	149	382	11	26	52	10	20	8	2
	%	21.50	16.95	43.46	1.25	2.96	5.92	1.13	2.28	0.91	0.23

Table 9 Vertical distribution of lithic groups at DhPt 10B - 1973 (Continued)

		11	12	13	14	15	16	17	18	19	20	Total
0-5	no.		7	1			1		1	1		368
	%		1.90	0.27			0.27		0.27	0.27		99.99
5-10	no.	8	35	1	2			3				1010
	%	0.79	3.47	0.10	0.20			0.30				100.01
10-15	no.	6	30				1	1	1		1	1612
	%	0.37	1.86				0.06	0.06	0.06		0.06	99.99
15-20	no.	13	38	2	2		2	9	2	2		1711
	%	0.76	2.22	0.11	0.11		0.11	0.53	0.11	0.11		100.01
20-25	no.	14	31	6	3		1	3	3	1		1674
	%	0.84	1.85	0.36	0.18		0.06	0.18	0.18	0.06		100.01
25-30	no.	5	15		1	1	1	1	7	1		1177
	%	0.42	1.27		0.08	0.08	0.08	0.08	0.59	0.08		99.95
30-35	no.	10	11	4	3		1	1				879
	%	1.13	1.25	0.46	0.34		0.11	0.11				99.99

Table 9 Vertical distribution of lithic groups at DhPt 10B - 1973 (Continued)

		1	2	3	4	5	6	7	8	9	10
35-40	no.	107	105	324	9	27	58	13	9	10	2
	%	15.37	15.09	46.55	1.29	3.88	8.33	1.87	1.29	1.44	0.29
40-45	no.	85	82	219	9	29	23	7	5	10	2
	%	17.17	16.57	44.24	1.82	5.86	4.65	1.41	1.01	2.02	0.40
45-50	no.	26	30	83	2	13	5	4	2	5	1
	%	14.94	17.24	47.70	1.15	7.47	2.87	2.30	1.15	2.87	0.57
50-55	no.	20	22	47	1	8	3	3	2	2	
	%	17.70	19.47	41.59	0.88	7.08	2.65	2.65	1.77	1.77	
55-60	no.	8	10	27		6	3				
	%	14.29	17.86	48.21		10.71	5.36				
60-65	no.	7	1	22		2	1				
	%	20.59	2.94	64.71		5.88	2.94				
65-70	no.	2		5		1					
	%	25.00		62.50		12.50					

Table 9 Vertical distribution of lithic groups at DhPt 10B - 1973 (Continued)

		11	12	13	14	15	16	17	18	19	20	Total
35-40	no.	9	16	1	4		1		1			696
	%	1.29	2.30	0.14	0.57		0.14		0.14			99.98
40-45	no.	8	11	2			2		1			495
	%	1.62	2.22	0.40			0.40		0.20			99.99
45-50	no.	1	2									174
	%	0.57	1.15									99.98
50-55	no.	3	2									113
		2.65	1.77									99.98
55-60	no.		2									56
	%		3.57									100.00
60-65	no.	1										34
	%	2.94										100.00
65-70	no.											8
	%											100.00

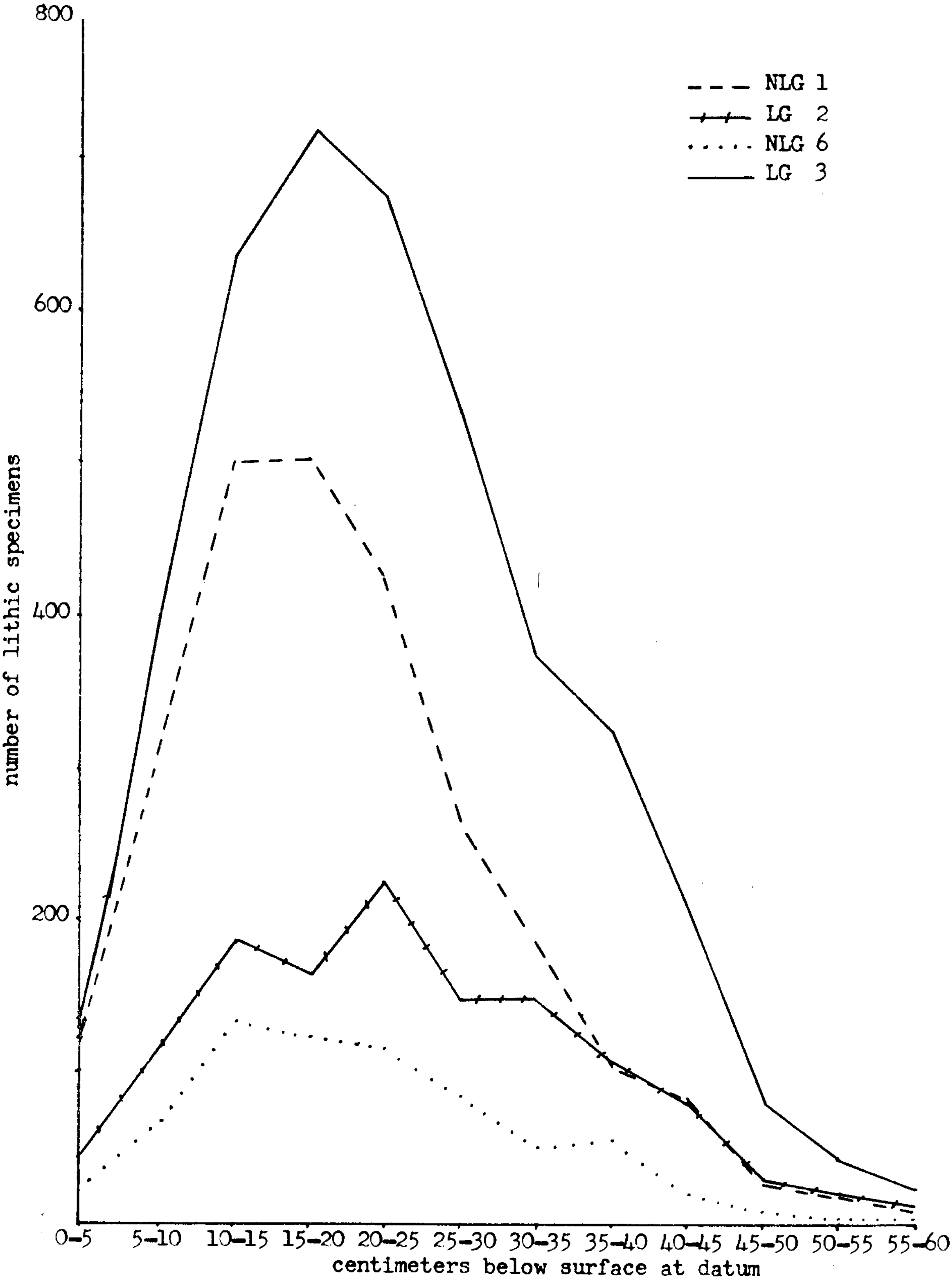


Figure 33 Vertical distribution of the major lithic groups at DhPt 10B - 1973 (number of specimens)

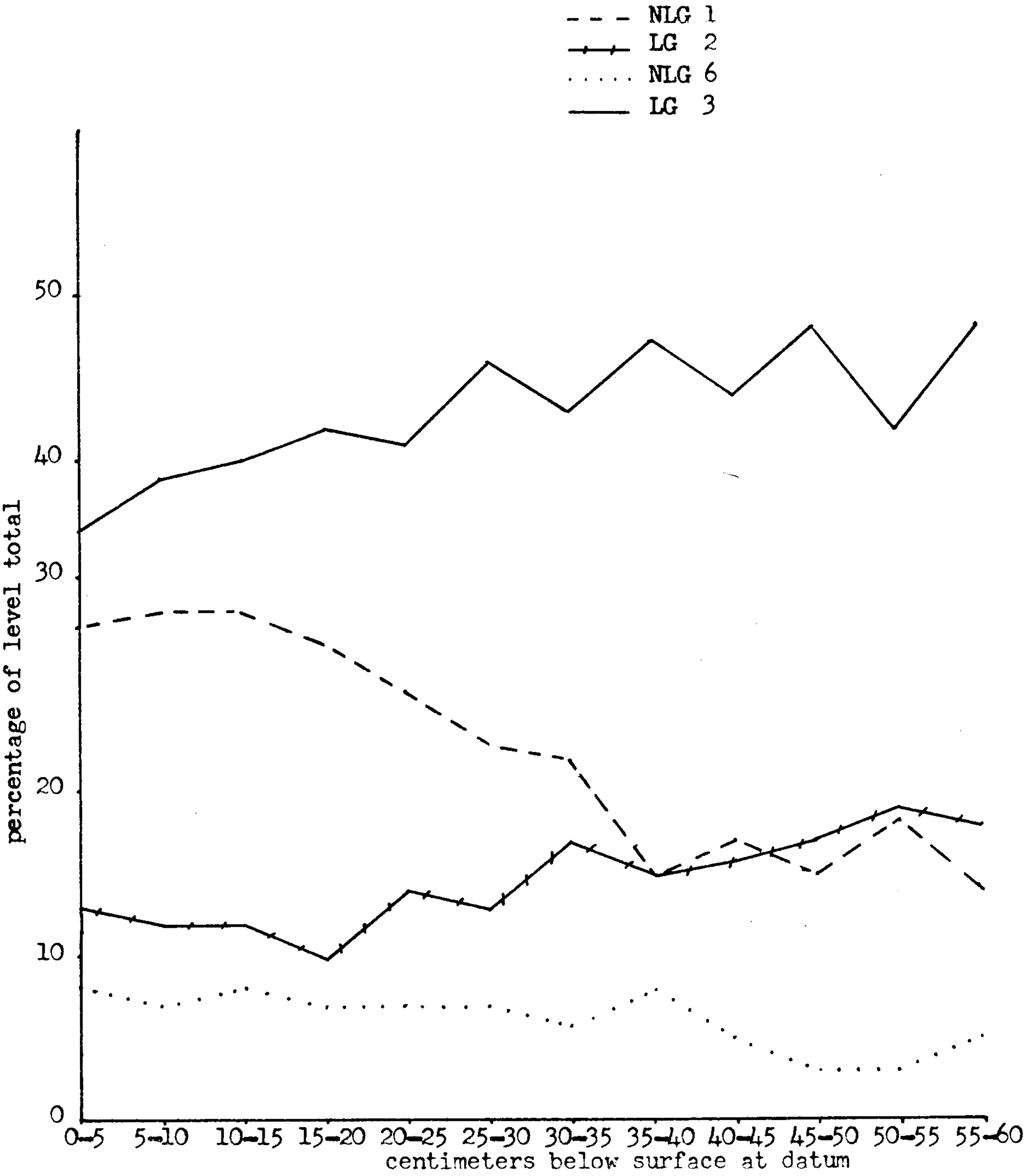


Figure 34 Vertical distribution of the major lithic groups at DhPt 10B - 1973 (percentage)

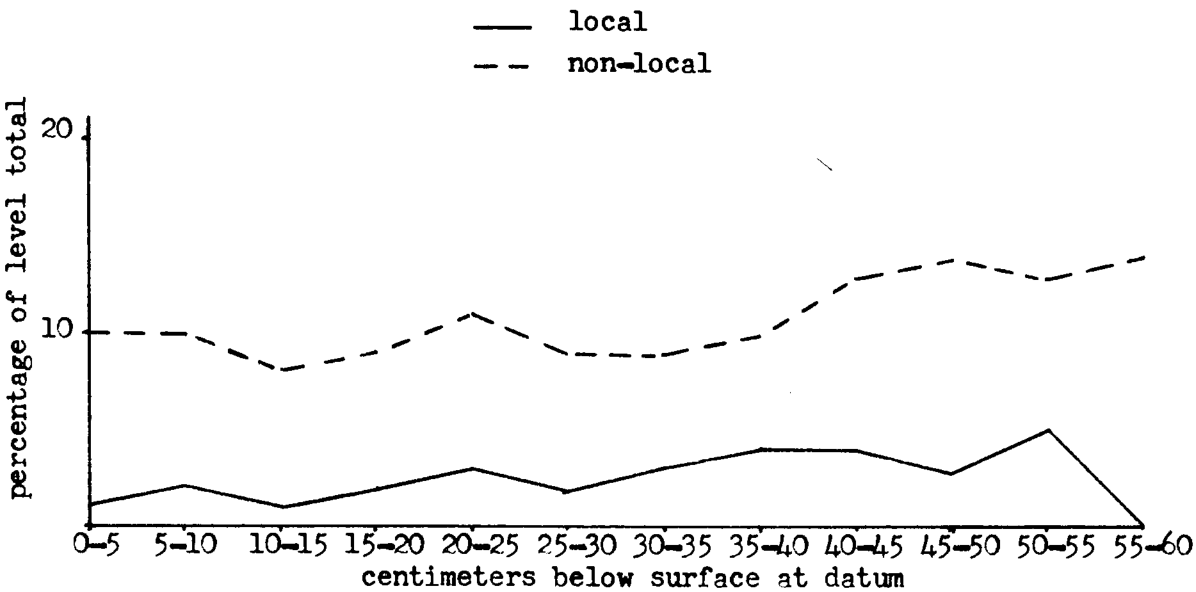


Figure 35 Vertical distribution of the minor lithics at DhPt 10B - 1973 (percentage)

less well represented LG 2 decreases with depth. Local Group 2 is more frequent in all levels in the 1973 sample and increases with depth while NLG 6 exhibits a decrease in relative frequency with depth. Prior to the start of analysis it was expected that LG 2 would behave in a manner similar to the other locally available major lithic resource, LG 3, while NLG 6 would emulate NLG 1. In the 1973 sample this is the pattern but in the 1972 sample LG 2 and NLG 6 appear to switch places. In order to determine which pattern, if any, is correct this distribution should be tested at other sites which exhibit a similar time depth.

Both samples exhibit a greater frequency of LG 3 than NLG 1, with the latter decreasing in relative frequency with depth, and the former increasing. Local resources tend to peak slightly deeper than non-local in both samples. There is a noted decrease in the number of lithic groups in the final levels, with only NLG 1, 5, 6, 12, and LG 3 in the last 10 cm of culture-bearing deposit in 1972; and NLG 1, 5, 6, and LG 2 and 3 in the last 10 cm from 1973. It thus appears that although there are some differences, which can probably be attributed to differences in the sample size and excavation procedure, the results of the two samples are similar and support the postulated change in lithic preference through time.

Speculations based on vertical distribution

It has been shown that LG 3 increases in relative importance with depth and NLG 1 decreases. This indicates that through time there was a shift from use of the readily available LG 3 to increasing exploitation of the less accessible NLG 1. There are a number of possible explanations for this shift.

Accessibility was undoubtedly a factor in the use of some lithic resources over others. However, LG 3 is readily accessible in the study area, while NLG 1 is not. Thus, increasing use of non-local material through time may be explained by the following factors: (1) a scarcity of LG 3; (2) a change in aesthetic preference; (3) NLG 1 becomes more suitable due to a shift in technology, or (4) NLG 1 became more accessible. A scarcity of LG 3 does not appear to be the only answer, for it was still evident prior to inundation of the valley, although perhaps the best and largest pebbles were used up leaving a progressively poorer selection. Meyers' research (1970:35) with chert sources in Illinois suggests that the rate of depletion and replenishment of river pebbles by nature is in equilibrium, and that human exploitation would replace rather than augment the natural forces of depletion. This would support the idea of a continued availability of LG 3 through time. It is possible that changes in aesthetic values may have resulted in the change from LG 3 to NLG 1 through time; NLG 1 material comes in a wider range of colors, is vitreous, and may be more pleasing to the eye. However, beauty may not have been a major consideration in relation to functional qualities. Non-local Group 1 does appear to be less brittle than LG 3, and thus an increase in its use could be related to its durability. It is also possible that a change in the seasonal round or intensification of a portion of it may have played a role in the increased use of NLG 1. Turney-High (1941) has noted that ethnographic Kutenai travelled to the Plains 3 times a year to hunt bison and Choquette (n.d.) has stated that the trail through Top of the World Plateau (source of NLG 1) may have been used as a pass to the east, and seasonal (summer) hunting grounds. Perhaps increased use of the bison hunting grounds or trail during the late period resulted in more NLG 1 being brought into the study area. It is probable that more than one factor was the cause of the increase in NLG 1, but it is difficult to discern which was more likely.

Further analysis of lithic preference and distribution at DhPt 1, 4 and 10B is interrelated with the time periods and artifact types evident in the artifact analysis. A discussion of the conclusions attained in the lithic analysis is presented in conjunction with a summary of the artifact study in the succeeding chapter.

CHAPTER 5 SUMMARY AND CONCLUSIONS

The following discussion of the lithic artifacts from DhPt 1, 4 and 10B will suggest the role of site function in lithic utilization, the extent of the lithic exploitation territory of the site occupants, and differences through time. These factors and other related ones, are not easy to separate for they tend to interact with one another. The discussion of how these factors act and react will begin with the temporal aspect.

TEMPORAL-SPATIAL DIMENSIONS

Three radiocarbon dates submitted to Washington State University arrived 2 days prior to the submission of this thesis to the examining committee. They have thus been included in the conclusions, but not the descriptive section of this study (Table 10).

Table 10 Radiocarbon dates as reported by WSU

	WSU age date determination
sample #1	109 ± 1% modern
sample #2	610 ± 70 yrs. B.P.
sample #3	230 ± 70 yrs. B.P.

These represent the only radiocarbon samples collected during the escavation of the 3 sites and are from the upper levels of DhPt 10B.

Samples #1 and #2 are from the same excavation unit and are vertically separated by only a few cm, with the former being slightly deeper. Associated artifacts include utilized, retouched and unworked flakes, notched pebbles and spall tools. Sample #2 is within the late time period as inferred by the artifact analysis (A.D. 1 to 1800). An unknown source of contamination or local source of disturbance not evident to the excavators may account for the modern date of sample #1. Sample #3 from a unit to the north of the first 2 samples, is also within the age range of the presumed late occupation, and was associated with a spall tool, debitage, faunal remains and fire-broken rock. The radiometric data thus supports a late date for the upper occupation of this site. Sufficient charcoal was not present in the lower levels, associated with the earlier period, to obtain a datable sample.

The early period is represented by lithic groups 1 to 8, and 10 to 14a, with local resources most frequent. The territory encompassed by the early exploitation of non-local lithics is diagrammed in Fig. 36. Although the source of NLG 6 is not specifically known it may be to the south or southeast (Choquette pers. comm. 1976: Reeves 1972a). Barring unknown factors, such as unfriendly groups near the source areas, it can be assumed that it was either 1) not as suitable, or 2) not as accessible as NLG 1. NLG 8 (obsidian) is the only lithic material represented in the early period that is inferred to have been traded. NLG 12 (Kootenay argillite) may also have been traded, but as it appears to be quite frequent in the study

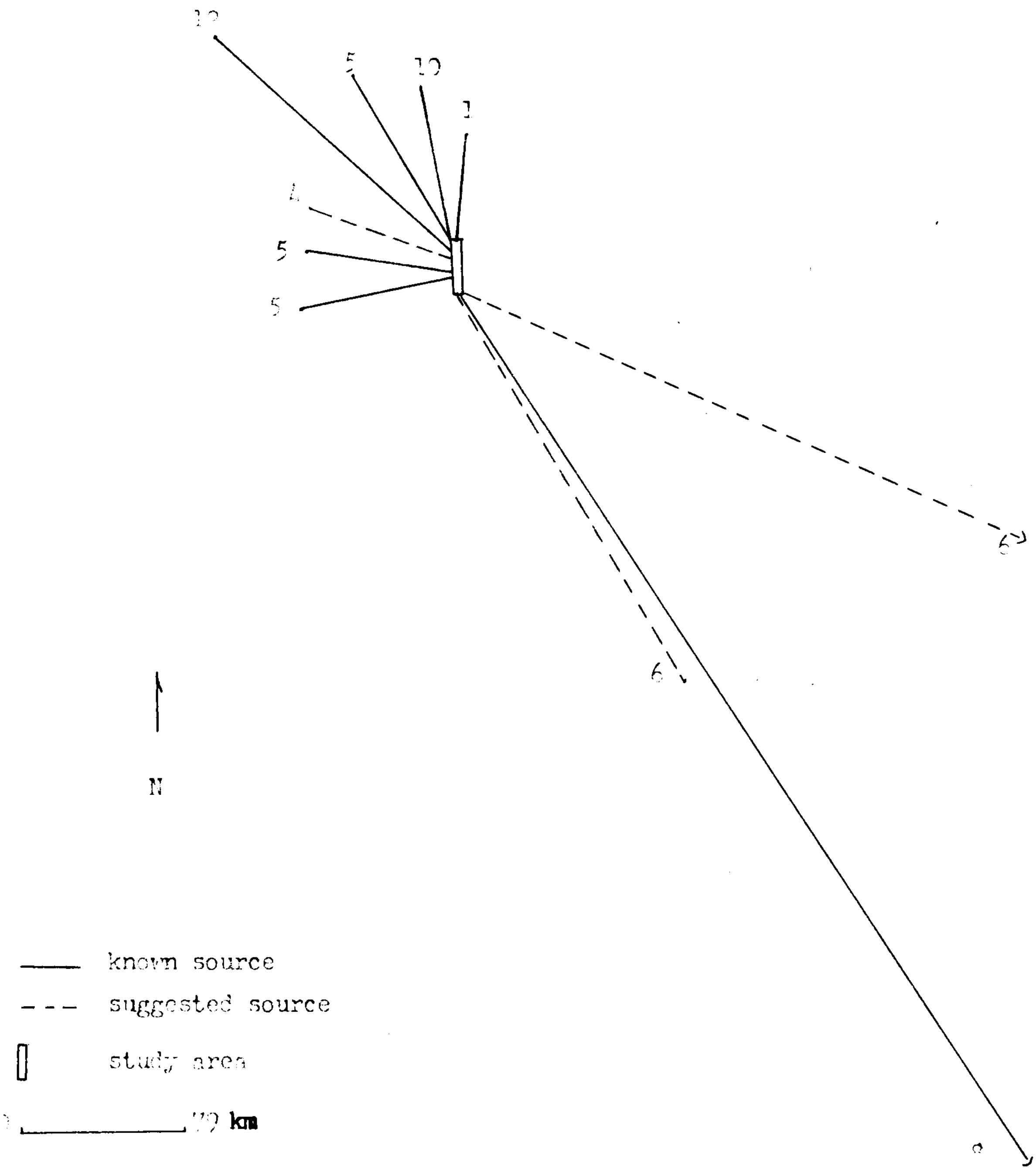


Figure 36 Schematic diagram showing the range of non-local lithics in the early period

sample it may also have been directly quarried. The remaining local lithic groups in the early component are believed to lie within the seasonal subsistence range of a population in the study area.

The late period at DhPt 10B contained specimens from 20 lithic groups. The lithic groups, not already evident in the earlier period, are both local (14b-e, 16, 17, 18, 19) and non-local (9, 15, 20). The suggested territory encompassed by late-period exploitation of non-local lithics is diagrammed in Fig. 37. Although the source of NLG 9 (Avon chert) may have been visited, the distance involved (approximately 350 km) (Fig. 12) and the fact that it is not well represented (0.02% of the total sample) could indicate it was traded. Group 15 (nephrite) was undoubtedly traded and its low frequency may be a function of the distance. However, tools of NLG 15 and NLG 20 could also represent "curated" artifacts which were not readily discarded.

The data suggests that NLG 1 (Top of the World chert) was exploited more frequently than any other non-local resource. Non-local Group 6 was second in frequency and NLG 4, 5 and 12 combined were third. Accessibility of some of the sources may have been limited during certain seasons. High water could have made some of the local pebble sources difficult to exploit and winter snows would effectively eliminate the higher altitude sources. The presence or absence of certain resources could theoretically be an aid in the determination of seasonality. However, the possibility that lithic raw materials were gathered prior to site occupation and utilized some time after

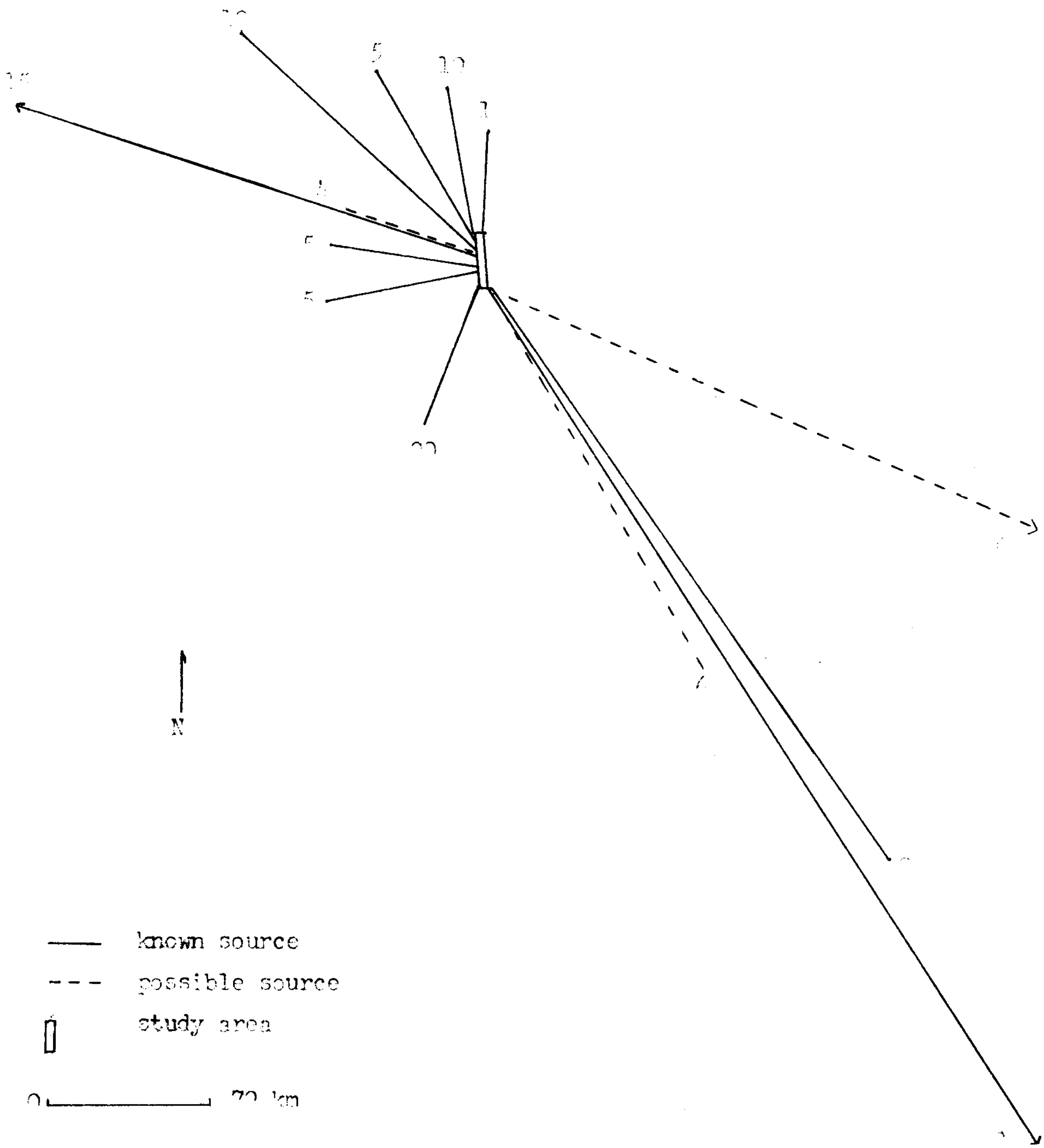


Figure 37 Schematic diagram showing the range of non-local lithics in the late period

they were obtained would partially bias such an interpretation, although it is not likely that a nomadic group would carry around large quantities of core material. The frequent occurence of lithics from stream and high altitude sources would suggest that the occupation of the sites was not likely in winter or during the spring freshet. Although informants have indicated that bed-rock quarry sources yield lithics that are not as brittle as that from pebble sources and thus are more desirable (Turney-High 1941:88), the latter are predominant in the study sample.

A comparison of non-local lithics available in the early period (Fig. 36) with those in the late period (Fig. 37) at DhPt 10B and DhPt 1, indicates that generally similar lithic territories were exploited. Two of the types not present in the earlier time (NLG 9 and 20) are suggestive of increasing interaction with the south. The 1 specimen from the west is not sufficient to demonstrate increased interaction in that direction. The scarcity of material from eastern sources confirm that Plains affiliations were not that strong in the late period. The study area is fairly central to the exploited lithic resources and most sources fall within the ethnographic territory of the Kutenai. The differences between the early and late component results from the addition of some lithic types and a slight change in percentage distributions of already present lithic groups.

It has been tentatively suggested that the continuation of occupations at DhPt 10B and 4 until contact, and the similarity of the artifact inventory and inferred subsistence activities to that exhibited by the Kutenai, may indicate their use of the area before historic times. This is only a tentative conclusion since the ethnographic material culture is only poorly known. The fact that this analysis suggests that the late occupation of the study area has more Plateau than Plains traits may be significant to theories of Kutenai origin.

One goal of this research was to investigate the use of raw material frequency as an aid to relative dating of sites, which do not contain otherwise diagnostic artifacts or radiometric dates. The idea that lithics might be valuable in this respect was based on the hypothesis that non-local resources would represent increasingly larger proportions of lithic assemblages through time. Analysis shows that some non-local materials, specifically NLG 1, do increase in relative frequency through time. The distribution of local and non-local lithics at the 3 sites would suggest that DhPt 1 is earliest, DhPt 10B intermediate, and DhPt 4 latest in age (Fig. 38). (This obviously does not take into account the fact that 2 of the sites are multicomponent.)

As the dominant materials at DhPt 4 are NLG 1, 6, and 9 and LG 3, and those at DhPt 10B are NLG 1 and 6 and LG 2 and 3, it is suggested that the former represents an occupation that is relatively later in time. Although an early period point is evident at DhPt 4 it could represent an isolated find or at least a single temporary occupation. It is suggested by the predominance of the non-local material, one of which is characteristic of only the late period and exhibits

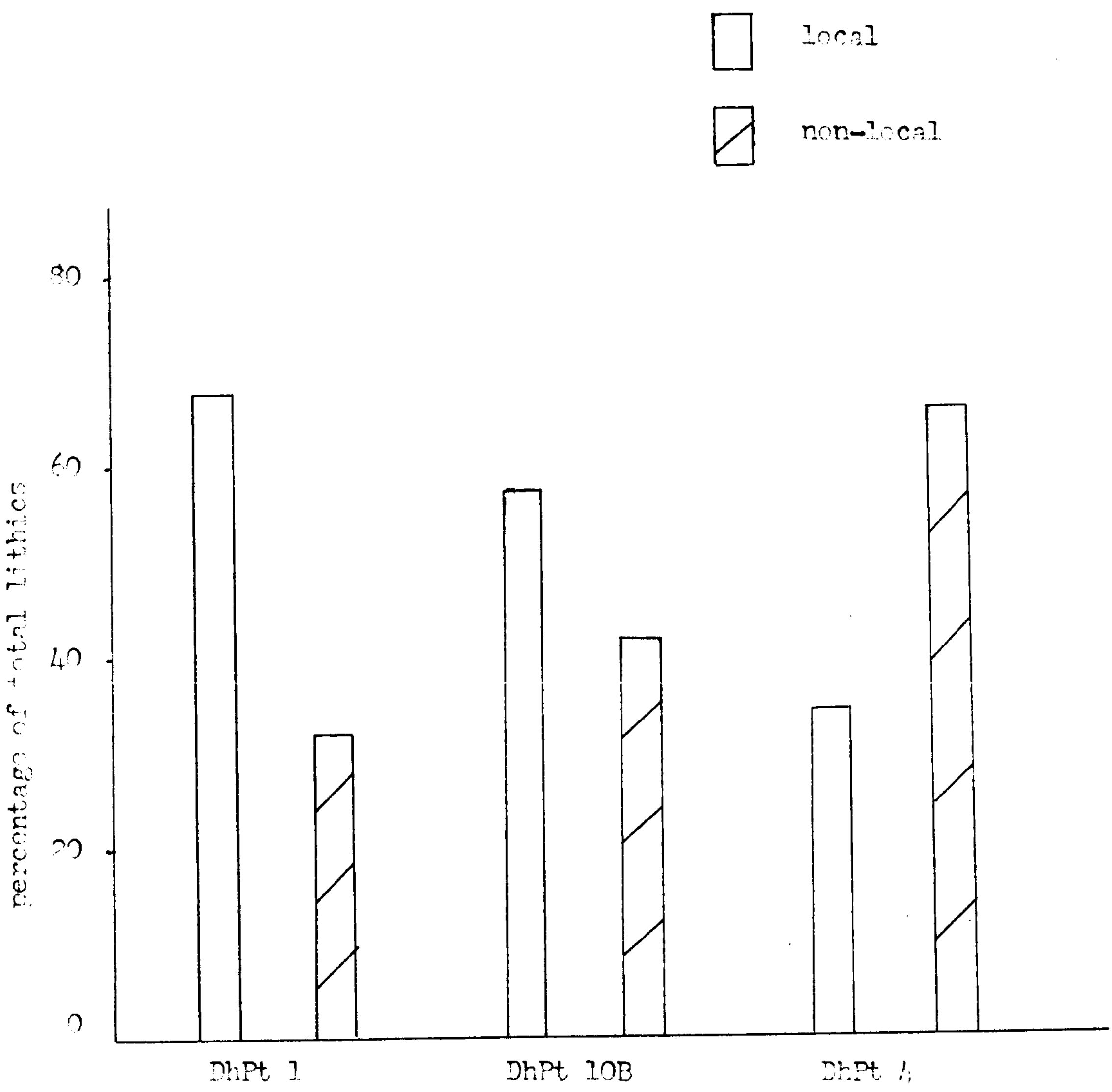


Figure 38 Distribution of local and non-local lithics at the 3 sites

a proportionate increase at DhPt 10B (NLG 9), that this site was primarily utilized in the later time. DhPt 1, with a higher proportion of local lithics than that exhibited by DhPt 4 or DhPt 10B, has been temporally assigned to the early period and would seem to support the idea of greater local lithic utilization in earlier times.

The intermediate percentage of local lithics at DhPt 10B may be explained as a function of more intense early period occupation than that at DhPt 4. Other factors, such as site activity and source proximity could also have had some effect.

It is thus suggested that lithics may prove to be useful in assigning relative dates to sites, but further evaluation of this hypothesis should be concentrated on single component sites with similar functions and durations of occupation.

SITE USE

The occurrence of more lithic groups in the late period may be a result of increased lithic utilization through time, but also appears to be affected by site use. It is logical to assume that a more permanent camp will contain a wider range of trait variability than a temporary or task-specific site. Varied activities in the late seasonal base camp occupation of DhPt 10B would necessitate more types of tools and raw materials. The close proximity of the LG 3 source would also likely effect the proportion of that material at this site in relation to the slightly more distant DhPt 1 and 4.

The changes in lithic frequency and lithic groups present in DhPt 1, 4 and 10B thus appear to be the result of time and length of occupation, the activities undertaken, and the proximity of lithic sources.

LITHICS AND ARTIFACTS

Investigation of lithic preferences for certain artifact classes indicates definite selection tendencies (Table 11). The artifacts have been arbitrarily divided into 3 groups, based on relative size, for this discussion. "Large" artifacts, such as pecked stone tools, the pecked and ground stone pestle, and pebble tools - class 1 (type a) are made exclusively of local materials and most exhibit little modification. With the exception of 2 specimens, "medium" sized tools, such as pebble tools - class 1 (type b), and class 2 (type a-c), slab tools, spalls, cores, and ground stone (type b) are produced from local materials as well. The modification of these tools is often more extensive than that exhibited by larger types. "Small" tools, which consist of formed bifaces - classes 1 and 2, formed unifaces, and flakes are made of both local and non-local materials. Local materials dominate in a few artifact types but non-local groups are predominant in most of the artifact types within this "small" tool classification. The formed bifaces - class 1 in which local materials are more frequent than non-local are unnotched bifaces (types ai and c) and corner notched bifaces (type a). Note that local lithics are not dominant in any biface group considered to be indicative of the late

Table **11** Distribution of artifacts by lithic group

	1*	2	3	4*	5*	6*	7	8*	9*	10*	11	12*	13	14	15*	16	17	18	19	20*	Total
Formed biface - class 1																					
Unnotched																					
type ai			5																		5
type aii	5	1																			6
type bi	1	2	1		1							1									6
type bii	12	1		1	2	1			1			1									19
type c		1																			1
fragments	79	10	10	6	6	14		3	4	2		8									142
Basally notched												2									2
Corner notched																					
type a		2	5		2																9
type bi	3	1	1																		5
type bii	3		3			2															8
type biii	1					1			1			1									4
type c	2		1		1	2															6
Stemmed	2	4				2			1			2									11
Side notched																					
type a	7		1		4	1	1														14
type b	8					2															10
type c	5		1																		6
type d	38	1		2		3															44
fragments	23	4	9	1	3	9			2			2									53
																					351

* Non-local

Table 11 Distribution of artifacts by lithic group (Continued)

	1*	2	3	4*	5*	6*	7	8*	9*	10*	11	12*	13	14	15*	16	17	18	19	20*	Total
Formed biface - class 2																					
Biface preforms	11	6	19		1	1	1														39
Perforator/drills																					
type a			1			3			1												5
type b	1		2			1															4
																					48
Formed unifaces																					
type ai	2					3															5
type aii	7		4	3		8			2			2									26
fragments	6	1	1	1		4			1			1									15
type b			2	3		1															6
type c	6	1	2	1		7															17
																					69
Cores																					
type a	2		10				2														14
type b	6		8			2															16
																					30
Slab tools																					
type a													1					3			4
type b											6					1	10	4			21
type c											8						11	8			27
																					52
Pebble tools - class 1																					
type a											9						2				11
type b			3								2		2	1d 1b		2				1	12
																					23

* Non-local

Table 11 Distribution of artifacts by lithic group (Continued)

	1*	2	3	4*	5*	6*	7	8*	9*	10*	11	12*	13	14	15*	16	17	18	19	20*	Total
Pebble tools - class 2																					
type a											5		5								10
type b											8		4	1b		5			4		22
type c											5										5
																					37
Cortex spall tools																					
type a							1				4		1	2e		1					9
type b			1				2				3		7	1e 1b				1			15
type c							3				2		2	1e					1		10
																					34
Flakes																					
type a	98	19	77	13	10	27	1	7	2	1	7	8									270
type b	98	13	68	22	11	65	1	5	6	3	1	10				1					304
type c	14	1	12	3	1	4		1			1	1									38
type d	3280	1468	5754	147	352	930	156	184	245	33	33	234	2			1					12,819
Pecked stone tools																					
type a											1			4c 3c		1					9
type b														1d							1
Pecked and ground														1d							1
Ground																					
type a																				1	1
type b															1						1
Incised																1					1
																					14

* Non-local

component (unnotched bifaces types aii, bii, and side notched bifaces types a-d). This suggests the increasing importance of non-local materials for point and knife forms. This may be a result of selection for functional efficiency, although previously discussed factors (accessibility and aesthetic preferences) should not be ignored. Biface preforms are also more frequently made of local material, as are unworked flakes. However, the remaining biface types, all unifaces, and utilized or retouched flakes are dominated by non-local lithics.

The fact that large stone tools are predominantly of local materials is not unexpected. A nomadic group cannot carry large quantities of rock from site to site and so will utilize whatever is available, especially for expendable tools that are large and/or require little modification. The same could be said to be true of the medium-sized tools. Of course, the material would have to be suitable for the purpose(s), or other materials would be sought.

The predominance of local material among unworked flakes, and of non-local material with modified flakes, is believed to be indicative of the "value" of non-local resources. In terms of travel and/or trade cost the non-local lithics represent a more valuable resource. Whether they were also aesthetically or technologically more desirable to the tool-maker is indeterminate. It would seem logical that the tool-maker and user would be more inclined to utilize as much of the non-local core and flakes as possible since that material cost him more effort to obtain. This may help to account for the predominance of non-local lithics in the utilized and retouched flake types, for there are obviously more unworked flakes of the local material available. This is further supported by the fact that the exhausted core (type b) category is predominantly non-local, while cores that could still yield flakes are mainly of local material. The tool maker would be more inclined to use as much of the non-local core as possible, or carry it to his next camp, rather than discarding it before it was exhausted. The scarcity of primary manufacture flakes of non-local material is believed to be a result of primary modification being completed near the source, to lessen weight. This is evidenced by the numerous workshops located near the NLG 1 source at Top of the World and, although this affects the proportion of non-local lithic flakes deposited at camps, the effect can be assumed to be constant through time, as workshops on the plateau contain both early and late period point styles (Choquette, pers. comm. 1976).

The nomadic tool-maker is not likely to have carried all of the tools he used from one site to another. It is logical to assume that he would be more inclined to transport tools of non-local "valuable" lithics, and those that represent the greatest expenditure of manufacture time. The tool-user is also less likely to transport tools that are seasonally specific. That is to say, if the "netweights" functioned as fishing sinkers it would be senseless to transport them to an upland site where there are no fish. Instead they would be left at the fishing station and possibly used in succeeding seasons. If these tools served a specific short-term site function they would more likely be made of local materials, to save more "valuable" materials for more generalized functions. Not all tools are seasonally specific, however. Vegetal processing tools could be used on meat in the winter, food and hide preparation tools might be used all year as hunting is usually a year round activity, and leisure activities may intensify during certain seasons, but not necessarily a single specific one. It would thus be difficult to assume seasonality on 1 factor alone, one should consider faunal remains, lithic availability and presence, and the length of occupation as well.

Table 9 reveals that a number of lithic groups, predominately in the late component, are only represented by secondarily modified tools and have yielded a few or no utilized, retouched or unworked flakes. Most of these materials are local. Since some of the tools are pecked and/or ground rather than flaked, especially those of groups 14, 15, and 20, the absence of detritus is not peculiar. The remaining lithic groups (13, 16, 17, 18 and 19), however, are often used to produce chipped stone tools. The absence of debitage from these lithic groups could be accounted for in a number of ways; (1) the materials do not produce "classic", or easily identifiable conchoidal flakes and were not collected; (2) in many cases the flake scars are small and thus discarded flakes may have passed through the $\frac{1}{4}$ inch mesh screening used in the excavation; or, (3) these tools may have been produced elsewhere and brought to the site. Which of these possibilities was the most likely alternative was not concluded.

In summary, the analysis has revealed that a number of factors may have interacted to produce the lithic variability at the 3 sites: date, season, length and function of occupation, and proximity to lithic sources. The overall rather limited change in the lithic materials used from ca 3000 - 1500 B.C. until contact, may suggest some cultural continuity.

The function of the sites appears to have changed through time, as suggested by the inferred seasonal occupation of DhPt 10B in the late period. This implies a change in the subsistence pattern, in which low terrace sites began to supply enough food and raw materials to be occupied for extended periods of time. That these camps would also serve as a base for hunting and lithic exploitation into surrounding areas is suggested in the lithic frequency and variety. Although the proximity of the LG 3 source has had an effect on the lithic frequencies at this site, it is not believed to be a prime cause for the selection of the site for occupation. This is supported by the wide variety and high frequency of other lithic materials that are not as accessible as LG 3, and by the inferred range of activities that were undertaken at the site. If lithic exploitation had been the primary cause of site occupation it would have been more efficient to camp on the east side of the Kootenay River, near the mouth of the Elk **(Fig.2)**. It is suggested that the subsistence pattern of the prehistoric occupants of the study area was based on a variety of resources in the valley and that lithic resources did not play the only major role in site location.

COMPARISONS TO SURROUNDING AREAS

Choquette's research in the study area was initiated in 1971. His typological comparisons with the Plains indicates initial occupation of the Kootenay Valley could be as early as 6000 to 7000 B.C. (Choquette 1972b). The earliest typological comparisons in the Libby Reservoir are with Oxbow and McKean-like points (3000 B.C.). Points comparable to Sanger's Upper Middle period (1500 B.C. to A.D. 1) are also present in the study area (Choquette pers. comm. 1973). Research to the east in the Elk River Valley has indicated that this area was also utilized as early as 6000 to 8000 B.C. but only in the last 2,000 to 3,000 years is there definite evidence of a local population (Choquette 1973c). Lithic materials utilized in the Elk Valley are similar to those from the Libby study area. The tool inventory from the Kootenay Valley indicates a hunting economy with some fishing and gathering at certain locations.

Analysis undertaken by Whitlam (1974) at DhPt 10A (Fig. 2) consisted mainly of a statistical investigation of tool kits which was not beneficial to this study. Whitlam's artifact typology, however, indicates that material and tool types are similar. The author would suggest that a comparable period of time is represented at DhPt 4, 10A and 10B and that possibly similar exploitive subsistence was practiced.

Borden's survey in 1954 included the southern portion of the Kootenay Valley and the Columbia-Windemere area. Borden noted the predominance of side notched points in the latter region and correlated them with the intrusion of Shuswap groups. Less common corner notched varieties were attributed to the Kutemai. The present analysis of the Libby area also indicated a predominance of side notched points, as does Taylor's research in Montana (Taylor 1969), suggesting these points are not distinctly Shuswap. Borden's artifact inventory is similar to that of the study area sample, except he notes Bitterroot-like points, leaf-shaped points, grooved stone mauls, girdled sinkers and anvil stones, none of which were recovered from DhPt 1, 4, or 10B, although most have been discovered elsewhere in the study area. Borden's lithic materials include types apparently similar to the study sample, but did not include obsidian. A paucity of grinding stones and bone tools has been noted by Borden, Choquette, and Taylor and is also evident in this analysis.

These 3 investigators did not locate any evidence for mat-covered lodges, which the ethnographers (Chamberlain 1892; Turney-High 1941) suggest were used by the Kutenai. Taylor's (1969) research in the American portion of the Libby reservoir reveals close affinities with the study area. Materials recovered relate almost exlusively to food-getting activities and most sites are temporary hunting and butcher camps. Stone sinkers were, once again, the only postulated evidence for fishing. The sites are not deeply stratified and early material is scarce. Taylor's comparison with Borden's survey collection revealed many comparable tool forms, and Taylor's stemmed and corner notched points are found in association with late side notched points, a characteristic previously discussed. Taylor also has some leaf-shaped styles similar to Borden's, and corner notched points with contracting stems, which are not known from the study area. Taylor's lithics include chert, obsidian, argillite, chalcedony, quartzite, jasper, and siliceous mudstone of various colors. Unfortunately these are not specifically described making accurate comparisons difficult. Choquette, Borden, and Taylor's research suggests that internal similarities are greater than the differences. This suggests cultural continuity within the Rocky Mountain Trench, from the Columbia-Windemere Lakes to Libby, Montana. The analysis of DhPt 1, 4, and 10B suggests that the similarities also extend to adjacent areas of the Plains and Plateau. Taylor concludes that the occupants of the American portion of the reservoir were prehistoric Kutenai, based on similarities between ethnographic and late prehistoric material. That there is not definitive evidence for this in the study area has already been discussed.

Reeves' (1972b) analysis of Crowsnest Valley material indicated that the culture history of the area extends as far back as 6000 B.C. The valley was occupied at that time by what Reeves terms the Mountain/Foothill Cultural Complex, distinct from that of the Plains. Around 5500 B.C. an intrusive group is believed to have displaced the earlier occupants. The new tradition continued to 1500 B.C. and is well represented by a number of sites and assemblages. After 1500 B.C. there appears to have been different locally adapted groups occupying the Crowsnest Lake area, and Reeves notes increasing Plains influences in the late prehistoric, as well as a distinctive assemblage that he suggests may be Kutenai.

Similarities between the formed biface-class 1 artifact types of the Kootenay Valley study area and the Crowsnest middle to late prehistoric styles are evident. "Sidescrapers" appear to be rare in both areas while other formed unifaces are well represented. Tools found in the Libby Reservoir sample that are absent from the Crowsnest include: worked slabs, bifacial perforators/drills, pestles, and adzes. Most other tool types described by Reeves (1972b) show general similarity with the west. The dominant lithics from the Crowsnest sample are local cherts and chalcedonies, with exotic such as obsidian, Kootenay argillite, Avon chert and basalt occuring rarely. Three of these exotics, although not major in the study area, are more frequent. Lithic trade with the Rocky Mountain Trench from 1000 B.C. to A.D. 200 is inferred (Reeves 1972b:27). A comparison of the results of the preliminary analysis of the Crowsnest material suggests similarities with the Kootenay Valley are greater than the differences.

In conclusion, the analysis of the data from DhPt 1, DhPt 4, and DhPt 10B has revealed an increase in non-local lithic utilization and suggests increased Plateau influences through time. The artifact analysis has supplied a tentative relative chronology which is supported in part by radiocarbon dates and changes in lithic preference. The range of prehistoric exploitation has been suggested and spatial affiliations discussed. This reasearch thus presents a foundation for further lithic studies and culture history investigations of the Kootenay Valley.

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APPENDIX 1

The following tables of quantitative artifact attributes are presented primarily as a source of data for future comparisons. Relative size was used occasionally as a determinant of the artifact type and the range of variation of some specimens were compared to attributes of comparable formal types.

APPENDIX 1 - ATTRIBUTE TABLES

Table 1. Unotched bifaces, type ai

	mean	range	S.D.
length	4.30	3.33 - 5.08	0.73
width	2.75	2.23 - 3.32	0.38
thickness	0.72	0.52 - 0.98	0.18
weight	8.53	3.75 -15.05	4.46

Table 2. Unnotched bifaces, type aii

length	2.02	1.52 - 2.51	0.70
width	1.23	0.86 - 1.74	0.46
thickness	0.31	0.21 - 0.45	0.11
weight	frag.		

Table 3. Unnotched bifaces, type bi

length	3.92	3.68 - 4.41	0.42
width	2.38	2.08 - 3.02	0.32
thickness	0.65	0.39 - 0.90	0.20
weight	6.57	6.30 - 7.10	0.46

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 4. Unnotched bifaces, type bii

	mean	range	S.D.
length	1.76	1.19 - 2.71	0.47
width	1.19	0.79 - 1.31	0.19
thickness	0.33	0.21 - 0.44	0.10
weight	0.65	0.20 - 1.20	0.33

Table 5. Corner notched bifaces, type a

length	2.80	2.80	
width	2.58	2.51 - 2.64	0.09
thickness	0.65	0.53 - 0.83	0.13
width (neck)	1.15	0.98 - 1.31	0.13
weight	2.90	2.90	

Table 6. Corner notched bifaces, type bi

length	3.45	3.34 - 3.61	0.14
width	1.91	1.66 - 2.40	0.29
thickness	0.52	0.41 - 0.63	0.09
width (neck)	1.12	0.93 - 1.40	0.18
weight	3.18	2.70 - 3.65	0.67

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 7. Corner notched bifaces, type bii

	mean	range	S.D.
length	4.08	2.65 - 6.31	1.96
width	2.18	1.75 - 2.56	0.35
thickness	0.56	0.38 - 0.78	0.17
width (neck)	1.27	1.01 - 1.47	0.22
weight	5.70	2.00 -10.10	4.10

Table 8. Corner notched bifaces, type biii

length	3.02	2.26 - 4.13	0.80
width	2.16	1.89 - 2.51	0.32
thickness	0.44	0.25 - 0.63	0.16
width (neck)	1.14	1.14 - 1.49	0.34
weight	2.25	2.00 - 2.50	0.35

Table 9. Corner notched bifaces, type c

length	2.68	2.08 - 3.37	0.52
width	1.89	1.42 - 2.22	0.30
thickness	0.55	0.35 - 0.79	0.16
width (neck)	1.20	0.79 - 1.48	0.25
weight	2.10	1.05 - 3.15	0.90

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 10. Stemmed bifaces

	mean	range	S.D.
length	3.15	1.71 - 5.30	1.14
width	1.98	1.57 - 2.32	0.22
thickness	0.48	0.36 - 0.62	0.08
width (neck)	1.13	0.82 - 1.44	0.18
weight	2.76	1.15 - 4.15	1.24

Table 11. Side notched bifaces, type a

length	2.53	1.81 - 3.08	0.50
width	1.72	1.37 - 2.31	0.25
thickness	0.51	0.35 - 0.65	0.09
width (neck)	1.18	0.89 - 1.62	0.20
weight	2.11	0.80 - 3.70	0.96

Table 12. Side notched bifaces, type b

length	1.68	1.60 - 1.81	0.11
width	1.35	1.16 - 1.62	0.20
thickness	0.25	0.21 - 0.27	0.02
width (neck)	1.05	0.84 - 1.33	0.18
weight	0.53	0.45 - 0.65	0.10

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 13. Side notched bifaces, type c

	mean	range	S.D.
length	1.75	1.42 - 1.88	0.29
width	1.02	0.79 - 1.27	0.22
thickness	0.23	0.18 - 0.31	0.05
width (neck)	0.68	0.52 - 0.99	0.21
weight	0.34	0.30 - 0.40	0.05

Table 14. Side notched bifaces, type d

length	1.90	1.30 - 2.89	0.41
width	1.35	0.98 - 1.62	0.16
thickness	0.29	0.20 - 0.42	0.06
width (neck)	0.79	0.47 - 1.22	0.16
weight	0.72	0.25 - 1.75	0.33

Table 15. Biface preforms

length	4.99	3.59 - 6.83	1.06
width	3.58	2.69 - 4.64	0.59
thickness	1.24	0.93 - 1.89	0.31

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 16. Perforators/drills, type a

	mean	range	S.D.
length	3.41	2.10 - 6.41	1.74
width	1.33	1.00 - 2.00	0.41
thickness (base)	0.53	0.38 - 0.73	0.13
thickness (tip)	0.43	0.35 - 0.47	0.07

Table 17. Formed unifaces, type aii

length	2.52	1.41 - 3.86	0.56
width	1.89	0.89 - 2.79	0.41
thickness	0.61	0.37 - 1.25	0.19

Table 18. Formed unifaces, type b

length	3.52	1.82 - 5.44	1.43
width	2.38	1.32 - 2.94	0.56
thickness	0.52	0.32 - 0.71	0.19

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 19. Gravers

	mean	range	S.D.
length	2.98	2.12 - 4.25	0.56
width	1.76	1.21 - 2.17	0.30
thickness	0.49	0.30 - 0.73	0.13

Table 20. Cores, type a

length	6.02	3.39 - 9.79	2.00
width	4.22	1.82 - 8.57	1.73
thickness	2.62	1.27 - 6.58	1.47

Table 21. Slab tools, type a

length	8.42	6.77 -11.60	2.17
width	6.19	5.53 - 6.75	0.62
thickness	0.74	0.55 - 1.17	0.29
weight	68.93	34.20-131.90	54.63

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 22. Slab tools, type b

	mean	range	S.D.
length	6.13	4.29 - 7.66	0.83
width	5.31	3.93 - 6.45	0.65
thickness	0.68	0.40 - 1.02	0.19
weight	32.54	18.90 -49.00	8.66

Table 23. Pebble tools—class 1, type a

length	11.88	10.05 -13.28	1.27
width	8.87	4.81 -12.43	2.56
thickness	3.72	1.31 - 6.38	1.85

Table 24. Pebble tools—class 1, type b

length	5.86	5.09 - 7.47	0.76
width	4.93	3.97 - 6.45	0.74
thickness	1.32	0.97 - 1.89	0.26

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 25. Pebble tools—class 2, type a

	mean	range	S.D.
length	6.92	4.75 - 9.23	1.47
width	4.83	3.68 - 6.82	0.91
$width_2$	4.47	3.35 - 6.65	0.97
thickness	1.12	0.51 - 1.56	0.35
weight	61.24	22.40-162.20	41.28
width of notch	1.96	1.24-2.96	0.53
length of retouch	2.96	1.77 - 3.89	0.64

Table 26. Pebble tools—class 2, type b

length	7.22	4.57 -13.38	1.96
width	5.28	3.64 - 7.83	1.19
$width_2$	4.82	3.24 - 6.88	1.11
thickness	1.37	0.61 - 2.59	0.45
weight	79.48	27.95-188.50	44.49
width of $notch_1$	1.62	0.72 - 3.41	0.62
width of $notch_2$	2.09	0.82 - 3.85	0.74

APPENDIX 1 - ATTRIBUTE TABLES (Continued)

Table 27. Pebble tools-class 2, type c

	mean	range	S.D.
length	6.44	5.91 - 7.78	0.79
width	4.88	3.70 - 5.61	0.76
thickness	1.38	1.26 - 1.54	0.13
weight	67.90	55.50 -75.90	7.53

Table 28. Cortex spall tools, type a

length	7.37	6.64 - 8.89	0.84
width	4.71	3.30 - 5.55	0.89
thickness	1.31	0.82 - 1.82	0.39

Table 29. Cortex spall tools, type b

length	11.58	7.92 -19.59	3.11
width	7.63	5.04 -12.77	3.10
thickness	1.56	0.83 - 2.23	0.45

APPENDIX 1 - ATTRIBUTE TABLES

Table 30. Cortex spall tools, type c

	mean	range	S.D.
length	10.38	5.61 -14.49	3.10
width	7.09	5.02 - 9.62	1.76
thickness	1.71	0.79 - 3.35	0.74

Table 31. Pecked pebble tools, type a

length	8.89	6.13 -15.02	2.65
width	7.17	5.72 - 8.69	0.82
thickness	5.12	2.70 - 6.65	1.36

APPENDIX 2

FIGURE 1 (length of b = 4.85 cm)

a–c	Unnotched bifaces, type ai
d–f	Unnotched bifaces, type bi
g–i	Unnotched bifaces, type aii
j–n	Unnotched bifaces, type bii

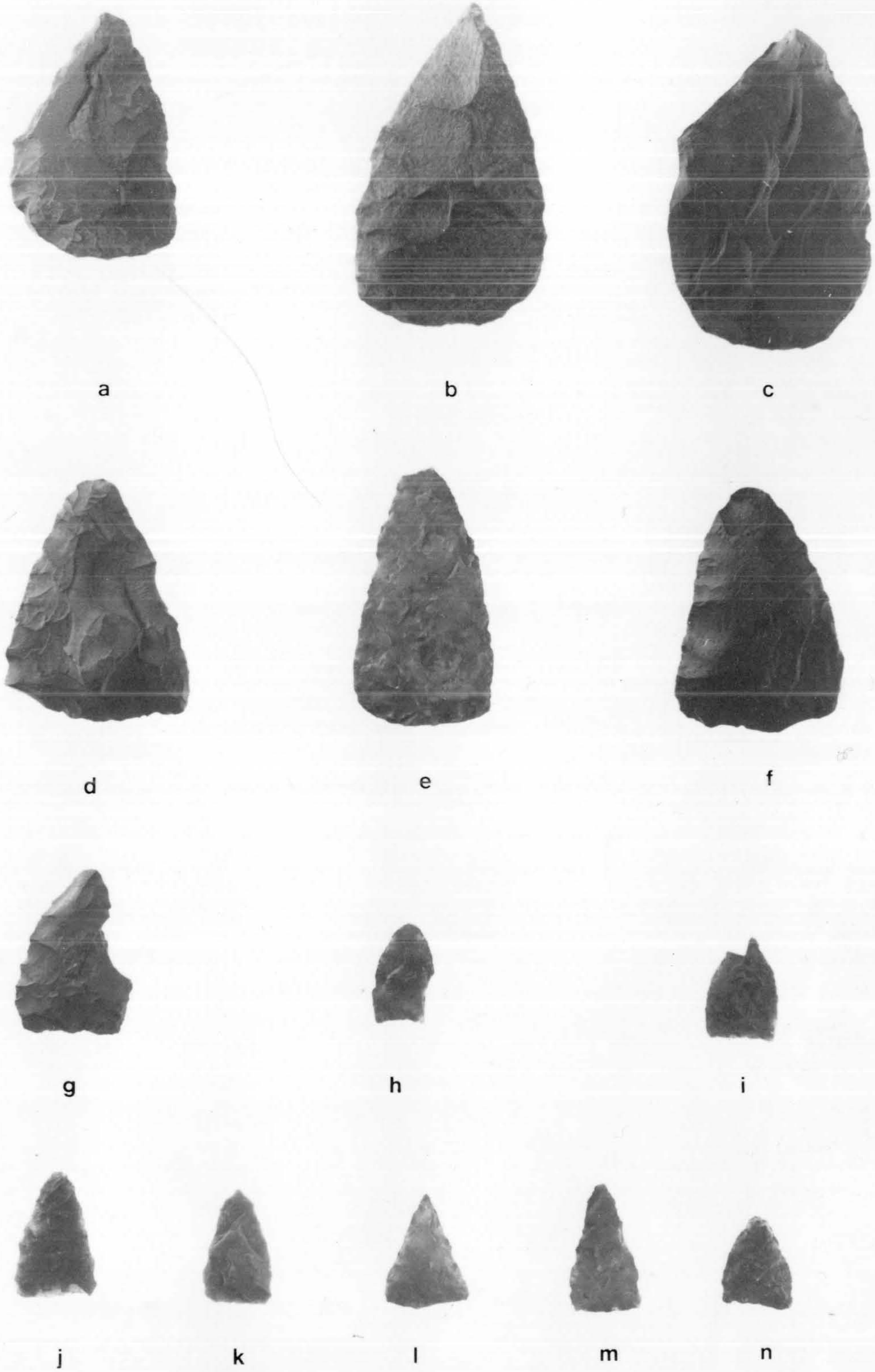
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FIGURE 2 (length of k = 4.13 cm)

a	Unnotched biface, type c
b,c	Basally notched bifaces
d-g	Corner notched bifaces, type a
h,i	Corner notched bifaces, type c
j,k	Corner notched bifaces, type bi
l,m	Corner notched bifaces, type bii

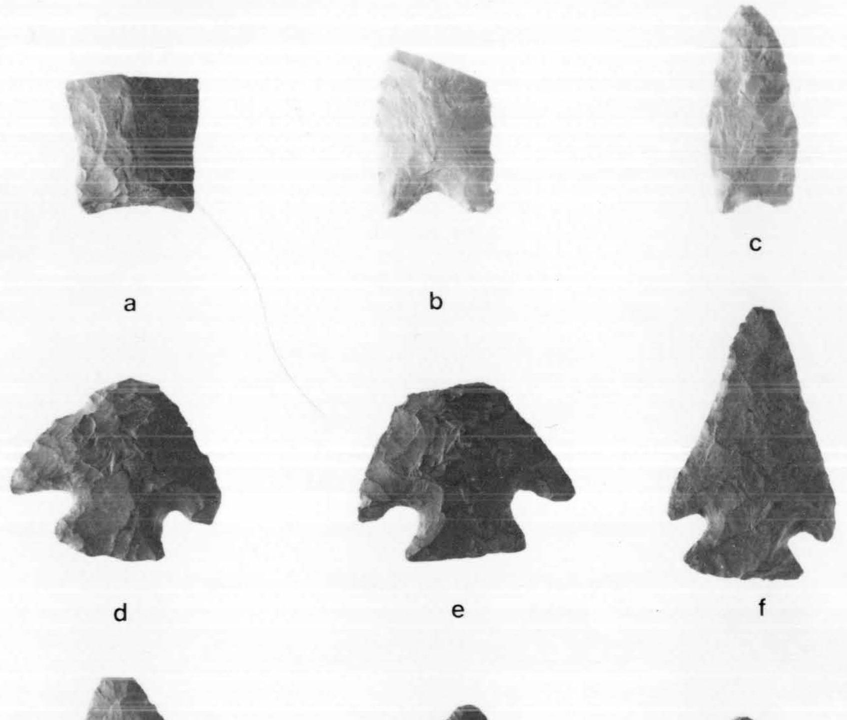
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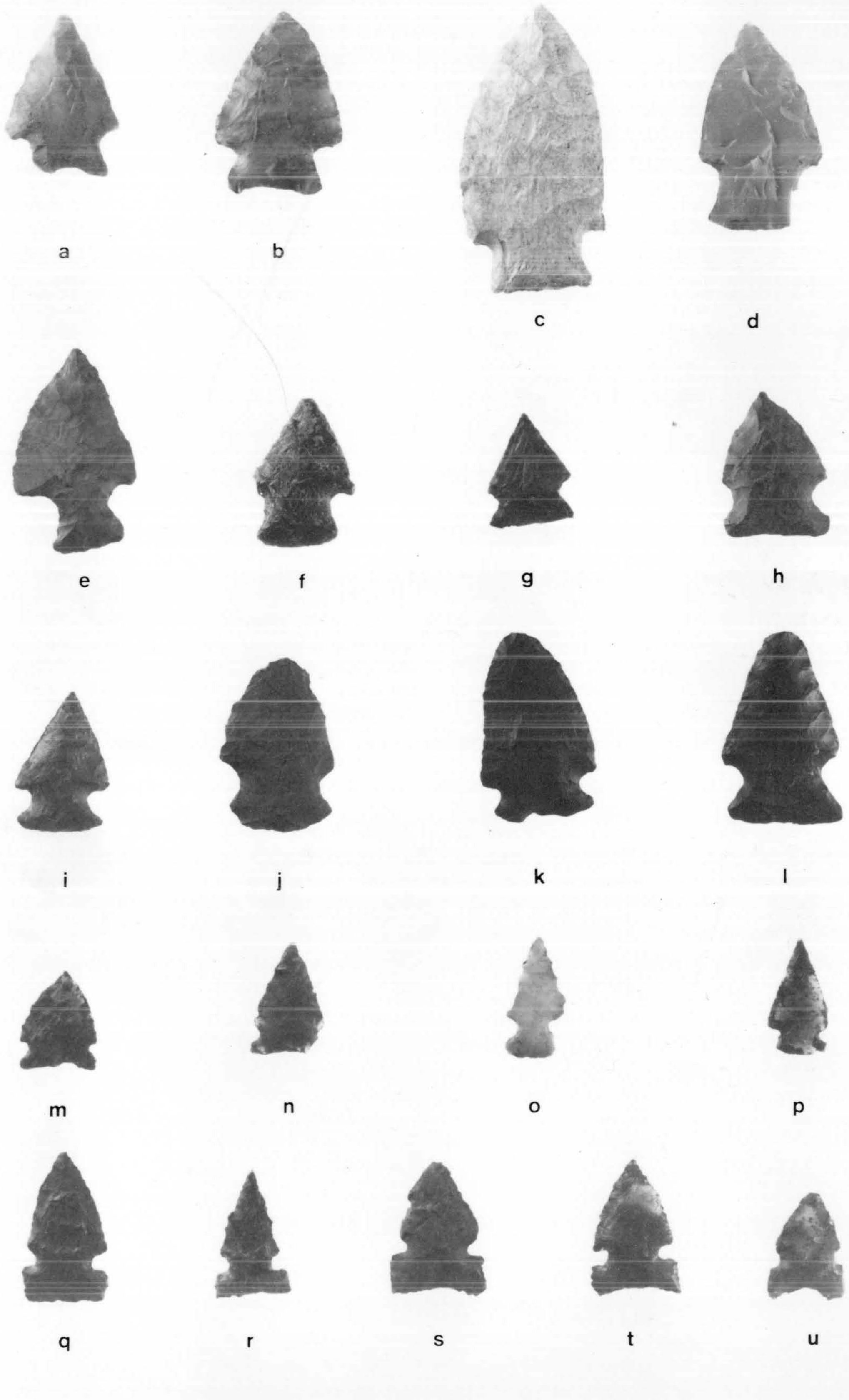
FIGURE 3 (length of c=4.59 cm)

a,b	Corner notched bifaces, type biii
c-f	Stemmed bifaces
g-l	Side notched bifaces, type a
m,n	Side notched bifaces, type b
o,p	Side notched bifaces, type c
q-u	Side notched bifaces, type d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u

FIGURE 4 (length of a = 4.92 cm)

a	Formed unifaces, type ai
b–e	Formed unifaces, type aii
f	Formed unifaces, type b
g–k	Gravers
l,m	Perforators/drills, type b
n,o	Perforators/drill, type a

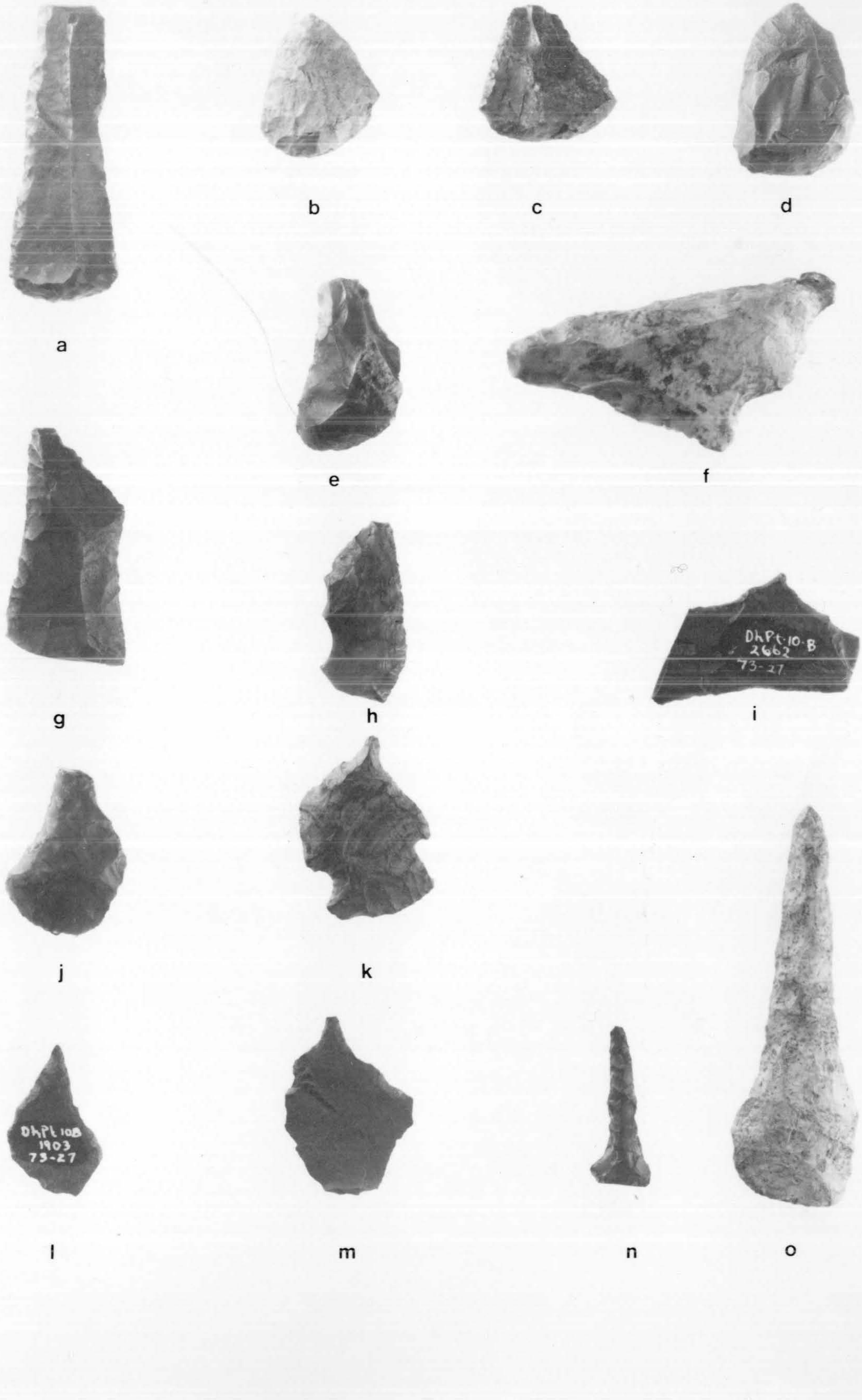

a
b
c
d
e
f
g
h
DhPt·10·B
2662
73-27
i
j
k
DhPt 10B
1903
73-27
l
m
n
o

FIGURE 5 (length of d = 6.46 cm)

a,b	Biface preforms
c,d	Pebble tools, class 1, type b
e	Cores, type b
f	Cores, type a

a

b

c

d

e

f

FIGURE 6 (length of a = 9.23 cm)

a	Pebble tools, class 2, type a
b	Pebble tools, class 2, type b
c	Pebble tools, class 1, type a

a

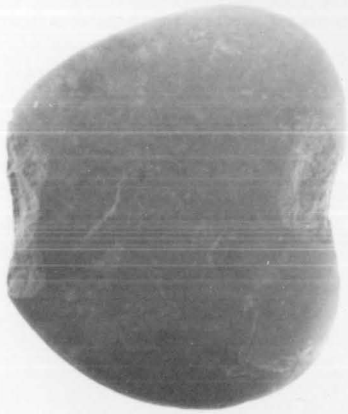
b

c

FIGURE 7 (length of c = 7.63 cm)

a,c,d	Pebble tools, class 2, type b
b,e,f	Pebble tools, class 2, type a
g	Pebble tools, class 2, type c

a



b

c

d

e

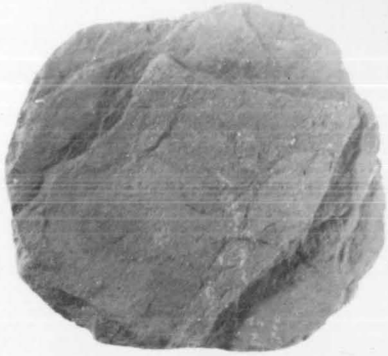
f

g

FIGURE 8 (length of c = 5.94 cm)

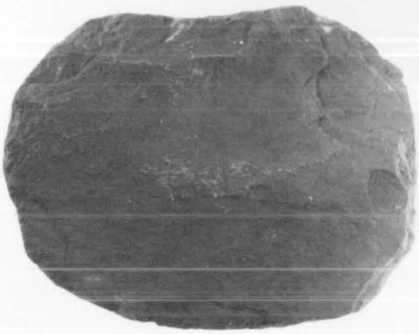
a–e Slab tools, type b

a



b

c



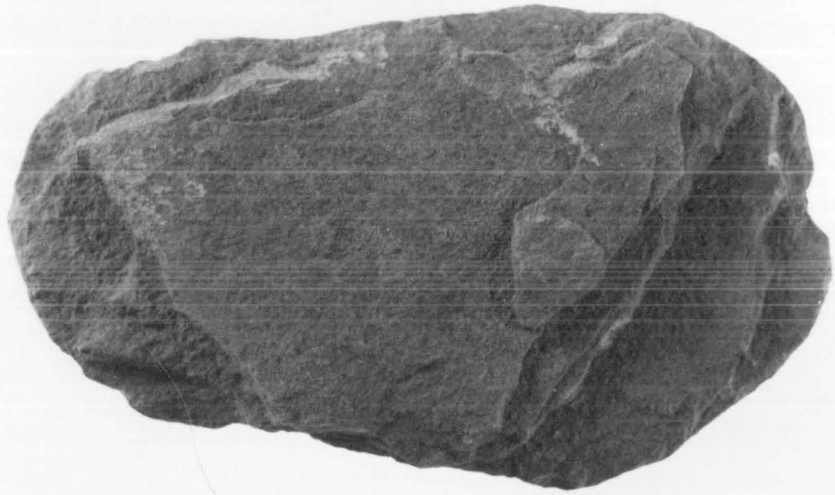
d

e

FIGURE 9 (Length of a = 11.60 cm)

a Slab tools, type a

b Cortex spall tool, type c



a

b

FIGURE 10 (length of c = 10.32 cm)

a,b,c	Cortex spall tool, type b
d	Cortex spall tool, type c

a

b

c

d

FIGURE 11 (length of b = 15.02 cm)

a,b Pecked pebble tool, type a

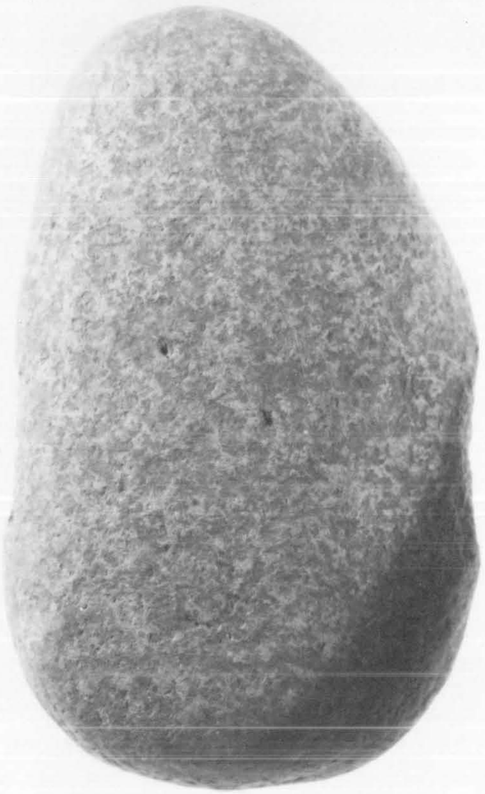
a

b

FIGURE 12 (length of b = 15.77 cm)

a Pecked pebble tool, type b

b Pecked and ground tool



a

b

FIGURE 13 (length of c = 5.62 cm)

a Ground pipe fragment

b Incised stone

c Ground adze

a

b

c