ARCHAEOLOGICAL EXCAVATIONS AT THE McCALL SITE, SOUTH OKANAGAN VALLEY, BRITISH COLUMBIA.

by

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Abstract

Archaeological materials from the McCall site (DhQv 48) in the south Okanagan valley in British Columbia are described and analyzed in this thesis, and placed in the local cultural sequence. Evidences of two prehistoric occupations were uncovered, and details of the subsistence methods and technology of each are described and compared with other prehistoric occupations in the region. These comparisons reveal many shared material traits in local cultural sequences across the Plateau culture area, and result in refinement of the local sequence. The two occupations at the McCall site are placed within the Chilliwist phase (3000-900 years B.P.) of the established Okanagan chronology. Comparisons of all components of this phase indicates the following sequence of subphases: subphase I (3000-2400 years B.P.), subphase II (2400-1800 years B.P.) and subphase III (1800-900 years B.P.).

Acknowledgements

I would like to take this opportunity to express my appreciation to a number of people without whose cooperation this thesis would not have been possible. First, I would like to thank Mr. and Mrs. C. McCall for granting permission to excavate on their property. Their efforts to make the field crew comfortable by providing camp space, fresh water, and gifts of fresh fruit and garden produce are most gratefully acknowledged. Funding for the excavation was provided by the Federal government Opportunities For Youth program (1975).

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I find myself in debt to Knut Fladmark, not only for editing earlier drafts of this thesis, but also for cultivating my academic interest in archaeology. Herbert Alexander, Erle Nelson and Jack Nance provided criticisms which greatly influenced the format and content of the final draft. Mark Skinner and Editha Stephens added their considerable proofreading expertise and graciously refrained from commenting on the numerous dangling participles and split infinitives in an earlier draft.

Jean Williams undertook the task of identifying faunal remains. Richard Casteel identified and estimated weight ranges for the fish remains. Erle Nelson provided the results of obsidian source analysis. I would also like to thank my parents for providing moral support for my academic studies and for my father's aid in paste-up techniques and printing.

Lastly, I would like to express my deepfelt appreciation for my wife Isobel, not only for her understanding during the oftimes difficult final writing period, but also for her unstinting support beginning from the initial field season through to the production of the final draft.

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Chapter 1: Theoretical Perspectives.

> "In this great crucible of life we call the world ... the mysteries lie close packed, uncountable as grains of sand on ocean's shores. They walk beside us, unseen and unheard, calling out to us, asking why we are deaf to their crying, blind to their wonder."
>
> (A. Merritt 1920)

1.1 Research Goals.

The primary purpose of this thesis is to provide additional information about the established culture sequence of the Okanagan branch of the Interior Salish-speaking peoples of British Columbia. The establishment or refinement of culture history is still one of the primary goals of archaeological research (cf. Willey and Phillips 1958:11). In this case, a single prehistoric open site in ethnographic Okanagan territory was excavated, and the material culture remains were placed in a chronological sequence congruent with one established for the Okanagan valley by Grabert (1970,1974).

1.2 Research Orientation.

The McCall site was considered suitable for investigation because: 1) it was one of the largest and least disturbed open habitation sites in the ecotone between the Osoyoos Arid and Dry Forest biotic zones (Cowan and Guiguet 1973:19); 2) previous excavations in the southern plateau of B.C. had been oriented more towards cultural depression or housepit sites than open sites; 3) the owner's surface collection indicated that late prehistoric and possible earlier components were present; and 4) the landowner's intention was to extend the boundaries of cultivation, threatening the remainder of the site.

Excavations were conducted over a three and one-half month season during the summer of 1975. Two major block areas were removed, and a test trench was excavated between these block units in October 1976 to investigate the stratigraphic relationships between these areas.

The objectives of excavation were to investigate how this site reflected the previously established Okanagan culuture history sequence, as most sites described previously tended to focus on housepit and inter-housepit excavation. As well, ethnographic and archaeological evidence for adaptations to the resource area were to be examined.

A number of underlying, but presumably testable, hypotheses derived from ethnographic and then-current archaeological research were indicated. These included:

1) That subsurface material culture clusters are indicative of specific activities leading ultimately to primary or

secondary refuse deposition. Such clusters imply specific behavioural functions which led to deposition,

2) That the site was occupied on a seasonal basis, and that this can be determined from analysis of floral and faunal remains as well as from the intra-site location of various features,

3) That trade or seasonal contact with neighbouring cultures would be represented by the presence of specific artifact types and materials,

4) That the nature and material of traded artifacts would indicate the direction of cultural influences into the Okanagan,

5) That the latest surface component would date within the last 1000 years,

6) That North Okanagan subsistence was oriented more towards procurement of terrestrial rather than riverine resources throughout prehistory,

7) That the orientation towards terrestrial fauna is a function of relative scarcity and poor quality of lacustrine and riverine resources, as indicated by reported fauna from sites of similar age,

8) That lithic materials from which artifacts were manufactured exhibit increasing use of silicates over basalts as time progressed.

Chapter 2: The Okanagan Valley Environment.

2.1 Introduction.

The Okanagan Valley (Figure 1) is a major north-south trench extending from the 48th Parallel in north central Washington to the 51st Parallel in British Columbia. A major portion of the trench is occupied by Okanagan Lake and the Okanagan River which drains southward to its junction with the Columbia River 96 km south of the International Border. A number of remnant Pleistocene lakes occupy the valley floor south of Okanagan Lake, the result of lowered volumes of meltwater after drainage of glacial Lakes Penticton and Oliver. These include Skaha lake, once part of Okanagan Lake until Holocene fan deposits separated the two water masses (Nasmith 1962), and Osoyoos Lake as well as the smaller Vaseaux, Mud, Gallagher and Tuc-el-nuit Lakes. These smaller bodies of water lie in depressions left from meltwater drainage channels, or in kettles (Nasmith 1962).

The Canadian portion of the valley bottom varies in width from ca 2.5 to 12.5 km, with maximum width at both the north and south ends. Elevation drops from ca 540 m in the north to ca 270 m above sea level at Osoyoos Lake.

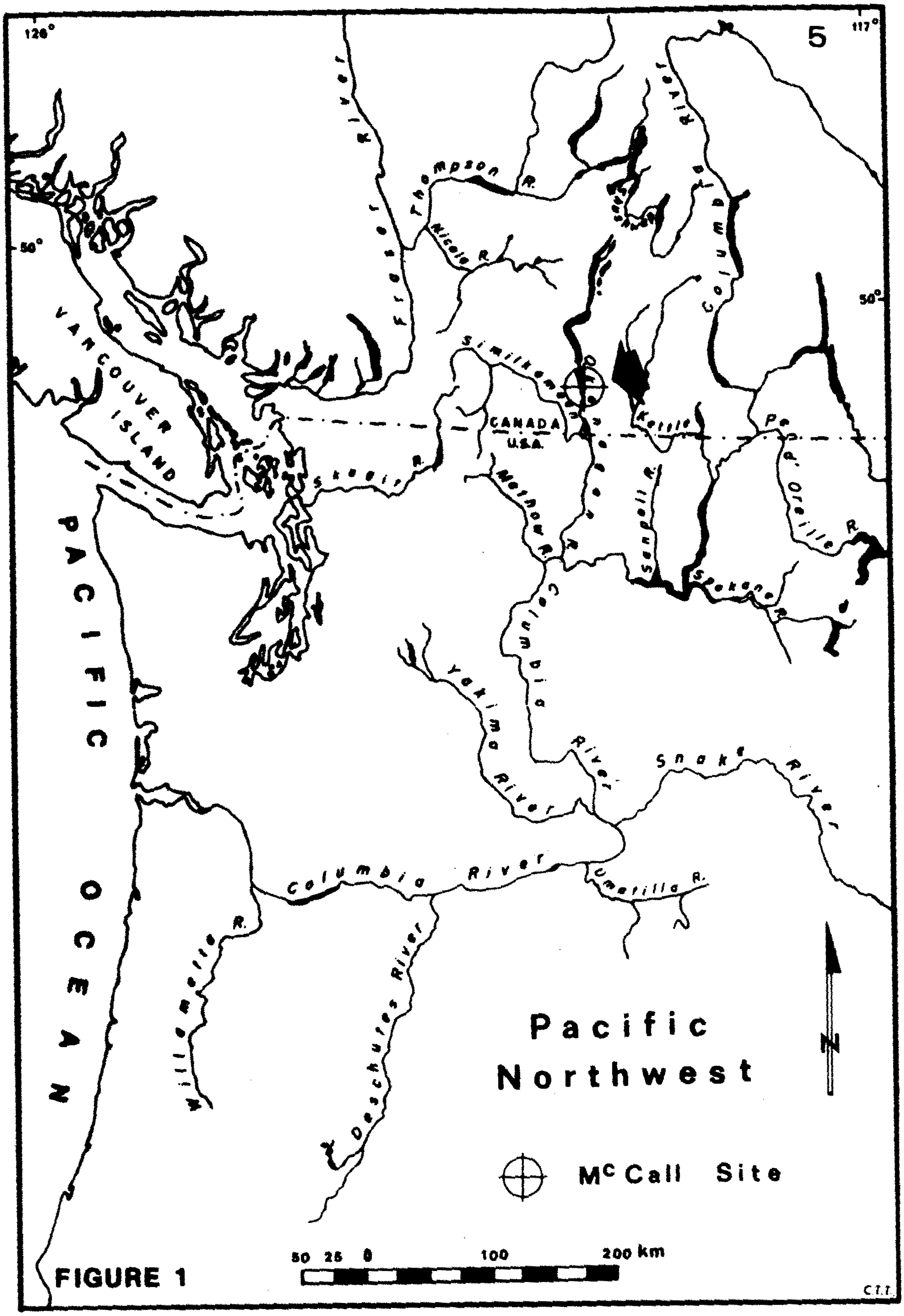

120°
117°
50°
50°
Fraser River
Thompson R.
Nicola R.
Similkameen
Columbia River
Kettle
CANADA
U.S.A.
Pend Oreille R.
Sanpoil R.
Spokane R.
Methow R.
Skagit R.
VANCOUVER ISLAND
PACIFIC OCEAN
Columbia River
Yakima River
Snake River
Columbia River
Umatilla R.
Willamette R.
Deschutes River
Pacific Northwest
N
McCall Site
50 25 0 100 200 km
C.T.T.

FIGURE 1

2.2 Late Glacial History of the Okanagan Valley.

The Okanagan Valley during the last glacial maximum was completely buried by a south-southeast trending ice sheet to elevations greater than 2100 m above sea level (Nasmith 1962:39). Climatic change resulted in ablation by down-wasting rather than by retreat of the ice terminus.

Down wasting continued until late stages of glacial retreat left upland areas ice free, while valley bottoms retained stagnating ice. During this period meltwater formed glacial Lake Penticton, which filled the valley north of Okanagan Falls, while meltwater channels deposited outwash drift among stagnating ice pockets south of Okanagan Falls. These large kettled outwash deposits served to dam glacial Lake Penticton by plugging the narrow valley corridor in the Falls area.

Continued wasting of the northern ice lobe eventually resulted in an overflow of meltwater at the Okanagan Falls plug resulting in rapid erosion of the outwash and formation of a large meltwater channel, remnants of which today carry the underfit Okanagan River. Glacial Lake Penticton was fully drained prior to 8900 years B.P., (as determined by radiocarbon estimates taken on bog samples in the northern Okanagan Valley (Alley 1976)), thereby dating the minimum age of this channel.

2.3 Okanagan Valley Temperatures.

The Okanagan Valley maintains a varied temperature and precipitation range, with the northern sector averaging lower temperatures and higher rainfall than the southern sector. In general, summers are hot and winters mild with temperatures among the highest in Canada. Annual temperatures average some 1-2 degrees Celsius colder in the north than in the south (Table 1).

Summer temperatures presented in Table 1 are misleading due to a modern increase in amount of water vapour released into the lower atmosphere by irrigation. This has resulted in a slight lowering of summer temperatures in areas of high density fruit crops. Mean annual precipitation varies from 24 cm at Oliver to 49 cm at Salmon Arm ,north of the valley, with mean snowfalls of 48 cm at Oliver and 139 cm at Salmon Arm (Kelley and Spillsbury 1955:11-13).

2.4 Vegetation.

At the end of the Altithermal, locally estimated at 6600 years B.P. (Alley 1976) and up to the present, vegetation became characterized by semi-arid grassland communities at lower elevations. Bluebunch wheatgrass (Agropyron spicatum) became the dominant species, followed by speargrass (Stipa comata), dwarf bluegrass (Poa secunda), dropseed (Sporobolus cryptandrus) and three-awn or needle grass (Aristida longiseta).

Table 1: Average Ckanagan Valley Temperatures.

Station	Elevation (metres)	Winter	Spring	Summer	Autumn	Year
		(Degrees Celsius)				
Salmon Arm	348	-03	09	19	08	08
Armstrong	356	-05	07	18	07	07
Vernon	386	-03	08	19	08	08
Kelowna	339	-02	08	19	08	08
Summerland	390	-02	09	20	09	10
Penticton	336	-01	09	19	09	09
Oliver	299	-02	11	21	10	10
Keremeos	350	-02	10	20	10	10

Complementing the grasses were more xeric shrubs such as grey sage (*Artemesia rigida*) and cactus (*Opuntia* sp.), as well as sagebrush (*A. tridentata* and *A. tritada*), rabbit brush (*Bigelowia dracunculoides*), and antelope brush or 'greasewood' (*Purshia tridentata*). Today, grasses and shrubs are found along lower valley slopes from the river floodplain to higher terrace and outwash deposits. Increasing altitude results in a transition from isolated stands of Western Yellow pine (*Pinus ponderosa*) and more xeric grasses and shrubs to stands of spruce (*Picea* sp.), fir (*Pseudotsuga menzieii*) and more mesic species (Brayshaw 1970) (Chapter 5.2).

The introduction of cattle grazing in the latter part of the nineteenth century severely disrupted the grassland. Under moderate grazing conditions bluebunch wheatgrass has been replaced by speargrass and other secondary grasses, but under severe overgrazing grasses have been replaced by desert shrubs and weeds (Kelley and Spillsbury 1955, Brayshaw 1970). In addition, bottomlands, terraces, and benches in the southern portion of the Canadian valley now support an intensive fruit industry, replacing earlier vegetative communities.

2.5 Fauna.

Present day mammalian species are presented in Table 2.

Table 2: South Okanagan Mammalian Species.
(after Cowan and Guiguet 1973).

Order Lagomorpha	
Cottontail	*Sylvilagus nuttalli*
Snowshoe hare	*Lepus americanus*
White-tailed jack rabbit	*Lepus townsendii*
Order Rodentia	
Yellow pine chipmunk	*Eutamius amoenus*
Yellow bellied marmot	*Marmota flaviventris*
Columbian ground squirrel	*Spermophilus columbianus*
American red squirrel	*Tamiasciurus hudsonicus*
Northern flying squirrel	*Glaucomys sabrinus*
Northern pocket gopher	*Thomomys talpoides*
Great Basin pocket mouse	*Perognathus parvus*
American beaver	*Castor canadensis*
Western harvest mouse	*Reithrodontomys megalotis*
Deer mouse	*Peromyscus maniculatus*
Bushy-tailed wood rat	*Neotoma cinerea*
Red-backed vole	*Clethrionomys gapperi*
Northern bog lemming	*Synaptomys borealis*
Heather vole	*Phenacomys intermedius*
Muskrat	*Ondatra zibethicus*
Montane vole	*Microtus montanus*
American porcupine	*Erethizon dorsatum*
Order Carnivora	
Coyote	*Canis latrans*
Wolf	*Canis lupus*
Red fox	*Vulpes fulva*
Black bear	*Ursus americanus*
Grizzly bear	*Ursus arctos horribilis*
Raccoon	*Procyon lotor*
Marten	*Martes americana*
Fisher	*Martes pennanti*
Ermine	*Mustela erminea*
American mink	*Mustela vision*
Wolverine	*Gulo luscus*
River otter	*Lontra canadensis*
Mountain lion	*Felis concolor*
Lynx	*Lynx canadensis*
Bobcat	*Lynx rufus*
Order Artiodactyla	
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Elk	*Cervus canadensis*
Mountain goat	*Oreamnos americanus*
Bighorn sheep	*Ovis canadensis*

Chapter 3: Ethnographic Okanagan Culture.

In general, speakers of Okanagan dialects in the Interior Plateaus of British Columbia and Washington lived in a number of autonomous bands, characterized by a loosely knit political organization. Subsistence activities were oriented towards a seasonally transhumant pattern of hunting, fishing, and gathering. Cressman (1977), relying upon Elmendorf's (1965) data, hypothesized a long standing antiquity for Interior proto-Salishan peoples, on the order of 6500-7500 years B.P. He suggests that a proto-Interior Salish language had begun to diverge from a problematical Mosan grouping at or about this time, in a homeland situated somewhat north and east of present Lillooet territory. Elmendorf's model indicates an Interior Salish expansion out of Lillooet territory by ca 3000-4500 years B.P. Elmendorf (1965:76-77) does not indicate further Salish expansion southwards until after ca 3000 years B.P. If this is the case then it may be assumed that the Chilliwist phase inhabitants of the Okanagan valley were Salishan speakers.

3.1 Dialectic subdivisions (Figures 2 and 3).

Bouchard and Kennedy (1975) subdivide the Okanagan into seven groups based primarily upon dialectical differences (Figure 3). These groups are:

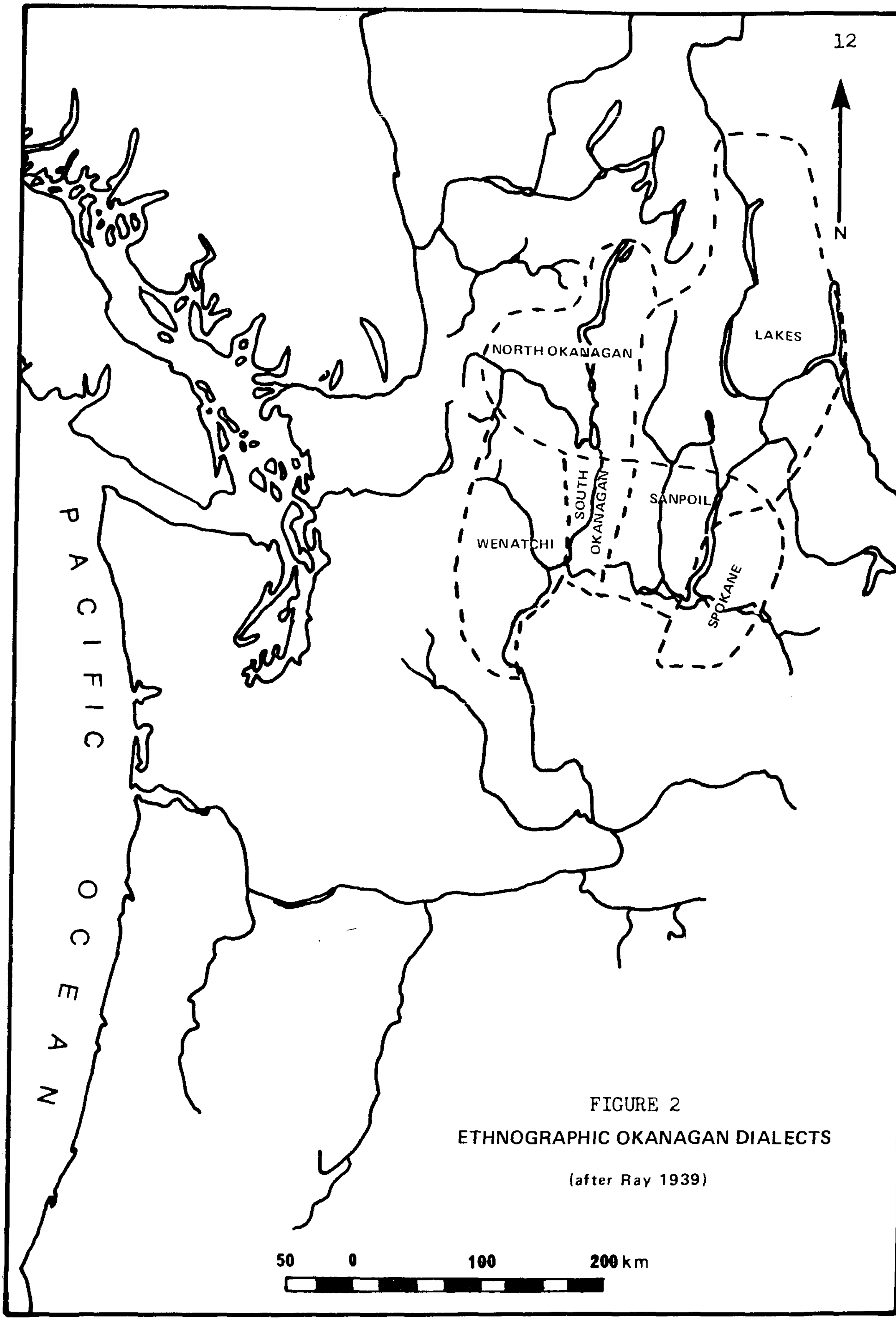


FIGURE 2
ETHNOGRAPHIC OKANAGAN DIALECTS
(after Ray 1939)

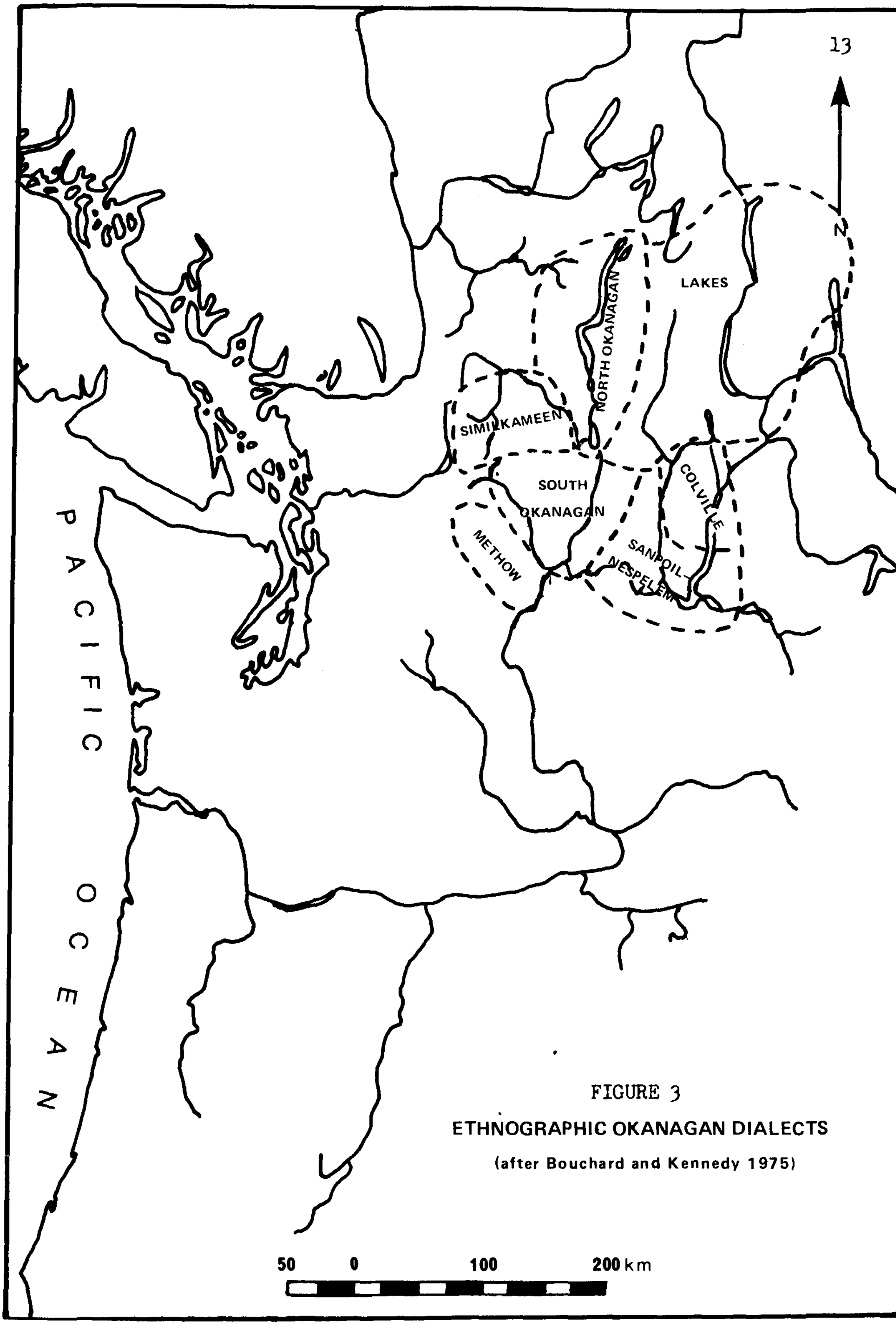


FIGURE 3

ETHNOGRAPHIC OKANAGAN DIALECTS

(after Bouchard and Kennedy 1975)

1) North Okanagan - inhabiting territory from Armstrong to Osoyoos in the Okanagan Valley of British Columbia,

2) Similkameen - of the Similkameen Valley in British Columbia and northern Washington. A previous Athapaskan population is hypothesized to have arrived in the Similakameen valley by way of the Nicola valley by ca 1300 years B.P. (Wyatt 1971:65). It would appear that these peoples were then assimilated into the resident Salishan speaking population, since no Athapaskan speakers resided in the valley by contact times (Teit 1930).

3) Methow - a virtually extinct dialect in the Methow Valley of north-central Washington,

4) South Okanogan - Residing between the towns of Brewster and Oroville in the American Okanogan Valley,

5) Colville - Residents of the Kettle Valley of British Columbia and Washington extending east to the Columbia River and south to the confluence of the Columbia and Spokane Rivers,

6) Lakes - Residents of upper and lower Arrow Lakes as well as the Slocan Valley in British Columbia,

7) Sanpoil-Nespelem - Inhabitants of the area between the Sanpoil and Columbia Rivers in Washington.

Earlier works (Teit 1930, Cline et al. 1938 and Ray 1939) lump or split the above divisions on the basis of regional topographic and ecological differences, or on the basis of informant's claims of political differentiation (Figure 2).

These split the inhabitants along the Okanagan river of British Columbia and Washington into northern and southern groups, a pattern which somewhat conforms to the present International Boundary. In the literature, the spelling of the name Okanagan as Okanogan reflects the present north-south political alignment. Okanagan refers to bands situated north of the International Boundary, whereas Okanogan is the spelling for American bands.

3.2. Social structure.

The following description of Okanagan social structure is compiled from a number of sources. These are; Teit (1930), Cline et al. (1938), Ray (1939), and Bouchard and Kennedy (1975).

Socio-political organization took the form of single autonomous bands each composed of one family or more sharing a semipermanent winter settlement. The non-winter organization exhibited a similar pattern, lacking only a semipermanent settlement. Non-winter settlements usually took the form of occupation in open sites or temporary mat lodge dwellings as opposed to the more permanent winter pithouse type of structure. Okanagan social organization follows the Beardsley et al. (1955) definition of a central based wandering type of society. A band is thus defined as a mobile group of dialectically related peoples, usually families, deriving subsistence from a common resource base. No tribal political associations are apparent from ethnographic evidence.

On a somewhat larger scale of Okanagan identity was the linguistic group, evidenced only in that various bands were cognizant of a shared linguistic base. In this case all speakers of an 'Okanagan' dialect were recognized as Okanagans. However, the band was considered the primary community (at least in winter) with membership determined by residence.

When viewing the autonomous band as a loosely knit organization of family groups sharing a localized residence or subsistence locality, the lack of recorded evidence for an elected, hereditary or wealthy, band or community leader is notable. As opposed to the ranked societies of the Coast, the common Plateau pattern appears to have been that a 'chief' or band leader (or any other term denoting persons of authority) attained his or her social position solely as a result of that individual's knowledge of, or prowess in, organizing group activities of hunting, fishing, gathering, winter dancing, or defence. Their actual political power was nominal.

Ethnographic band structure follows that which Service (1973:54-72) refers to as a patrilocal band, where individual bands are recognized as distinct social units within the overall ethnic group, but mobility of the individual or family unit from one band affiliation to another is not restrained.

Religion was inextricably bound up in the guardian spirit complex where the individual is seen as a composite of three forces: the physical body, the metaphysical soul, and a guardian spirit or 'partner'. The guardian spirit was accredited with imbuing curative powers, knowledge over the movements of game animals, and was available to offer advice on many matters. The nature of religion and its implications for prehistoric aboriginal society, as well as its relationship to the archaeolgical record, is beyond the scope of this thesis, except when rare material indicators of the complex may be preserved. Such aspects may include rockshelter and pictograph complexes, stone cairns, stone alignments and trenches, or artifacts ethnographically associated with puberty rites such as bone whistles and drinking tubes.

3.3 Trade.

Teit (1930) and Cline et al. (1938) agree that trade routes and trading relationships in Okanagan territory changed and increased in volume as a result of late prehistoric acquisition of the horse and its related culture complexes. Prior to this, major trading ventures were accomplished on foot and by canoe along rivers, with minor ventures across open countryside. Three major trading centres are indicated. These were near Okanagan Falls in North Okanagan territory; near the confluence of the Okanagan and Columbia rivers in Sinkaietk territory, henceforth termed the Cassimer Bar locality; and near Kettle Falls in Colville territory. Of the three centres, both Okanagan and Kettle Falls were also major fishing stations (Figure 4).

Major trading partners were the Thompson and Shuswap to the north; the Stalo near the mouth of the Fraser Canyon and the Wenatchi to the west; various Sahaptin groups along the Columbia river south to the Dalles; the Nez Perce, Kutenai, Kalispell and possibly Blackfoot to the east; and the Couer d'Alene to the south and east.

It seems reasonable that the three trade centres would have accounted for a two way flow of trade articles through Okanagan Falls from the Thompson, Shuswap and Coast Salish, between Cassimer Bar and southern Sahaptin groups and between Kettle Falls and the Kutenai, Shuswap, and other groups. As well, trade among and between centres transferred articles throughout Okanagan territories. Items traded by the Okanagan included local raw and finished fibre products, dried berries, dressed hides, camas, bitteroot, red ochre, and steatite. In exchange they received coastal products such as coiled basketry, marine

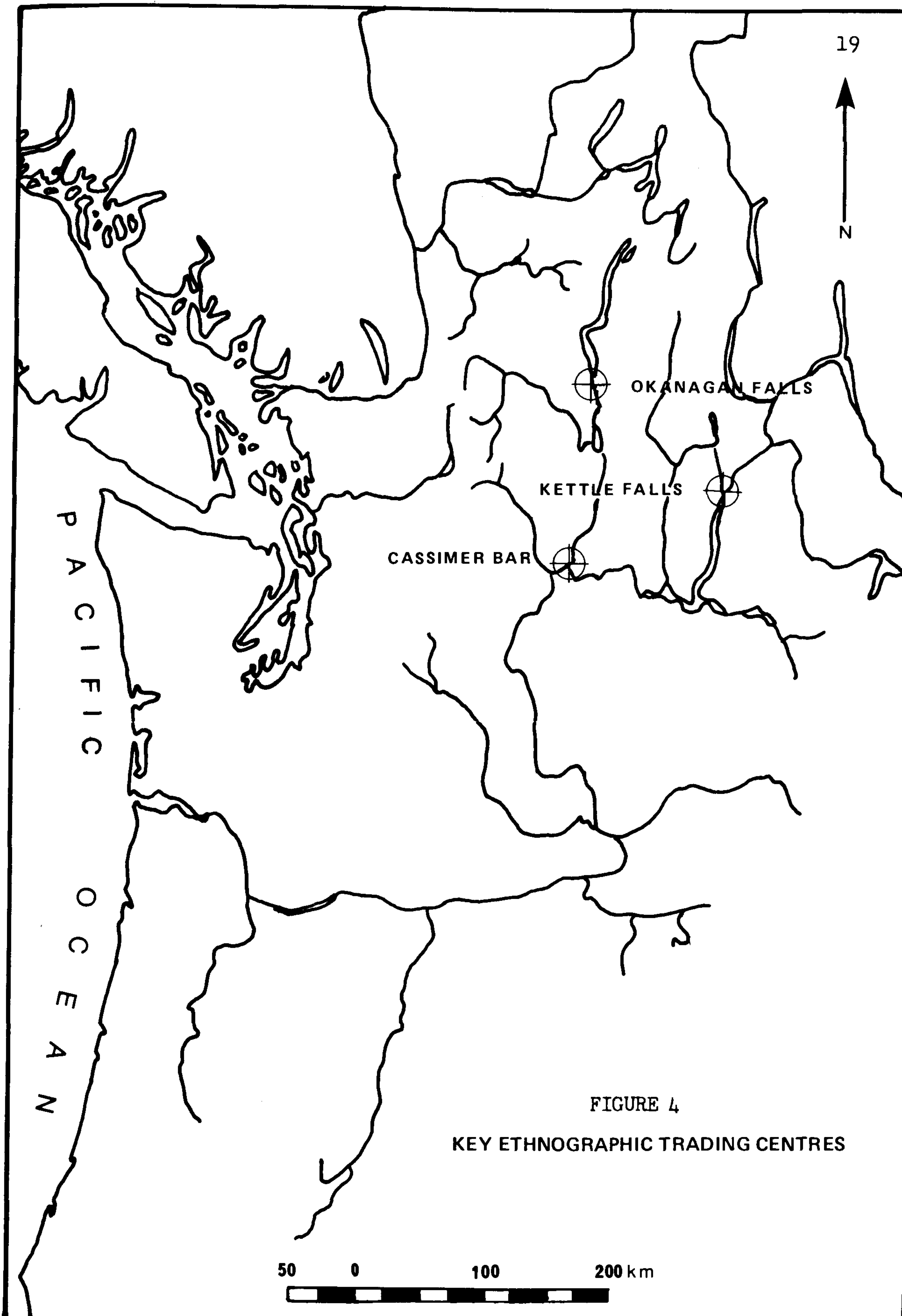


FIGURE 4

KEY ETHNOGRAPHIC TRADING CENTRES

shells, nephrite adzes, nonlocal hides and other materials. Similar products could be obtained from the Great Basin by way of the trading centre at the Dalles, including manufactured products, dried foodstuffs including tobacco and salmon, camas, marine shells, and obsidian, the latter from sources in Oregon. Trade goods from the Plains area could have included hide products and Eurocanadian goods during the historic and protohistoric periods. In addition, some obsidian may have been obtained from sources in Idaho through Plains intermediaries (cf Bussey 1977).

3.4. Ethnographic Okanagan Subsistence Patterns.

Ethnographic Okanagan culture was characterized by a seasonally transhumant pattern of resource exploitation across regional territories as a function of ecozonal variation. Resource scheduling involved acquisition of various foodstuffs based on knowledge of when and where resources were in the most suitable condition for hunting or collecting.

The seasonal round began in March with root and mussel gathering, as well as hunting. As spring lapsed into summer more and varied flora and fauna were exploited, including initial runs of salmon during June, along with continued root digging, and berrying and hunting.

In the fall concern was more towards exploitation of salmon, depending upon regional availability, as well as large ungulates in the latter half of the season (October - November). Fall also saw the last collection of roots, and perhaps additional freshwater mussel gathering. In general, the most active season of bioresource pursuit was fall, in order that sufficient food stores could be stocked against the coming of winter. All food resources, unless seasonally absent, are presumed to have been exploited as they became available. Certain species of fish were available on a year round basis (Table 3) as were most ungulates and smaller game animals. In addition, freshwater mussels could be gathered from streams and lakeshores even in winter, providing the locations of mussel beds were known. Resources which could not have been obtained throughout the year were those floral species which mature as edible plants in the spring, summer or fall, as well as anadromous salmon.

3.5. Fishing Industry.

The major ethnographers (Teit 1930, Cline et al. 1938, and Ray 1939) state that the north Okanagan severely lacked fish resources when compared to the Sinkaietk and Colville divisions. While some of this bias has been attributed to a relative scarcity of anadromous fish in the northern valley, it cannot be attributed to a scarcity of other lake and stream species.

Table 3: Ethnographically Recorded Fish Species. (from Bouchard and Kennedy 1975).

Coho salmon	*Oncorhynchus kisutch*
Spring salmon	*Oncorhynchus tshawytscha*
Sockeye salmon	*Oncorhynchus nerka*
Kokanee salmon	*Oncorhynchus nerka*
Steelhead trout	*Salmo gairdneri*
Cutthroat trout	*Salmon clarki*
Largescale sucker	*Catostmus macrocheilus*
Bridgelip sucker	*Catostmus columbus*
Northern mountain sucker	*Catostmus platyrhyncus*
Burbot	*Lota lota*
Pacific lamprey	*Entosphenus* sp.
White sturgeon	*Acipenser* sp.
Mountain whitefish	*Prosopium* sp.
Peamouth	*Mylocheilus* sp.
Northern squawfish	*Ptychocheilus* sp.
Dace	*Rhinichthys falcatus*
Redside shiner	*Richardsonius* sp.
Mottled sculpin	*Cottus bairdi*

At present the antiquity of salmon runs in the Okanagan River is unknown, but at least one component in the Wells Reservoir of Washington, associated with tentatively identified salmon remains, has been dated to the first millenium B.C. (Grabert 1968). Chance et al. (1977) in work at Kettle Falls on the upper Columbia River have evidence for even earlier salmon runs, beginning with the earliest occupations about 9000 years B.P. and continuing throughout the prehistoric sequence.

Cline et al. (1938) record at least 10 species of anadromous and nonanadromous fishes utilized by the Sinkiaetk along the Okanogan-Columbia river system south of the International Boundary. Teit (1930) on the other hand, briefly disregards the importance of fishing, at least for the Canadian Okanagan, mentioning the presence of 'salmon and small fishes' in that ... "[m]any Okanogan from Okanogan Lake and the upper part of Okanogan River, where salmon was scarce, went to fish salmon on the Lower Okanogan River" (Teit 1930:247).

This pattern would be expected as anadromous species were only able to travel upriver as far north as Okanagan Falls in British Columbia before their passage was blocked. Data which support an hypothesis of the prehistoric availability of salmon north of the International Boundary are found in a 14 km stretch of the Okanagan River that has been maintained in its original state between McIntyre Bluff and Oliver. Present runs provide two-thirds of the available Columbia River salmon although these runs would appear to be much reduced compared to the size of runs prior to extensive damming projects along the Columbia River system.

Table 4, drawn from Carl, Clemens and Lindsey (1959), indicates the present monthly availability of fish in the Okanagan river system. Of 16 species listed, only anadromous salmon are not available throughout the year. Kokanee salmon and other freshwater species on the other hand, are available year round in Skaha and other Okanagan Lakes as well as in the river and stream systems.

Both Teit (1930) and Cline et al. (1938) provide brief discussions of Okanagan fishing technologies, but the most useful data are provided by Bouchard and Kennedy (1975) who list a number of alternative fishing techniques, some of which are species specific.

Combining ethnographic data results in the following technological fishing complexes:

1) Hook and line - using hemp (Apocynum sp.) lines with a variety of hooks, including composite ungulate bone hooks, salmon caudal bone hooks, cactus thorn hooks, and gorges of

Table 4: Monthly Availability of Fish Species
(from Carl, Clemens and Lindsey 1959)

	J	F	M	A	M	J	J	A	S	O	N	D
Spring salmon								+	+	+	+	
Coho salmon								+	+	+	+	
Sockeye salmon									+	+	+	
Kokanee salmon									+	+	+	
Steelhead trout	+	+	+	+	+	X	X	X	X	X	X	+
Cutthroat trout	X	X	+	+	+	+	X	X	X	X	X	X
Largescale sucker	X	X	X	+	+	X	X	X	X	X	X	X
Bridgelip sucker	X	X	X	X	+	+	X	X	X	X	X	X
N. mountain sucker	X	X	+	+	+	+	X	X	X	X	X	X
Burbot	X	+	X	X	X	X	X	X	X	X	X	X
White sturgeon	X	X	+	+	+	+	X	X	X	X	X	X
Mountain whitefish	X	X	X	X	X	X	X	X	X	X	+	X
Peamouth	X	X	X	X	+	+	X	X	X	X	X	X
Northern squawfish	X	X	X	X	+	+	+	X	X	X	X	X
Redside shiner	X	X	X	X	+	+	+	+	X	X	X	X

Key: + (Spawning) X (Present)

deer ulna. Hooks and lines were employed either by trolling from watercraft, or as set lines for deeper river and lake fishes. Set lines utilized various sinker stones for weights, presumably notched, girdled or perforated pebbles. Hooks and lines were also used in winter ice fishing for burbot (*Lota lota*) among the North Okanagan.

2) Simple spears - generally manufactured of wood as single shafts with a sharpened tip for use at any fishing location.

3) Leisters - composed of three hafted wooden or bone prongs or points. These were used from vantage points such as spearing platforms, canoes, from lake ice, and weirs.

4) Harpoons - were primarily composite toggling types or simple unilaterally barbed types of bone.

5) Weirs - various types were constructed at suitable points along rivers and streams. These were primarily constructed of wood although stone weirs were also used.

6) Basketry traps - three types of trap were used including conical, V-shaped and J-shaped types. Both conical and V-shaped types were used in conjunction with weirs, whereas the J-shaped trap was operated by a pole and line from land.

7) Nets - various types were used ranging from seine and dip types to larger, undescribed, forms. Manufactured of hemp, dip nets were operated by individuals whereas larger nets presumably required a coordinated effort by a number of people.

8) Poison - the root of the Chocolate tip (<u>Lomatium dissectum</u>) was introduced into low energy streams to kill smaller fish (Bouchard and Kennedy 1975:20).

In general, any one or a number of the above technologies could have been used, depending upon cultural preferences. Bouchard and Kennedy (1975) and Cline <u>et al</u>. (1938) indicate that particular fish species were commonly acquired using a specific technological system, depending upon size and condition of the fish, the season, and nature of the fishing grounds. For example, burbot in Okanagan lake were generally acquired by hook and line (or, less commonly, nets) in any season other than winter. Winter conditions allowed them to be speared or taken with hook and line directly through lake ice during February spawning.

Bouchard and Kennedy (1975) also mention a number of fishing accessories complementing primary fishing gear. These include canoes, mentioned by all ethnographers, wooden or stone fish clubs; and rock corral containments or short term storage corrals, possibly constructed to keep the catch fresh until butchering later that day. Fish were butchered either with the spine in or out, then dried on racks. Storage was in A-frame or wooden scaffold platforms, or in bark, grass, or stone lined cachepits nearby or in rockshelters. Cline <u>et al</u>. (1938:32) indicated that prepared or dried foodstuffs were also stored in woven tule rush bags placed in mat lodges or pithouses.

3.6. Ethnographic Hunting Patterns.

Ethnographic exploitation of avian and mammalian animals included a number of species (Table 5). The Similkameen appear to have heavily utilized deer, elk, and mountain sheep (Teit 1930:243). The North Okanagan were primarily hunters and gatherers with only a secondary dependence upon fishing, whereas the South Okanogan appear to have relied equally upon fishing and hunting-gathering (Teit 1930, Cline et al. 1938).

Included in Table 5 are some infrequently consumed animals. For example; Teit (1930) states that dogs were eaten by the Similkameen. However, he qualifies this statement with the remark that dogs ... "were eaten only by the old people" (in times of economic deprivation). Consequently dog (*Canis familiaris*) has been listed, even though this species may have been utilized only infrequently.

The two most informative ethnographies detailing hunting technology are Teit (1930) and Cline et al. (1938). Hunting technology is portrayed as follows:

(1) Bow - both straight and recurved, sinew-backed bows are mentioned. Recurved bows were only noted for the North Okanagan.

(2) Arrows - consist of wooden, bone or stone projectile points hafted onto shafts of juniper or serviceberry. Fletching appears to have been optional, although usually present. Some

Table 5: Ethnographic Mammalian Species.
(from Teit 1930 and Cline *et al.* 1938)

Order Lagomorpha	
Snowshoe hare	*Lepus americanus*
Order Rodentia	
Yellow bellied marmot	*Marmota flaviventris*
Columbian ground squirrel	*Spermophilus columbianus*
American red squirrel	*Tamiasciurus hudsonicus*
Northern flying squirrel	*Glaucomys sabrinus*
American beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicus*
Order Carnivora	
Coyote	*Canis latrans*
Wolf	*Canis lupus*
Red fox	*Vulpes fulva*
Black bear	*Ursus americanus*
Grizzly bear	*Ursus arctos horribilis*
Fisher	*Martes pennanti*
Ermine	*Mustela erminea*
Mink	*Mustela vision*
Wolverine	*Gulo luscus*
River otter	*Lontra canadensis*
Mountain lion	*Felis concolor*
Lynx	*Lynx canadensis*
Bobcat	*Lynx rufus*
Order Artiodactyla	
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Elk	*Cervus canadensis*
Moose	*Alces alces*
Mountain goat	*Oreamnos americanus*
Bighorn sheep	*Ovis canadensis*

projectile point styles are described as species or game specific based on criteria of notching, barbs, or material. Foreshafts of wood or bone are attributed only to the South Okanogan.

(3) Spears - consist of simple sharpened wooden shafts, as well as shafts tipped with stone, "horn" (antler), or bone points. Long and short war and hunting spears are mentioned for the South Okanogan.

(4) Clubs - manufactured of wood or stone and used in war or to dispatch game. These are also recorded as fishing implements (Teit 1930).

(5) Stone knives - used for butchering and dismemberment of large game.

(6) Slings - manufactured of hemp and used with smooth river pebbles by children to procure small game.

(7) Various traps, deadfalls, and nooses - used for large and small game, with deadfall constructions restricted to larger game such as bear.

(8) Nets - manufactured of hemp for use on diverse game from fish and waterfowl to deer.

(9) Fences and corral entrapments - manufactured from brush and deadfalls to be used in conjunction with communal drives of larger game, particularly deer.

(10) Throwing stones - perhaps the simplest technological unit requiring no modification, but effective on small game at close range.

The most frequent method of hunting was individual stalking. Stalking in disguise and calling is attributed only to the North Okanagan. Game was taken at favoured places such as salt licks, watering places, along game trails, or other places where animals congregated. Also used were various ambuscades in natural cul-de-sacs; shooting from concealed pits; from trees; communal drives into corrals and nets or drives along fences to waiting hunters; encircling or surrounds; and hunting from canoes in lakes for large swimming game. Dogs were also used in animal drives.

Various aspects of game butchering receive much less ethnographic attention than do fish processing methods. It is suggested that large game could have been transported after the kill to a central camp for butchering and distribution. Numerous transport methods were used, ranging from the common practice of inserting the forelegs of large mammals through incisions in the hindlegs and carrying the carcass suspended upon one's back, to simple dragging across snowfields in winter. Alternatively, large game could be butchered or at least sectioned at the kill site, with sections carried individually, depending upon need and travelling distance. In such cases, the head may have been removed and discarded along with viscera, and desired portions sectioned and carried in the green skin. Smaller game could be more easily transported, except in large numbers, thus one could expect more complete archaeological preservation of small species' skeletal elements, except for unpredictable cultural factors which may affect preservation. All game, if not roasted or boiled for immediate consumption, was smoked or dried in a manner similar to that used on fish. Dried foodstuffs, such as pemmican, were also prepared.

Numbers of small animals were "collected" depending upon season and need. These include:

(1) Freshwater mussels of two species - Margaritifera margaritifera and Gonidea angulata. Post in Cline et al. (1938:29) and Teit (1900) refer to freshwater mussels being utilized by plateau peoples primarily as starvation foods. If these statements are representative of prehistoric and historic practices then the numbers of archaeological sites containing mussels in both plateaus indicate that times of economic duress were relatively frequent (cf Blake 1973). However, the presence of mussels in Plateau sites suggest that mussels were used as a dietary supplement.

(2) One other major resource that is often overlooked are the numerous species of waterfowl and eggs available during spring. Species currently nesting in the Okanagan valley include pintails (Anas acuta), snow goose (Chon caecrulescens), mallard (Anas platyrhyncos), widgeon (Mareca americana), Canada goose (Branta canadensis), redhead (Aytha americana), American

coot (*Fulica americana*), hooded merganser (*Lophodytus cucullatus*), blue-winged teal (*Anas discors*), green-winged teal (*Anas carolinensis*), common goldeneye (*Bocephala clangula*), various rails (*Rallidae* sp.), various Passeriformes such as jays and crows (family *Corvidae*) (Brooks 1973).

(3) Some animals were also obtained using traps and snares manufactured from hemp. These included rabbit, marmot, squirrel, mink, weasel, beaver, and muskrat, although larger game such as bear were also taken (Teit 1930).

3.7. Ethnographic Floral Resources.

Tables 6-8 list plants recorded by Teit (1930) for the North Okanagan and by Cline *et al*. (1938) for the South Okanagan. More recent data are supplied by Turner *et al*. (1977).

Various floral resources were utilized, including numbers of fruit, seed-bearing and root plants, the majority of which are commonly found throughout B.C. and north-central Washington. Plants with restricted growing zones are blue elderberry (*Sambucus* sp.), camas (*Camassia quamash* and *C. leichtilinnii*), water leaf (*Hydrophyllum* sp.), bitteroot (*Lewisia rediviva*), Western yellow pine (*Pinus ponderosa*), balsalmroot sunflower (*Balsamorrhiza* sp.), and mariposa lily (*Calochortus* sp.). These plants are restricted to arid and semi-arid ecozones of British

Table 6: Ethnographically Recorded Berry Species. (from Teit 1930, Cline *et al*. 1938, and Turner *et al*. 1977).

Serviceberry	*Amelanchier alnifolia*
Choke cherry	*Prunus virginiana*
Blue elderberry	*Sambucus cerulea*
Black thornberry	*Crataegus rivalaris*
Willowberry	*Corneus pubescens*
Raspberry	*Rubus* sp.
Blackberry	*Rubus* sp.
Thimbleberry	*Rubus parviflorus*
Red gooseberry	*Ribes* sp.
Black gooseberry	*Ribes lacustre*
Wild currant	*Ribes cereum*
Soapberry	*Shepherdia canadensis*
Strawberry	*Fragaria* sp.
Huckleberry	*Vaccinium membranaceum*
Blueberry	*Vaccinium myrtillus*
Oregon grape	*Berberis* sp.
Bearberry	*Arctostaphylos uva-ursi*
Rose	*Rosa* sp.

Table 7: Ethnographically Recorded Root Species. (from Teit 1930, Cline *et al*. 1938, and Turner *et al*. 1977).

Camas	*Camassia quamash* *Camassia leichtilinnii*
Bitterroot	*Lewisia rediviva*
Spring beauty	*Claytonia sessilifolia*
Wild onion	*Allium cernum*
Chocolate lily	*Frittilaria lanceolata*
Yellow bells	*Frittilaria pudica*
Skirret	*Sium lineare*
Tiger lily	*Lilium columbianum*
Giant fennel	*Ferula dissoluta*
Balsamroot sunflower	*Balsamorrhiza sagittata*
Bear's wort	*Peucedanum macrocarpum*
Mariposa lily	*Calochortus macrocarpus*
Dog's tooth violet	*Erythronium grandiflorum*
Cinqefoil	*Potentilla anserina*
Water leaf	*Hydrophyllum occidentale*
Brilliant thistle	*Cnicus undulatus*

Table 8: Other Plant Foods.
(from Teit 1930, Cline *et al*. 1938, and Turner *et al*. 1977).

Hazelnut	*Corylus carnuta*
Balsamroot sunflower seed	*Balsamorrhiza sagittata*
Toad-flax seed	*Comandra pallida*
Lodgepole pine seed	*Pinus contorta*
Cow parsnip	*Heracleum lanatum*
Western yellow pine cambrium	*Pinus ponderosa*
Black moss	*Alectoria jubata*
"Celery"	*Apiacae* sp.
Cactus	*Opuntia* sp.
Western yellow pine sap	*Pinus ponderosa*
Lodgepole pine sap	*Pinus contorta*
Douglas fir sap	*Pseutotsuga menziesii*
Oleaster	*Elaeagnus argentea*
Snowberries	*Symphoricarpos albus*

Columbia and Washington (Szcawinski and Hardy 1962). Camas occurs only infrequently in the northern Okanagan Valley, lending credence to statements by Cline et al. (1938) and Teit (1930) that these plants were restricted to the most southerly areas of Sinkaietk territory, and were traded northwards.

Gathering technology consisted primarily of digging sticks, coiled and bark baskets, woven sacks and bags, and leather bags and parfleches, with attendant straps and tump lines (Teit 1930:218-227, Cline et al. 1938:60-64).

Berries were eaten fresh or air dried for later inclusion in soups, or mixed with ground pemmican. Roots and seeds were generally stored with minimum preparation, or prepared for immediate consumption in earth ovens. Freshwater mussels could be stored after smoking or air drying, or steamed or roasted for immediate consumption.

Storage facilities reportedly consisted of lined cache pits or any of the other methods, notably scaffold structures, previously mentioned for fish. Roots were generally boiled or roasted, but roasting in earth pit ovens appears to have been the favoured or predominant technique.

Other resources include various local lithic materials, primarily basalts and silicates, used in the manufacture of stone tools. Sources vary from veins in bedrock cutcroppings to cobbles in glacial drift. Red ochre (hematite) was procured from the Tulameen valley where it occurs as natural outcroppings along the steep cliff face on a portion of that river. A source of black steatite for pipe manufacture was noted by Cline *et al.* (1938:65) as occuring in the Similkameen valley.

Chapter 4: Previous Archaeological Research.

Archaeolcgical investigations in the Okanagan valley of British Columbia and north-central Washington state commenced when W. Caldwell (1954) conducted an archaeological and ethnographic survey in the Canadian Okanagan and Similkameen Valley systems, resulting in the location of over 100 sites.

This survey included the classification of three distinct types of structural habitation-feature sites. All were variations of housepits or other cultural depressions, distinguishing criteria being depth and shape of the depression, as well as the presence of associated stone linings or wall features. Surface scatters of artifacts and detritus (open sites) were referred to as featureless sites. Rockshelter, burial and pictograph sites complete Caldwell's inventory. Burials were distinguished by surface characteristics of interment as: cedar or stone cist, cairn, talus slope interment, surficial stone ring feature, or simple interment.

Artifacts reported by Caldwell included varieties of stemmed, barbed, and nonstemmed chipped stone projectile points, chipped stone scrapers of various forms, chipped and ground stone celts, antler wedges, ground and pecked or ground stone mauls and pestles, pecked stone mortars, grooved or notched netsinkers, and various ornaments of shell, copper, and elk teeth. In summary, Caldwell concluded that the majority of observed materials was late prehistoric in age, although exhibiting an underlying continuity with an earlier, generalized Plateau style (Caldwell 1954:22).

Garland Grabert (1968) conducted extensive survey and excavations in north-central Washington. He later expanded research to include the Canadian Okanagan valley (Grabert 1968). His work in the Wells Reservoir and Canadian valley system involved excavation of 23 open and housepit sites. As a result of these works an Okanagan culture sequence was advanced for the entire valley on both sides of the International Border (Grabert 1968, 1970, 1974). This chronological framework consists of four named phases. These are: 1) the Okanogan phase dating from post-Pleistocene origins to 6000 years B.P., 2) the Indian Dan phase ca 6000-3000 years B.P., 3) the Chilliwist phase ca 3000-900 years B.P., and 4) the Cassimer Bar phase ca 900-100 years B.P.

G. Roberts (1973,1974) conducted two seasons of survey and salvage excavations on the Inkameep Indian Reserve on the east side of Osoyoos Lake. Six sites were tested. Four of these were lakeshore terrace sites, three containing cultural depressions. Two remaining cultural depression sites were located at higher elevations ca 1-2 km east of the lake, alongside small creeks. Artifact typology indicated occupations during the late prehistoric period (ca 500-600 years B.P.), one historic component (ca A.D. 1820-1860), as well as one possible earlier component of ca 3500 years B.P. (Roberts 1974:38).

In 1974 I conducted a judgemental site survey of portions of the Canadian South Okanagan and Similkameen valleys which led to the discovery, recording and in some areas, rerecording of 63 sites (Copp 1975). These included open sites, cultural depression/habitation features, isolated surface finds, rockshelters, pictographs, rockshelter and pictograph complexes, and quarries. In addition a few aboriginal monuments, believed to be territorial markers or myth features and a number of miscellaneous cultural sites or features were located (Copp 1975:94-104). The McCall site (DhQv:48) was recorded as a result of this survey.

A more systematic site survey combined with compilation of ethnographic data was begun by J. Baker in 1975 (Baker 1975) with a goal of delineating the total resource area of Okanagan Indian Bands in the Canadian Okanagan. As the beginning stage in a multi-year program, a probabilistic survey scheme was developed to investigate drainage systems in the Okanagan valley between Shuttleworth Creek near the town of Okanagan Falls in the south and Peachland Creek in the north.

Another probabilistic survey of Okanagan Lake by S. Lawhead and K. McAleese (1976) recorded 75 previously unknown sites between Kelowna and Vernon. Site types observed and recorded included surface scatters, cultural depression sites, rock features, exposed cultural strata and combinations of these sites.

In summary, previous archaeological research in the Okanagan valley has included both excavations and judgemental to probabalistic surveys. Earlier attempts generally embraced the entire valley system (Caldwell 1954, Grabert 1968, 1970,1974) with later research designs becoming increasingly concerned with smaller, less unwieldy areas (Roberts 1974,Copp 1975, Baker 1975, Lawhead and McAleese 1976).

Investigations of southern Interior Salish areas outside of the Okanagan valley include work by C. Turnbull (1977) in the Arrow Lakes and by D. Chance et al. (1977) at Kettle Falls in Washington. Both involved excavation of housepit and other sites based on research oriented towards the development and description of local culture sequences.

Chapter 5: The McCall Site.

5.1 Site Description.

The McCall site is located off highway 97 in the south Okanagan valley of British Columbia about 3.5 km south of the town of Okanagan Falls (Figure 5). Situated above the east bank of the Okanagan river, the site is bounded on the north and east by a ridge of kettled outwash deposits and on the west by post-glacial brunisols over a sloping beach lag deposit and the present river channel. Recent disturbance is indicated by the owner's landscaping activities as well as by highway construction infringing on the northern perimeter of the site. Surface cultural area is estimated to be 7200 square metres (180 x 40 metres).

On-site vegetation consists of sagebrush (Artemesia tridentata), cactus (Opuntia sp.), serviceberry (Amelanchier alnifolia), current (Ribes cereum), bunchgrass (Agropyron spicatum), rye grass (Elymus condensatus) as well as spear grass (Stipa comata). Recent domestic Eurocanadian additions are lawn grass, various fruit trees, flowering plants and shrubs, and crops of asparagus, corn and potatoes.

Surrounding vegetation consists of open park-like stands of Western yellow pine (Pinus ponderosa), as well as some willow (Salix sp.), birch (Betula sp.) and cottonwood (Populus sp.) near

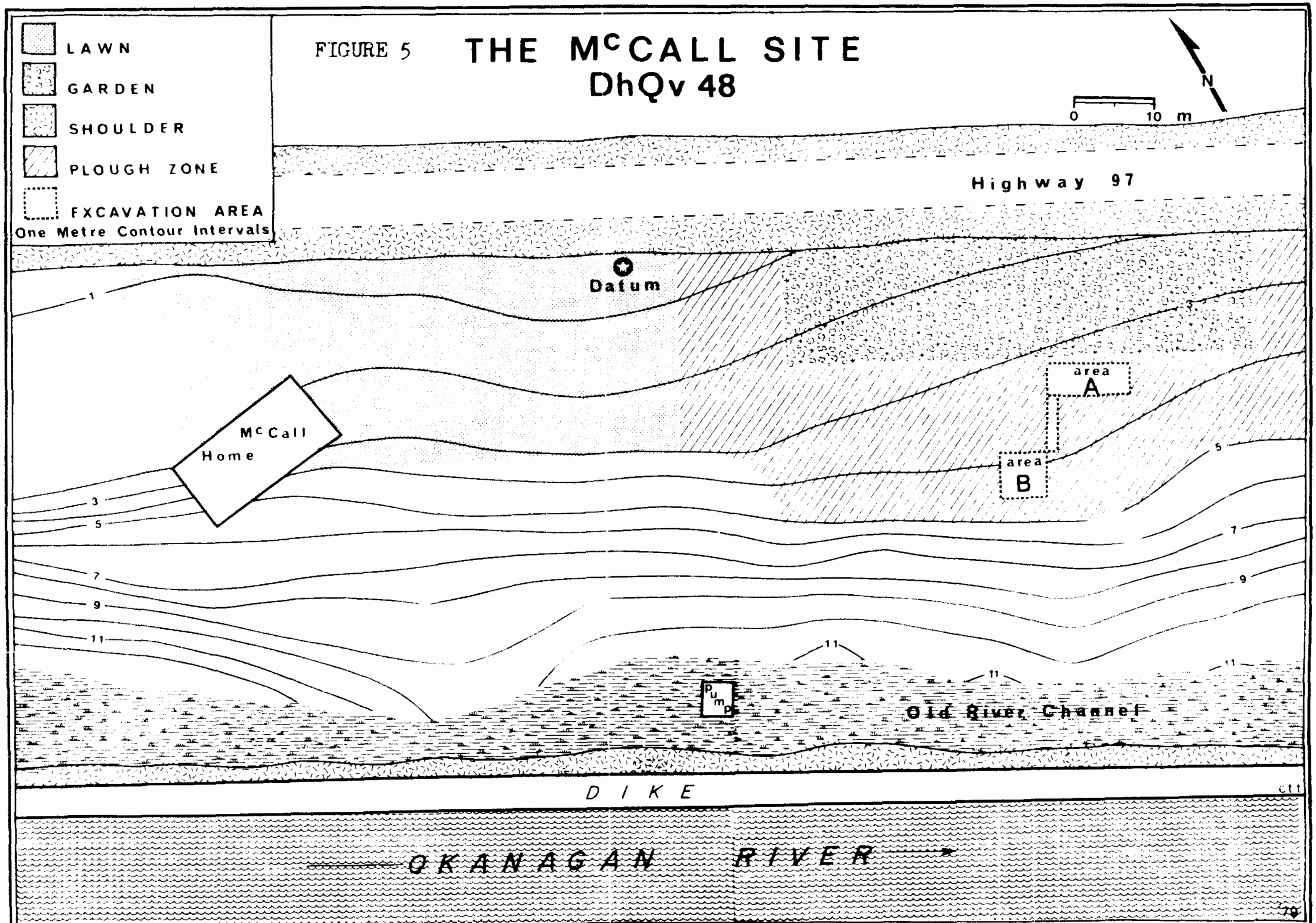


FIGURE 5 THE McCALL SITE DhQv 48

the river's edge, accompanied by various shrubs on undisturbed sections of the site. The open parkland vegetation probably represents the original ground cover prior to Eurocanadian disruption.

5.2 McCall Site Environment.

At present the climate borders that of the Osoyoos Arid and the Dry Forest Biotic regions as defined by Cowan and Guiguet (1973:20-21). The Osoyoos Arid regime is characterized by cold, dry winters and hot, dry summers. Precipitation is less than 20 cm annually. This regime is represented by the Okanagan River floodplain and adjacent areas to elevations of ca 300 m (Cowan and Guiguet 1973:20). The Dry Forest regime commences immediately north of the Osoyoos Arid regime at the south end of Skaha Lake. Summer and winter temperature ranges are similar between the regimes but the Dry Forest regime receives a maximum of ca 40 cm precipitation annually. The McCall site, located some 3.5 km south of Skaha Lake, is situated close to the ecotone between the 2 regimes. Effects of this ecotonal position are expressed in the floral and faunal community zones surrounding the site.

Brayshaw (1970) classified the regional floral communities of the south Okanagan into six biotic community or zonal associations, based upon qualitative changes in soil type, elevation and relative degree of slope. Within these limits, the zonal associations can be related to the catchment area surrounding the McCall site by combining Brayshaw's six zones into four major and two minor zones.

The McCall site locality includes a first zonal association of a gallery forest complex located adjacent to the Okanagan river. The river, marshy riverbank, and old oxbow marshlands are not included in Brayshaw's zonal scheme but they offer important resources. The river and marsh areas harbour various riverine and lacustrine fauna, including fish and freshwater mussel species, as well as edible and industrial floral resources. Various species of migratory and nonmigratory waterfowl and their eggs (in nesting season), are also present.

Adjacent to this is the gallery forest complex consisting of river and stream bank floral communities. Floral associations are willow (Salix sp.) and cottonwood (Populus balsamifera), with a few Ponderosa pine (Pinus ponderosa) on higher ground. Rye grass (Elymus condensatus) and choke cherry (Prunus virginiana) provide the dominant ground cover away from the water's edge. The gallery community provides ample browse for various ungulates such as white tail (Odocoileus virginianus) and mule deer (Odocoileus hemionus), mountain sheep (Ovis canadensis) and mountain goat (Ovis creamnos), as well as protective cover for other animals. Other fauna exploiting this zone include small mammals such as muskrat, beaver, and turtles.

Adjacent to the gallery forest and river's edge, at elevations ranging from 305 to 1220 m above sea level, is a zonal community characterized by open stands of Ponderosa pine and bunchgrasses (Agropyron sp.). This zone has additional ground cover such as choke cherry (Prunus virginianus), sagebrush (Artemesia tridentata), bitterbrush (Purshia tridentata), cacti (Opuntia sp.), berry bushes, notably serviceberry (Amelanchier alnifolia), bitteroot (Lewisia rediviva) and some camas (Camassia sp.). This zone corresponds with the ancient Okanagan river floodplain as well as the upper slope of kettled outwash deposits immediately north of the McCall site.

Besides the floral associations, a number of faunal species are known to inhabit this zone, some on a seasonal basis. Deer, small mammals, and small carnivores such as coyote (Canis latrans) and lynx (Lynx canadensis) are present throughout the year, but mountain sheep and goats are usually present only in the spring and autumn. Similarly bears, though rare at lower elevations, are not present during winter hibernation.

Aboriginal exploitation patterns in this zone are envisioned to compare favourably with the total ethnographically recorded pattern, including all hunting and gathering activities; occupation of open and semi-subterranean house sites, construction of food processing and storage features; such as earth pit ovens, cache pits and drying racks or scaffolding; use of burial and rock art sites; as well as exploitation of lithic raw material sources. I suggest that it is this zone which has been most predominantly researched by archaeologists in the past for two reasons: (1) it has proven to be by far the most productive area of the valley in terms of number of sites located (see chapter 4), perhaps due to the relative paucity of ground cover facilitating recognition of sites; and (2) this zone has seen more modern construction and disturbance than have upper valley slopes.

The third major biotic zone is the Douglas-fir-bunchgrass-bearberry and pine grass community, ca 600 to 1400 m above sea level. The succession of Douglas fir (Pseudotsuga menziesii) over Ponderosa pine is gradual; the result of changing critical soil temperatures controlling seedling development.

A mixture of Douglas fir and Ponderosa pine with bunchgrasses is present until the Douglas fir climaxes at the expense of the pine ca 900 m above sea level or above. Beyond these elevations Ponderosa pine does not occur, being replaced by Lodgepole pine (Pinus contorta) (Brayshaw 1970:26).

Similarly, bunchgrasses begin to be replaced by bearberry (Arctostaphylos uva-ursi) at approximately 600 m above sea level, until it too is gradually replaced by pine grass (Calamagrostris rubescens) at ca 760 m above sea level. Sod formation, a process not found with Ponderosa pine associations, commences only with the Douglas fir-pine grass community.

Faunal species similar to that of the preceding Ponderosa pine-bunchgrass zone are present, excluding small semi-arid adapted animals, notably rattlesnake (Croatilus viridis). Other species increase in occurence, especially larger ungulates such as mountain goat and sheep, as well as elk, and bear. Root foods such as bitterroot and camas also decline with an increase in elevation; the result of cooler temperatures and less well-drained soils.

A fourth zone at elevations greater than ca 1300 m above sea level is an Englemann spruce (Picea glauca)-pine grass meadow community. This community is not prevalent close to the McCall site. Such meadows are depressions in forested uplands that trap snowmelt waters. Rye grass (Elymus condensatus) is the seral dominant. Meadow margins are shrubby woodland associations of water birch (Betula occidentalis) and willow (Salix sp.), with hawthorn (Cratoegus columbianus) and choke cherry (Prunus virginianus).

The combination of meadow and meadow margin areas in the Englemann spruce-pine grass community provides browse and cover for a number of animal species in a manner similar to the gallery growth on the valley floor, especially during the spring and summer months when open water is present. With autumn, browsing animals migrate downslope in search of food, to winter in the valley bottoms, and move upslope again when snowmelt rejuvenates the upland meadows.

It cannot be shown that the McCall site inhabitants used all of these zones; however, all zones occur within a 10 km radius of the site. A 10 km radius of exploitation may have been within the daily or seasonal walking capabilities of these peoples as part of their seasonally transhumant pattern of resource explcitation.

Around the McCall site fish resources available in all seasons include: trout (<u>Salmonidae</u> spp.), salmon (<u>Oncorhyncus</u> spp.), mountain whitefish (<u>Coregonidae</u> <u>clupeaformis</u>), suckers (<u>Catostomus</u> spp.) and lake burbot (<u>Lota</u> <u>lota</u>). Some floral species are generally available from mid-March to the end of October, with earliest growth and ripening ccurring in valley bottomlands and gradually moving upslope as the season progresses.

Various faunal species could have been procured at any season, limited only by depth of snow, technology, and personal motivation. Teit (1930) records that the Okanagan perceived the year as consisting of four or five seasons based upon weather conditions and the pattern of floral growth and fauna behaviour. The year began with a winter season, when deer were restricted to valley hollows and floral resources were generally not available. Spring began when deer and other browsing ungulates moved to upland grazing areas and roots and berries began to ripen in the lower valley. Some fishing also took place. Summer followed much the same pattern as spring, with ungulates becoming established in the upland regions. Fall and winter began when deer started downslope, when berries and roots were finished, and salmon fishing took precedence over other activities. Winter also saw the final movement to the winter village.

A major problem involved with any attempt to interrelate the ecology of an area and the archaeologically visible remains of past culture is inadequate sampling of the various zones. To date, upland Okanagan areas have received little in the way of archaeological investigation as most excavated and radiometrically assessed materials derive from the valley floor in the Ponderosa pine-bunchgrass zone. Consequently a representative sample of the full range of prehistoric Okanagan sites has yet to be attained.

5.3. Research Methodology.

Although the original areal extent of cultural deposits at the McCall site is estimated to be about 7200 square metres, the actual area which could be investigated was limited by highway construction and other land disturbances. In all, an area 60 x 40 m or 2400 square metres remained undisturbed, except for surface disc plowing. Disc plowing was observed to a maximum depth of 18 cm below surface. In order to investigate this remnant site area an excavation sampling design by large block units was undertaken. Provenience controls were established through a grid system tied to an arbitrary elevation datum. Major grid blocks measured 10 x 5 metres, with smaller 2 x 2 m individual excavation units between and among the major units.

Two major block excavations were defined after test excavations. A total of six test pits was excavated using a combination of trowel and shovel-screening techniques. Data from these test units were used to identify two areas of relatively dense cultural material occurences. These units were then expanded to encompass areas of 10 x 4 and 6 x 6 m labelled A and B respectively, covering a total area of 76 square metres (Figure 5). This form of block excavation insures more complete recovery of artifact associations and features than isolated excavation units.

Both excavation areas A and B were subdivided into a number of discrete 2 x 2 m units separated by baulks 30 cm wide for stratigraphic control. Baulks were later removed; completely to sterile in area A, and to 50 cm below surface in area B, insuring the integrity of the block units. All excavations were dug by trowel in arbitrary 10 cm levels and screened through 1/4 inch mesh to insure maximum *in situ* artifact recovery. Formed artifacts, identifiable faunal remains, and unmodified flakes were recorded with more precise vertical control than were shell or fire cracked rock features. Artifacts were individually recorded both in horizontal and vertical proveniences within the arbitrary 10 cm levels. Both proveniences are considered precise to within one cm in both dimensions. Fire cracked rock, on the other hand, was recorded precisely according to horizontal location but only within a single 10 cm level vertically. Since more precise provenience data was available for artifacts it was later possible to define analytical five cm levels, since these materials were not restricted to 10 cm levels only. Shovel screening was used only below the level judged to have the greatest density of artifacts and features. Nondiagnostic bone, shell and debitage fragments less than one cm in diameter were saved as level material per 2 x 2 metre unit.

Excavation proceeded by subdividing each 2 x 2 metre unit into four 1 x 1 metre quadrants. Each quadrant was generally treated as a separate excavation subunit to be dug leaving artifacts and features <u>in situ</u>. In addition, the quadrant system facilitated removal of four 250-500 cc soil samples per unit level. All artifacts including unmodified flakes and unidentifiable bone, and features were recorded on a computer coded data sheet. In addition a level record form permitted maintaining nonportable cultural and noncultural provenience data (fire cracked rock, shell lenses, and tree roots). In addition, crew members were required to keep a daily record of their excavation activities.

Post-field season analysis necessitated further examination of unexcavated deposits between excavation areas A and B. Consequently a series of seven 1 x 1 metre units connecting the two areas was excavated in October, 1976. Due to time constraints excavation was in arbitrary 10 cm levels dug by shovel- screening. In total, the actual amount of surface site examined by excavation covered 89 square metres, or 1.24% of the estimated site surface area, but 3.71% of the site available for excavation.

5.4. Cultural and Natural Stratigraphy.

An idealized stratigraphic profile of both excavation areas would include the following strata (Figure 6):

Stratum 1: A culturally sterile sedimentary deposit of undetermined depth composed of beach or channel lag deposits (Fladmark 1975: pers. comm.) consisting of large rounded boulders, cobbles and pebbles.

Stratum 2: A light grey-brown sandy loam soil horizon ca 40-100 cm below surface composed of medium to fine sand particles, Munsell 10YR 6/3 to 5/2, with a pH of 7.0 to 8.5. Fine hair rootlets intruded as far as the interface between this and stratum 3 above. A few isolated pieces of fire cracked rock,

FIGURE 6 **LEGEND**

- PLOW ZONE
- LIGHT BROWN SANDY LOAM
- YELLOW BROWN SANDY LOAM
- LAG DEPOSIT
- ROOTS
- RIVER COBBLES
- FIRE CRACKED ROCK
- DBS DEPTH BELOW SURFACE

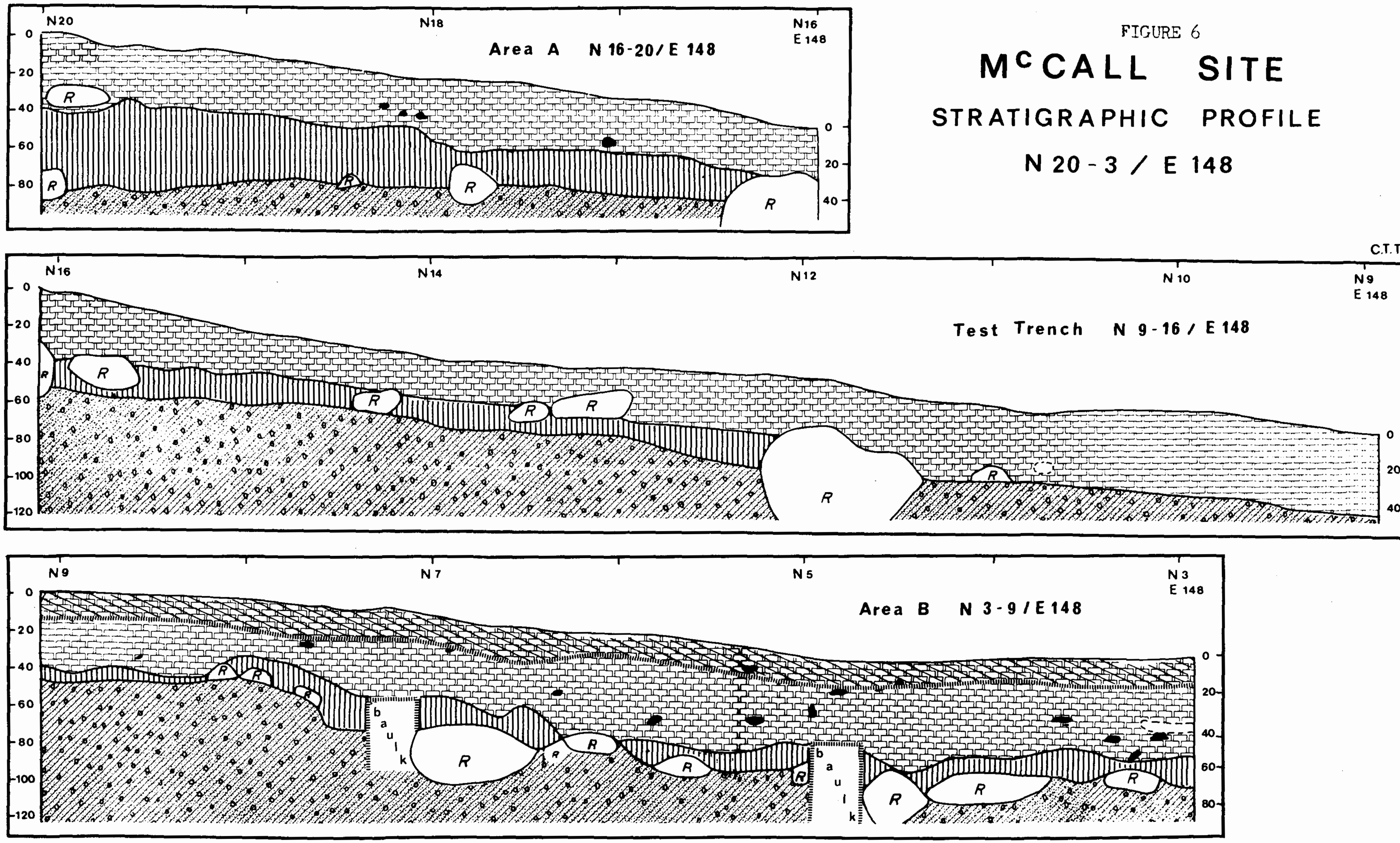


FIGURE 6
McCALL SITE
STRATIGRAPHIC PROFILE
N 20 - 3 / E 148

debitage, bone and shell, probably originating in stratum 3, were the only cultural materials.

Stratum 3: A dark grey-brown to brown sandy loam with fine to medium sands, Munsell 10YR 4/2 to 5/3, with pH of 6.5 to 8 ca 0-40 cm below surface characterized this horizon. Numerous rootlets plus a few decaying tree roots were present. This horizon contained the major assemblage of cultural materials, including artifacts and features of all types, with lenses of whole and fragmented shell. This natural soil horizon has been disturbed by disc ploughing to a maximum depth of 18 cm below surface.

Stratum 4: This poorly defined horizon is defined on the basis of observed plow disturbance over much of the site. This Ap horizon varies in depth but nowhere extends greater than 18 cm below surface.

The reconstructed history of these deposits is as follows:

Prior to drainage of glacial Lake Penticton and during final stagnation of valley ice, the area south of Okanagan Falls received massive deposits of glacial drift and kettled outwash deposits. These deposits are characterized by sands and gravels with some silts and clays resulting from ponding above and around stagnant ice blocks. Eventual overriding of outwash by meltwater resulted in rapid drainage of the lake as well as stripping of deposits from the western portion of the valley. Alley's (1976) estimate of complete lake drainage prior to 8900 years B.P. indicates that beach or channel lag deposits underlying the McCall site soils were fully formed prior to this date. Subsequent soil formation over the lag deposits then commenced.

Okanagan Valley soils grade from south to north from brunisolic to podsolic, due to increasing precipitation ranges (Kelley and Spillsbury 1955), with brunisols or Brown soils prevailing at lower elevations in the south.

Kelley and Spillsbury (1955:29) include the McCall site area in their brunisolic zone. The soils in this area are locally classified as Osoyoos Sandy Loams and derive from kettled outwash deposits. Osoyoos Sandy Loams (Kettle phase) are characterised by brown to pale-brown subsoils with indistinct A horizons composed of medium to fine sands of finely granular texture with a pH of about 7.5. The B horizon is characterized by sandy-loams to loamy-sands with pH of 7.8 to 8.6 with an accumulation of lime in the lower B horizon depending upon local conditions and drainage.

Microscopic analysis of sand particles revealed materials of quartz with subangular blocky shapes and visual sphericity values of 0.45-0.65 for medium sized particles and 0.79-0.81 for smaller particles (after Rittenhouse 1943). A high incidence of surface frosting on quartz particles was observed, indicating an aeolian mode of deposition (Shackley 1975:53). Alley (1976) has postulated a short period of high aeolian activity to have occured ca 8400-6600 years B.P. in the Okanagan valley prior to climatic stabilization. Personal observance of winds in this section of the valley confirms that aeolian particle transport is an active process due to prevailing southwesterly 10 km/hour winds in all months except July when north winds average 11 km/hour (Kelley and Spillsbury 1955:15-16).

Particle size analysis of a north to south sloping transect of deposits stratigraphically overlying the basal lag deposit along the east wall of excavation area B was conducted using 100 gram samples taken from arbitrary 20 cm intervals and mechanically processed with a sieve series with aperture ranges of -2 to +4 phi. Particle size interval materials were weighed and converted to percentages per arbitrary level (Table 9). Silts and clay particles smaller than +4 phi were collected in a base pan and considered as a single phi interval. These were not subjected to further analysis. Results of statistical analysis are presented in Table 10. Cumulative curves are not included here.

Table 9: Soil Particle Size Percentages.

	147.50-148.00 East									
Unit:	3-5N			5-7N				7-9N		
Level:	01	03	05	01	03	05	07	01	03	05
Stratum:	03	03	03	03	03	03	02	03	03	03
Phi Interval										
-2	01	01	01	01	02	00	01	01	01	00
-1	01	01	01	01	00	00	00	01	01	01
0	06	03	03	02	02	01	01	03	02	02
+1	23	15	16	19	16	16	15	18	14	17
+2	46	49	48	52	51	50	52	51	53	59
+3	12	15	14	13	13	14	15	14	14	13
+4	06	08	07	06	07	08	07	06	06	04
Pan	04	06	11	06	09	11	09	07	09	04

Table 10: Soil Particle Size Statistics.

	147.50-148.00 East									
Unit:	3-5 N			5-7 N				7-9 N		
Stratum:	03	03	03	03	03	03	02	03	03	03
Level:	01	03	05	01	03	05	07	01	03	05
Kurtosis	1.50	1.14	0.68	1.22	0.81	0.68	0.61	0.82	1.05	1.50
Median	1.40	1.60	1.60	1.50	1.60	1.70	1.65	1.50	1.60	1.50
S.D. (O)	1.00	1.05	1.25	1.10	1.10	1.10	1.15	1.10	1.00	1.20
Mean	1.50	1.85	2.05	1.70	1.90	2.10	2.15	1.60	1.90	1.55
Skewness	-2.40	-2.52	-2.28	-2.73	-2.50	-2.55	-2.43	-2.36	-2.60	-3.14

Results of the analysis reveal sediments grading from medium to fine sands from the surface to the top of the lag deposit. Silts and clays varied between 5% and 10% by sample weight per level and generally increased slightly with depth, as do finer sized sand particles. Larger medium sands decrease with depth. Cumulative curve shapes were plotted on standard log paper with the result that all curves approximated a straight line function except for a slight kink at the +2 phi interval, probably due to experimental error as Shackley (1975) indicates is common with this type of analysis. The shape of curves was similar for all levels plotted, indicating a similar mode and rate of deposition.

As opposed to a visual inspection of soil particles, skewness and sphericity values derived from the above data indicate a water laid deposit such as is found in a beach environment. Aeolian deposits are characterized by similar sphericity values but with low, positive skewness values whereas beach deposits are characteristically high, negative values (C. Crampton: pers comm). High kurtosis values indicate a poorly sorted deposit. Poorly sorted deposits are not characteristic of either beach or aeolian modes of deposition. Plotting of frequency graphs per level of the samples were unimodal thus ruling out statistical smoothing of the data. Therefore it would appear that neither fluvial nor aeolian deposition can be determined from statistical analysis alone. However, the presence of kettled outwash deposits adjacent to the site as well as ongoing aeolian deposition in the valley suggests that the site deposits may derive from this close source as wind blown sands need only have travelled less than 200 metres in order to be deposited on the site. Alternatively, poor sorting of the deposits could be the result of combined downslope wasting of outwash materials and aeolian deposition since the site is situated at the foot of outwash deposits themselves. It cannot definitely be stated at this time that the above data precludes one method of deposition over another.

Regardless of the mode of deposition, the majority of archaeological materials, situated in stratum 3, were separated from the sterile lag deposits by varying depths of stratum 2 deposits across the site. The depth of the cultural deposit, as well as the slope of the underlying beach lag deposit are illustrated in Figures 7 and 8.

5.5. Artifact Classification.

The McCall site artifact classification scheme is primarily descriptive. Limited functional interpretations for some artifact classes are included in the description. Function is inferred from microwear analysis of tool working edges and by overall tool morphology. This is in keeping with descriptive

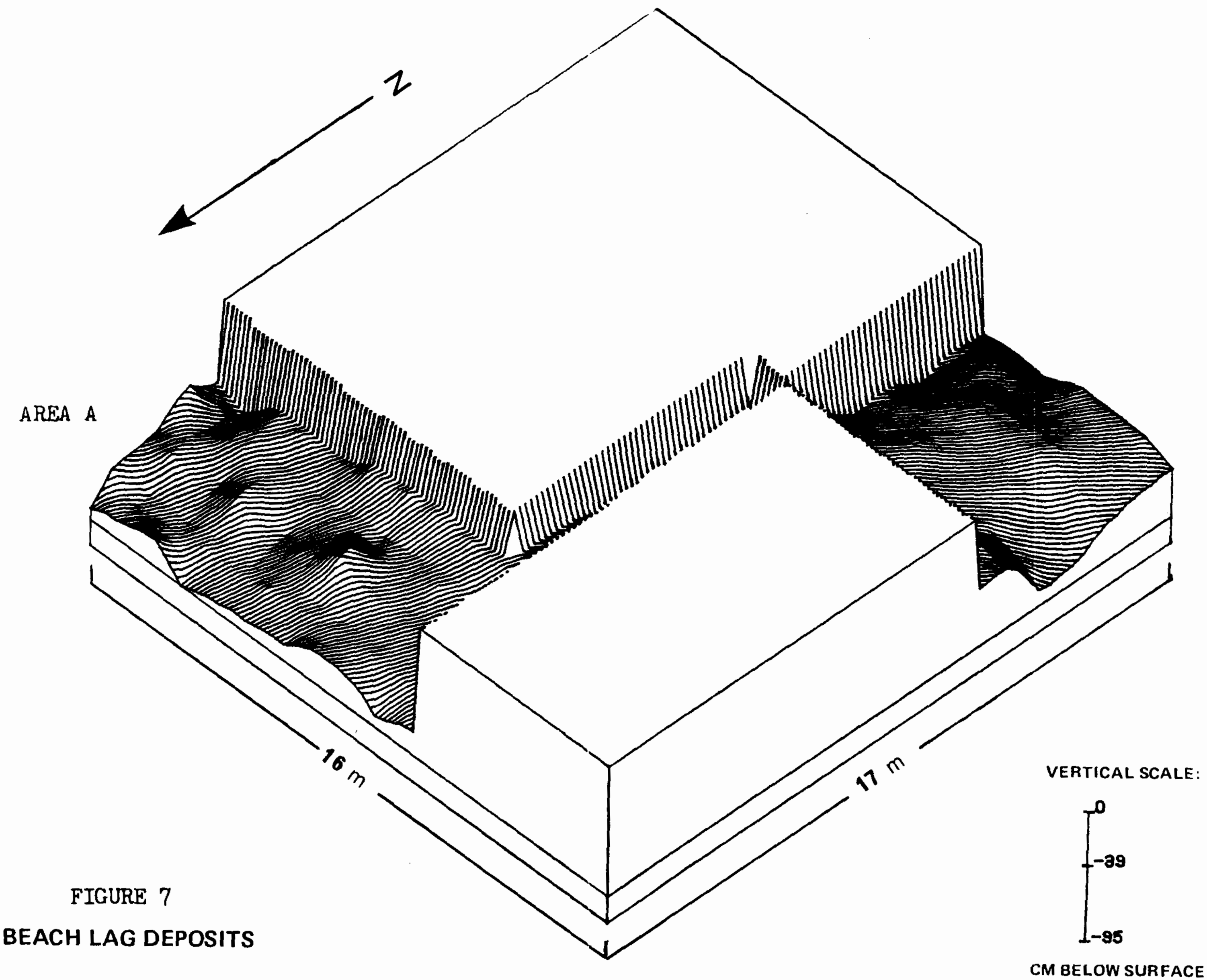


FIGURE 7
BEACH LAG DEPOSITS

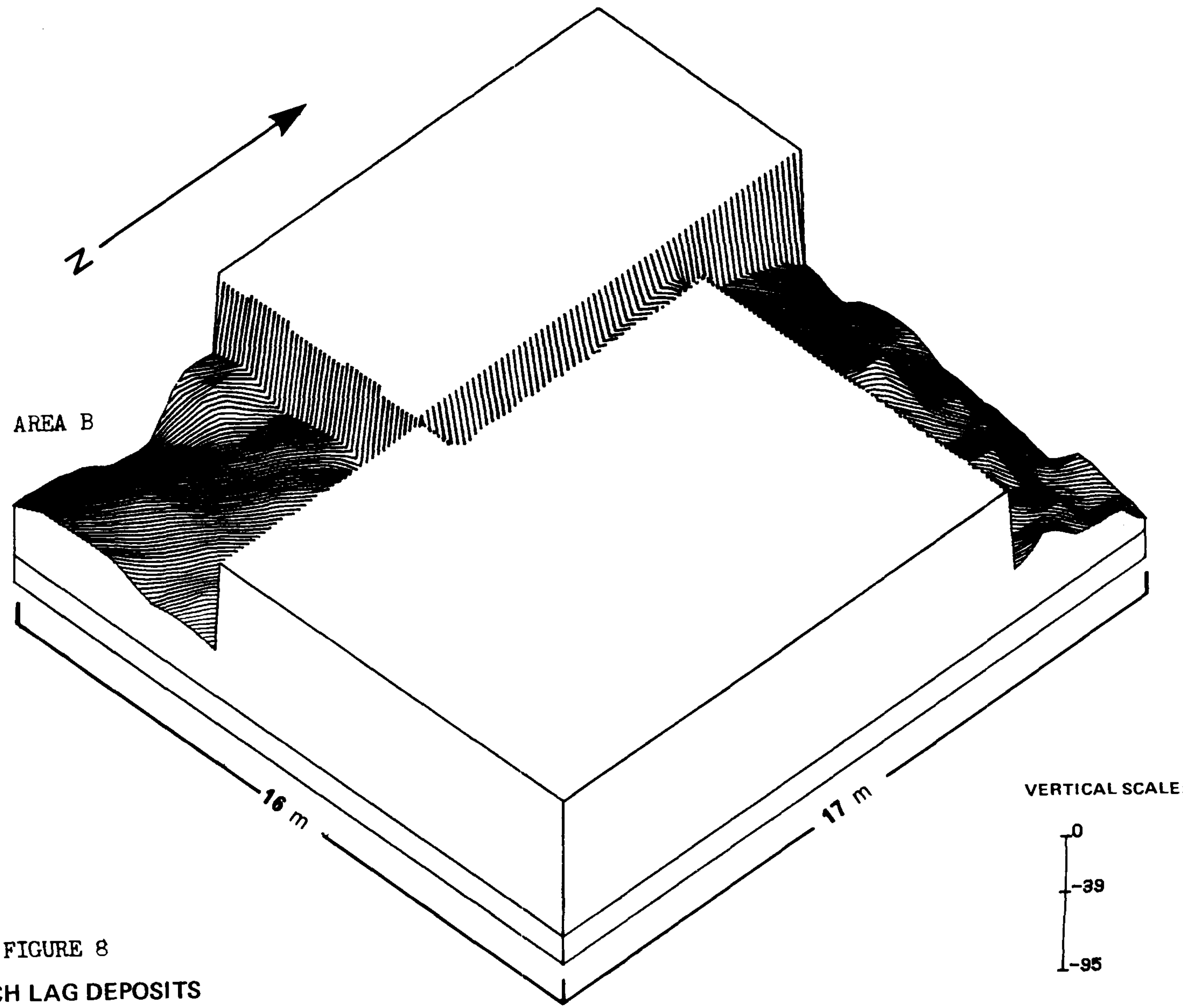


FIGURE 8
BEACH LAG DEPOSITS

schemes employed by other Interior Plateau researchers (Grabert 1968, Sanger 1970, Stryd 1973a and Wilson 1977).

The descriptive part of this scheme is based upon precepts advanced by Spaulding (1953:305), that an artifact type is a ..."group of artifacts exhibiting a consistent assemblage of attributes whose combined properties give a characteristic pattern." These patterned attributes are a result of the manufacturing process and are related to the performance of single or multiple tasks and are reflected in tool attributes, including the nature of the working edge. However, as Brew (1971:76-77) suggests, types reflect arbitrary decisions made by the archaeologist in a conscious attempt to supply order to the data and may bear little relation to the conceptual ideas of the manufacturer. Analysis of working edges for patterned microwear provides an index whereby the mode of use per working edge and sometimes the general properties of the worked material can be defined. A functionally descriptive classification relies upon analogy and edge wear to provide statements about tool use, and to generate hypotheses about past cultural behaviour.

The "industry" is the primary division in this scheme, based upon raw material as well as the manner in which it was mainly modified, e.g. the "chipped stone industry." Subdividing industries is the "type", a distinction based not only upon function, but also upon morphological and metric attributes that have been found to define temporal progressions in style in nearby plateau areas, primarily by Grabert (1970), Sanger(1970), Stryd (1973a,b), and Wilson (1977). The type can be further subdivided into subtypes or groups based upon ..."discrete clusters or patterns of attributes that bear no necessary relationship to the patterns or clusters on any other level." (Rouse 1972:54).

Any one type need not have a single function accredited to it, as many tools can be utilized in more than one specific manner. Inferred function refers to previous classificatory systems, as well as to functions suggested by other archaeological research. Implicit functions can be determined by microwear analysis following precedents set by such researchers as Semenov (1964), Hayden (1975), Kamminga (1977: pers. comm.), Keeley (1977) and others. When these factors are taken into account, this classification provides an analytic, not taxonomic, description of artifact morphology and function.

An artifact is defined as any natural or modified material which has been used by a human being in any task. Formed artifacts, e.g., those exhibiting intentional secondary modification, number 859 from the McCall site. Unformed artifacts, including unmodified stone flakes or debitage, number 1517, for a combined total of 2376.

Chipped Stone Industry.

The chipped stone industry makes up 91% of the McCall site artifacts. Workmanship is characterized by random contracting and expanding primary flaking with discontinuous to random secondary edge retouch (Loy et al. 1974:Diagrams 16-17).

The quality of workmanship is thought to be a result of the quality of the lithic materials, which range from granular quartzites and micaceous schists, through various grades of basalts, to cryptocrystalline silicates. Overall quality of workmanship increases with fine grained silicates which exhibit improved, that is, less random, flaking over other materials. Flaking techniques are not dealt with in detail unless considered relevant to the description of a particular artifact type.

Formed Bifaces:

N = 334

Bifacially formed artifacts exhibit bifacial retouch across dorsal and ventral surfaces, with one or more working edges. A working edge should exhibit the correct surface, edge attributes and cross sectional area to suit the task for which it was made. The nature of the raw material, the skill of the knapper, and the desired final shape would influence finished attributes.

Consequently the following types and subtypes contain ranges in morphology.

Type: Projectile points.

Projectile points are defined as pointed, bifacially flaked lithic artifacts with hafting elements (base and/or stem), as well as blade forms, following Loy _et al_. (1974) descriptors. Point cross sections are described following Binford's (1963:203) terminology. Points are assumed to have a primary function as weapons on arrow, dart, or spear, for the procurement of game, or for armed conflict. Secondary functions as cutting implements or knives are also probable, although for the purpose of classification only the primary function is considered.

Two types of fractures are noted on broken or incomplete artifacts. These are flexion breaks, often called _languettes_ or tongue fractures (Lenoir 1976:132) resulting from overloading tension forces at right angles to the main axes until the elastic strength of raw lithic material is exceeded. The resultant fracture surface is readily identifiable by a lipped or tongue shaped edge. Lateral snaps (Purdy 1976:137) lack percussion bulbs and are the result of manufacturing errors such as end shocks. Such fractures could also be a result of force loadings when removed from animal carcasses or when used as a cutting edge, or be the result of impact stresses upon entering animal tissues and connecting with bone or cartilege. Accidental breakage could also be the result of storage conditions of both pre- and post-depositional nature.

The following flaked point types are defined on the basis of blade and hafting element attributes. It should be noted that illustrated forms may not be characteristic of the entire range of variation within the group, rather they represent the most complete specimen or a composite of shared attributes.

Group 1: Leaf shaped.

N = 14. (Figure 9 a-e).

Material: Basalt (11), Silicates (3).

These specimens encompass a range of leaf and tear drop blade forms with convex bases (Loy, et al. 1974). Basal thinning accompanied by step fractures predominates, except for two cases of basal transverse truncations. Primary flaking is expanding in form, with discontinuous edge retouch.

Group 2: Stemmed.

N = 86

This type is characterized by stemmed hafting elements and excurvate to triangular blade forms. Included are all base fragments identifiable as belonging to this group. Stem junctures or shoulders exhibit a range of variation

Figure 9. Complete Artifacts and Measurements (cm).

Formed Bifaces: Projectile Points.

Group 1: Leaf shaped (a-e)

	Assemblage	N	Range	Mean	S.D.
Length	A	7	2.1-4.0	2.67	0.68
	B	5	2.6-3.9	3.15	0.56
Width	A	8	1.2-1.5	1.48	0.32
	B	6	1.4-2.3	1.74	0.37
Thickness	A	8	0.4-0.8	0.53	0.14
	B	6	0.6-0.8	0.66	0.05

Group 2a: Contracting stemmed (f-q)

	Assemblage	N	Range	Mean	S.D.
Length	A	9	2.3-4.6	3.08	0.85
	B	8	2.2-4.6	3.03	0.78
Width	A	10	1.4-2.4	1.72	0.28
	B	8	1.2-2.2	1.59	0.27
Thickness	A	10	0.4-0.8	0.55	0.15
	B	8	0.3-0.8	0.56	0.12
Neck width	A	10	1.1-1.7	1.34	0.21
	B	8	0.9-1.7	1.17	0.28

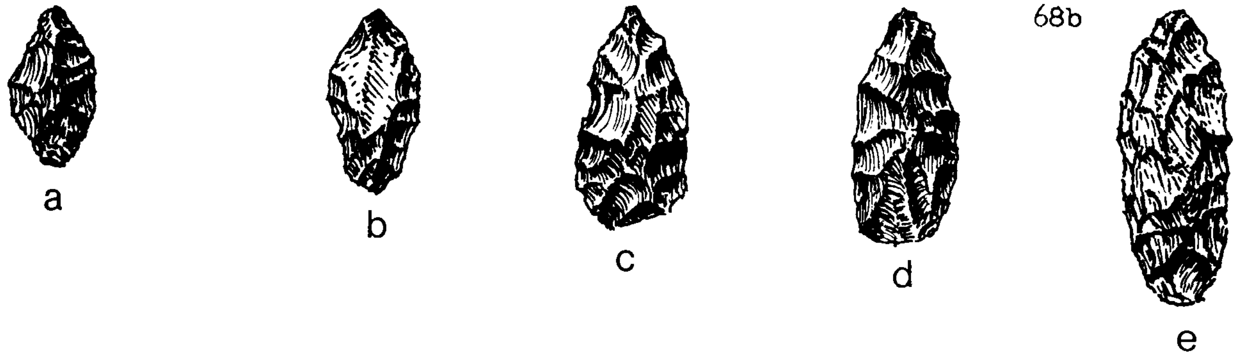
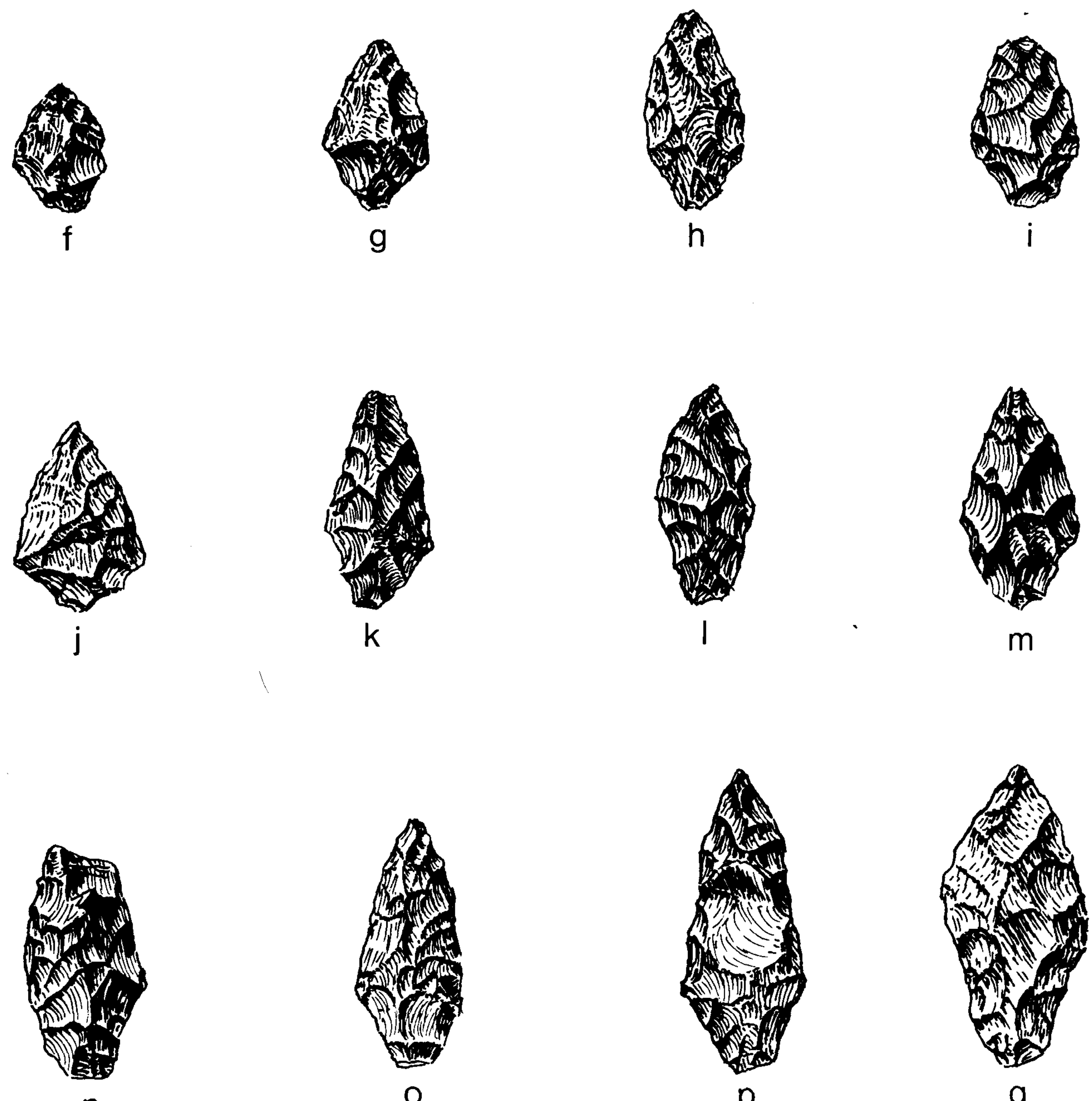


FIGURE 9



(Figures 9-11) which is the primary distinction between the following subtypes:

Group 2a: Contracting stem.

N = 47. (Figure 9 f-q).

Material: Basalt (39), Silicates (8).

These points are characterized by wide-rounded shoulders converging to convex or convex-straight bases. All specimens exhibit expanding primary flaking with discontinuous edge retouch. Basal fragments number 28; 10 with snap fractures and 18 with flexion fractures.

Group 2b: Contracting stem with shoulders.

N = 23. (Figure 10 a-k).

Material: Basalt (23).

These specimens exhibit blade margins ranging from excurvate to straight, with contracting stems and convex to straight bases. The primary distinction between this and other stemmed types lies in the shoulder element. All group 2b specimens exhibit acute angles at this juncture. A majority display a larger angle on one shoulder margin, while the remainder are bilaterally symetrical (Figure 10 b,d,e). Basal fragments number 5, all with flexion breaks.

Figure 10. Complete Artifacts and Measurements (cm).

Formed Bifaces: Projectile Points

Group 2b: Contracting stemmed, shouldered (a-k)

	Assemblage	N	Range	Mean	S.D.
Length	A	6	2.6-3.5	3.08	0.34
	B	4	2.7-3.0	2.85	0.13
Width	A	10	1.6-2.9	2.02	0.36
	B	8	1.4-2.3	1.95	0.34
Thickness	A	10	0.4-0.7	0.52	0.10
	B	8	0.3-0.7	0.49	0.12
Neck width	A	10	1.3-1.6	1.34	0.10
	B	8	0.9-1.6	1.26	0.21

Group 2c: Rectangular stemmed, shouldered (l-o)

	Assemblage	N	Range	Mean	S.D.
Length	A	1	2.1		
	B	3	3.1-3.6	3.35	0.35
Width	A	2	1.4-1.9	1.65	0.35
	B	3	1.7-2.1	1.75	0.07
Thickness	A	2	0.4-0.6	0.50	0.14
	B	4	0.4-0.7	0.53	0.15
Neck width	A	2	1.2-1.5	1.35	0.21
	B	3	1.2-1.4	1.30	0.14

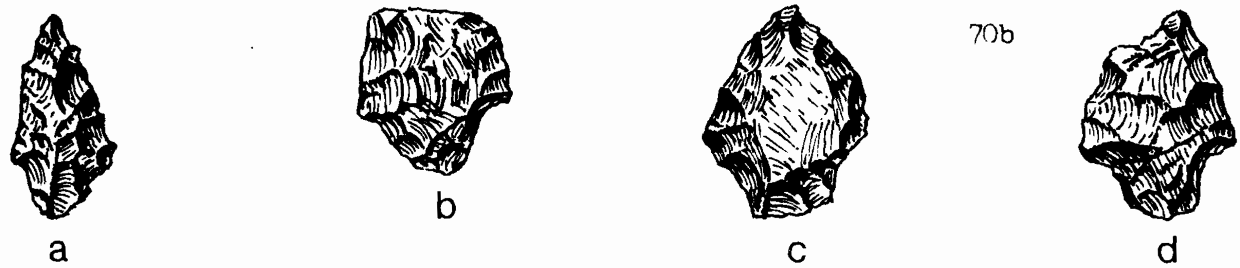
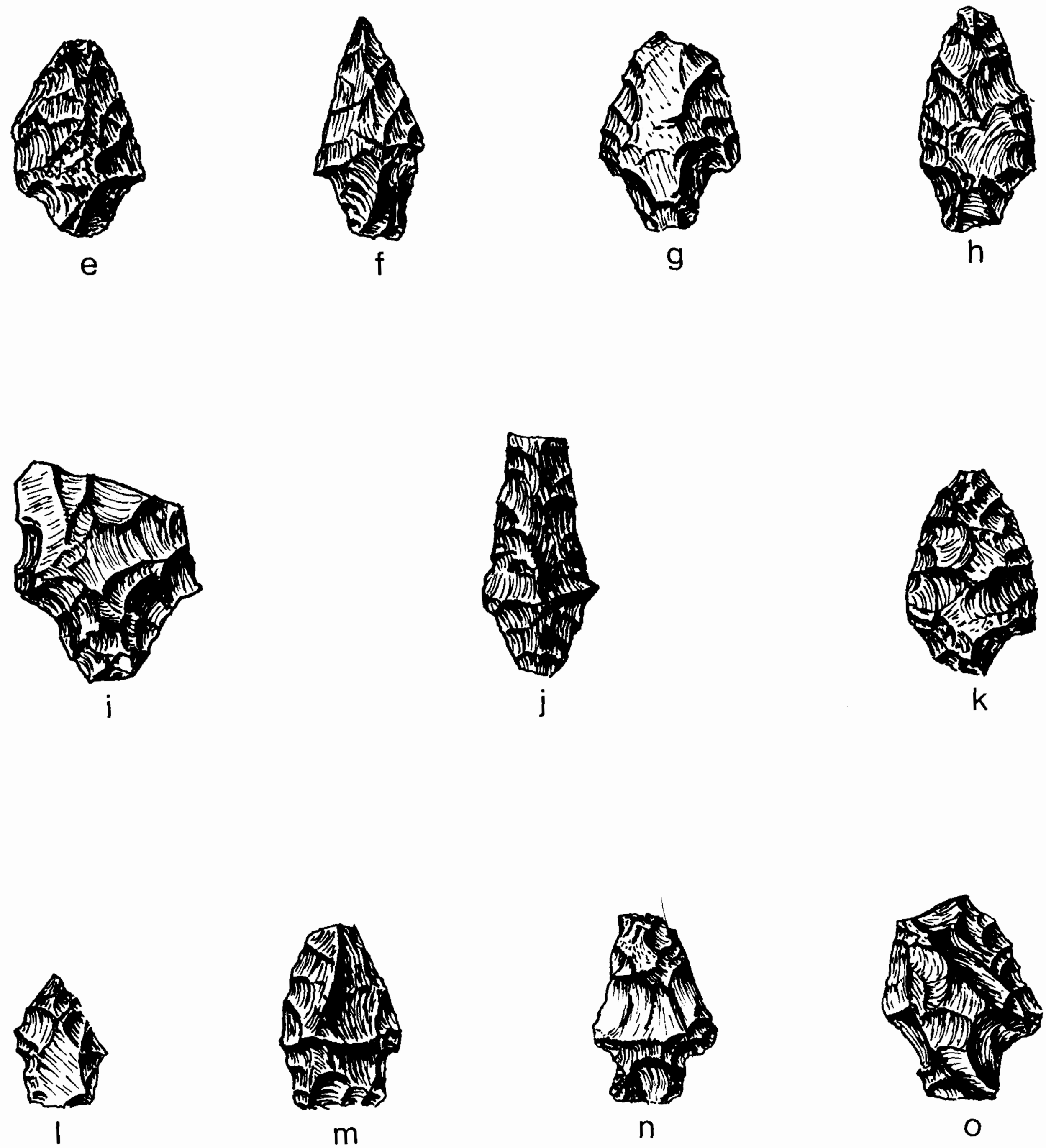


FIGURE 10



Group 2c: Rectangular stem.

N = 16. (Figure 10 i-c).

Material: Basalt (14), Silicates (2).

Stem form is characterized by parallel to slightly expanding stem margins leading to straight, convex or concave bases. Blades consist of excurvate and triangular forms only. Shoulders vary, with bilaterally symmetrical, acute angled shapes predominating. Basal fragments number 10, two with snap and eight with flexion breaks.

Group 3: Corner notched.

N = 23.

Corner notched projectile points possess one or more notches flaked so that ..."the notch includes parts of both the reconstructed blade and base." (Loy, et al. 1974:19,Dia.7). The following corner notched types are defined by variations in barb, blade, stem and base forms:

Group 3a: Small corner notched, barbed, with parallel stem.

N = 2. (Figure 11 a,b).

Material: Basalt (2).

These two small points have straight blades and finely pointed tips. Barb forms are medium. Primary flaking is expanding with discontinuous edge retouch in both cases.

Figure 11. Complete Artifacts and Measurements (cm).

Formed Bifaces: Projectile Points

Group 3a: Small corner notched, parallel stem (a,b)

	Assemblage	N	Range	Mean	S.D.
Length	B	2	1.9		
Width	B	1	1.6		
Thickness	B	2	0.3		
Neck width	B	2	0.5		

Group 3b: Corner notched, expanding stem (c-i)

	Assemblage	N	Range	Mean	S.D.
Length	B	6	2.6-4.6	3.48	0.69
Width	B	9	1.9-3.1	2.54	0.33
Thickness	B	12	0.4-0.7	0.57	0.10
Neck width	B	11	0.9-1.5	1.25	0.17

Group 3c: Corner notched, small barb (j-m)

	Assemblage	N	Range	Mean	S.D.
Length	B	4	2.1-3.3	2.65	0.49
Width	B	2	2.0-2.1	2.05	0.07
Thickness	B	4	0.3-0.5	0.43	0.10
Neck width	B	4	1.1-1.8	1.40	0.32

Group 4: Basal notched (r-p)

	Assemblage	N	Range	Mean	S.D.
Length	B	2	2.3-2.6	2.45	0.21
Width	B	1	2.3		
Thickness	B	4	0.3-0.5	0.40	0.08
Neck width	B	4	1.0-1.3	1.10	0.14

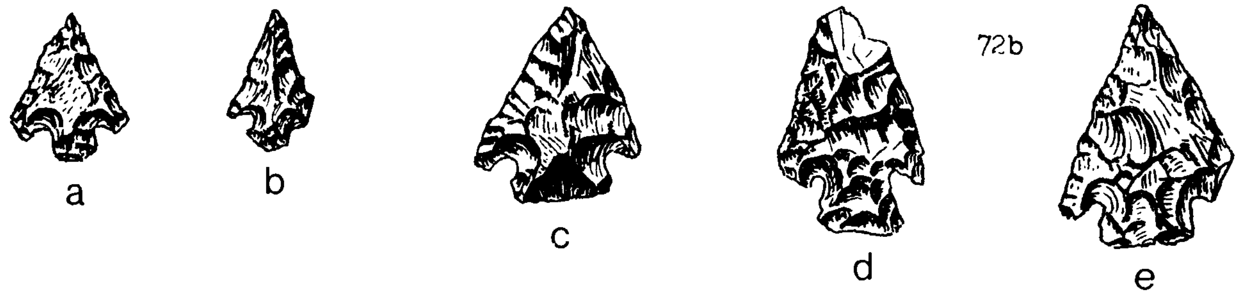
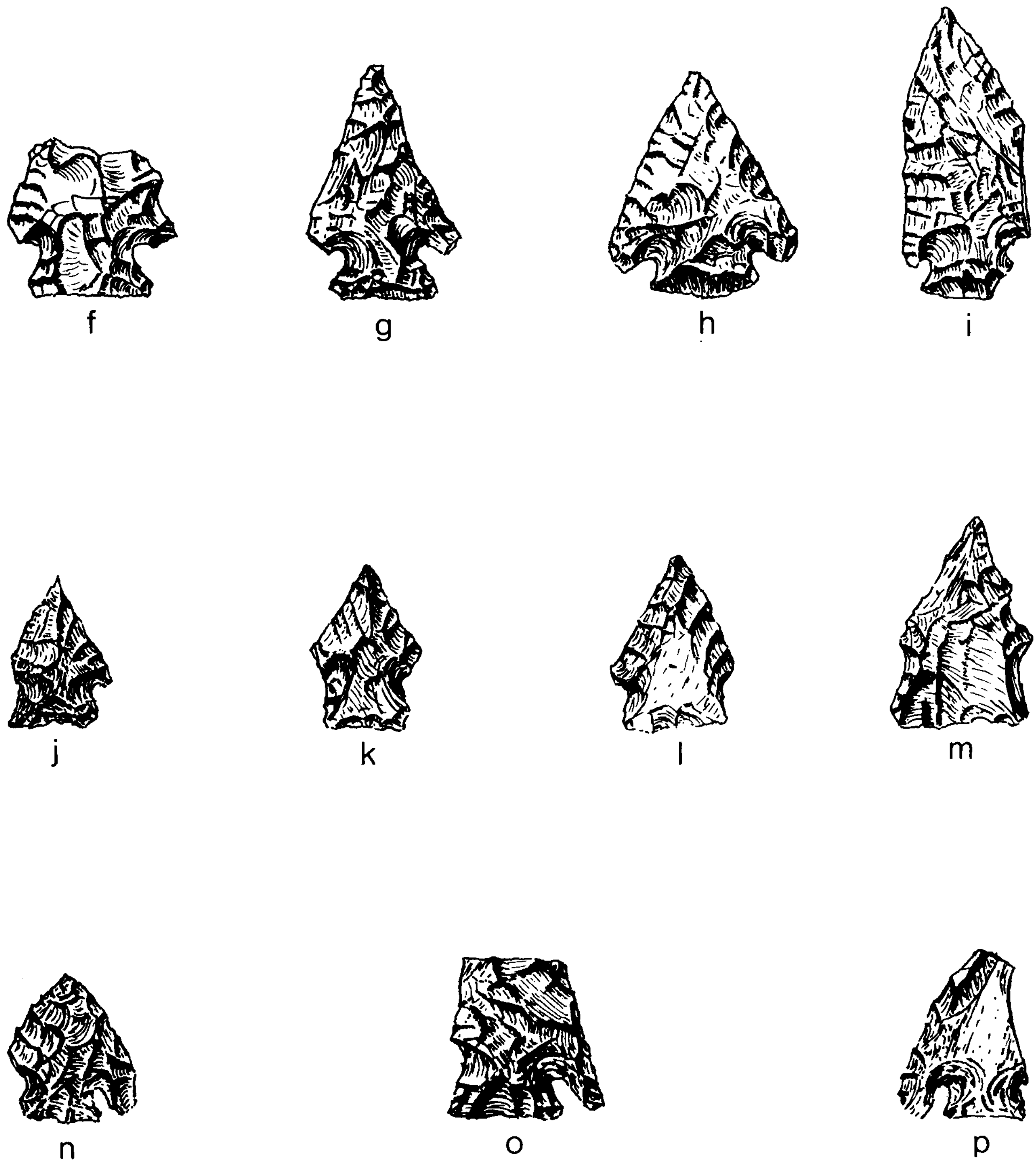


FIGURE 11



Group 3b: Corner notched, barbed, with expanding stem.

N = 13. (Figure 11 c-i).

Material: Basalt (10), Silicates (3).

These points exhibit lateral to medium barbs, excurvate to straight blade edge margins, and straight to convex bases. All have expanding stems and well defined notches, although most display breakage on at least one barb.

Group 3c: Corner notched, small barb.

N = 6. (Figure 11 j-m).

Material: Basalt (4), Silicates (2).

These points are characterized by straight blade edge margins ,small lateral barbs with expanding stems and straight to concave bases. Primary flaking is expanding in all cases, with discontinuous edge retouch on three specimens and continous edge retouch on another. One incomplete proximal fragment exhibiting a single small lateral barb is included along with a single base and stem fragment with a flexion break.

Group 3d: Miscellaneous corner notched.

N = 2

Material: Basalt (2).

These points include incomplete and asymmetric forms. The incomplete example is triangular bladed with medium-size notches missing both tip and stem. The other specimen is single corner notched with a pointed-concave base, excurvate blade edges and marginal bifacial retouch.

Group 4: Basal notched, barbed.

N = 4. (Figure 11 r-p).

Material: Basalt (1), Silicates (3).

These points are characterized by basal notches forming two barbs intruding into the reconstructed base. (Loy, et al. 1974:Dia.7). Two have straight blade margins, the remainder are excurvate. The straight bladed specimens are asymmetric (Figure 11 o).

Group 5: Side notched.

N = 18.

Side notched points are divided into two subtypes on the basis of overall size, base, stem and blade form, and placement of notches.

Group 5a: Small side notched.

N = 13. (Figure 12 a-q).

Material: Basalt (7), Silicates (6).

All small side notched projectile points have straight blade margins, straight bases and well formed side notches. Two smaller specimens have diagonal bases with corresponding diagonal

Figure 12. Complete Artifacts and Measurements (cm).

Formed Bifaces: Projectile Points

Group 5a: Small side notched (a-g)

	Assemblage	N	Range	Mean	S.D.
Length	B	9	1.2-2.2	1.69	0.35
Width	B	13	0.9-1.9	1.15	0.27
Thickness	B	13	0.2-0.4	0.26	0.07
Neck width	B	13	0.5-0.9	0.63	0.11

Group 5b : Large side notched (h-j)

	Assemblage	N	Range	Mean	S.D.
Length	B	1	2.8		
Width	B	1	2.2		
Thickness	B	2	0.5	0.5	0.00
Neck width	B	1	1.3		

Group 6: Triangular (k-n)

	Assemblage	N	Range	Mean	S.D.
Length	B	3	2.9-3.5	3.20	0.42
Width	B	6	1.9-2.4	2.18	0.22
Thickness	B	6	0.5-0.6	0.52	0.04

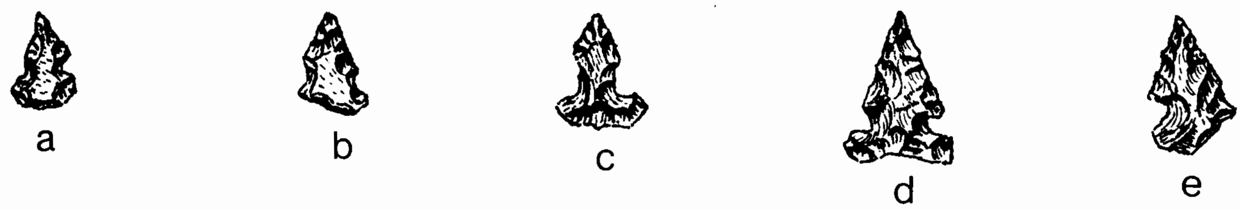
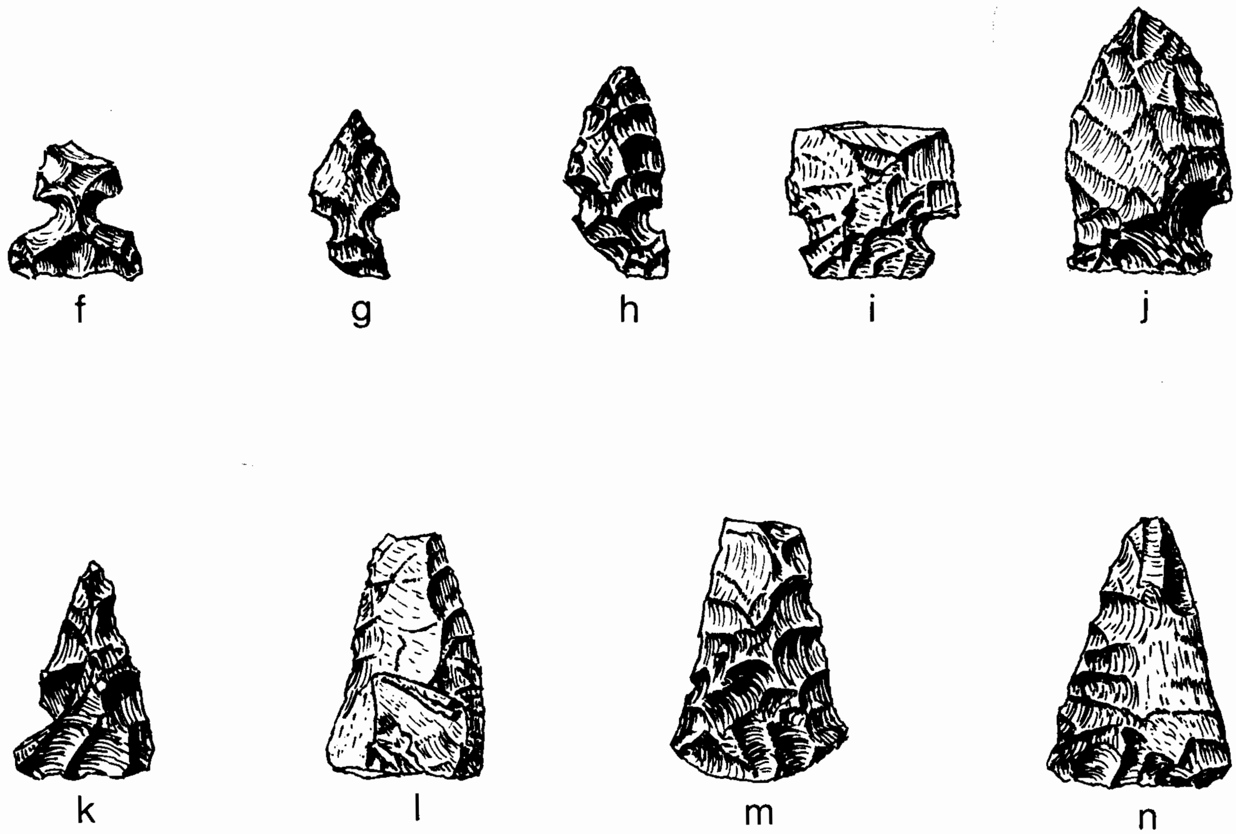


FIGURE 12



notches (Figure 12 a,b). The larger of these points are fully bifacial, whereas the smaller are bifacially retouched only along blade and base edges.

Group 5b: Large side notched.
N = 5. (Figure 12 h-j).
Material: Basalt (4), Silicates (1).

Larger side notched points are distinguished by larger length-width ratios and by size of neck width measurement. Neck widths are greater than 1.0 cm. Three are complete whereas two are lateral base and hafting element fragments only. A single complete, atypical point possessing only one lateral notch is present.

Group 6: Triangular.
N = 6. (Figure 12 k-n).
Material: Basalt (3), Silicates (3).

These points have straight blade margins and straight or convex bases. All bases but one have been formed by bifacial thinning, the remaining specimen has a broken base (Figure 12 l).

Group 7: Flaked point fragments.
N = 70

Those fragments identifiable as to point type are included in the above classes. The following fragments are not readily identifiable in the same manner.

Group 7a: Miscellaneous base fragments.

N = 12

Material: Basalt (9), Silicates (3).

These expanding stem base fragments are assumed broken forms of various notched points. Fractures include three lateral snaps and nine flexion breaks.

Group 7b: Point tip fragments.

N = 41

Material: Basalt (31), Silicates (10).

These small distal biface sections are identifiable as projectile point tips by similar blade attributes as have complete forms. The ratio of flexion to lateral snap fractures is 27/8 for the straight forms and 5/2 for excurvate forms.

Group 7c: Medial point fragments.

N = 17

Material: Basalt (14), Silicates (3).

Medial fragements have few diagnostic attributes and are unclassifiable. They do however, exhibit similar flexion and snap fracture patterns to other fragmentary point sections, presumably caused by similar forces during manufacture and use.

Types: Other Bifaces.

Tear shaped bifaces.

N = 5. (Figure 13 a-c).

Material: Basalt (4), Silicates (1).

These artifacts have excurvate to straight blade margins with convex bases. Primary flaking is expanding with discontinuous edge retouch. A cutting function is indicated by severe crushing and microflaking along major portions of all working edges. Functionally, bifaces can be equated with the term "knives".

Pentagonal biface.

N = 1. (Figure 13 d).

Material: Basalt (1).

This biface dffers from the tear shaped forms only in shape. In this characteristic it resembles other formed bifaces commonly referred to as "Plateau Pentagonal" knives in the southern plateau (Caldwell 1956:76-79 Plate VIII g, Nelson 1969:161-162 Figure 46 e-i).

Broken bifaces.

N = 34. (Figure 13 e-g).

Material: Basalt (30), Silicates (4).

These incomplete bifaces are not identifiable as to a

Figure 13. Complete Artifacts and Measurements (cm).

Formed Bifaces:

Tear and Pentagonal Bifaces (a-d)

	Assemblage	N	Range	Mean	S.D.
Length	B	6	3.7-5.6	4.65	0.70
Width	B	6	2.9-3.4	3.10	0.23
Thickness	B	6	0.7-0.9	0.80	0.09

Formed Biface Fragments:

Lanceolate (e,g)
Triangular (f)

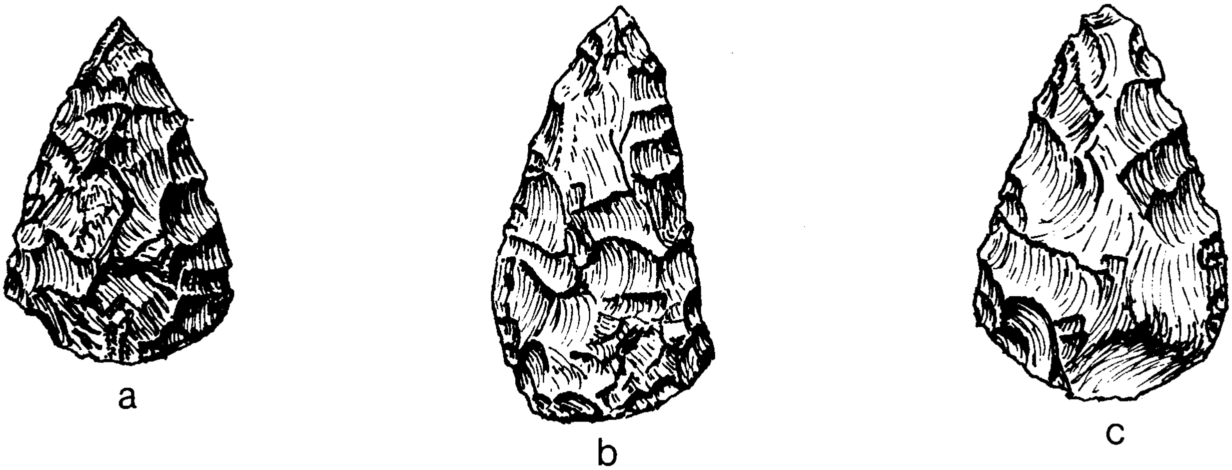
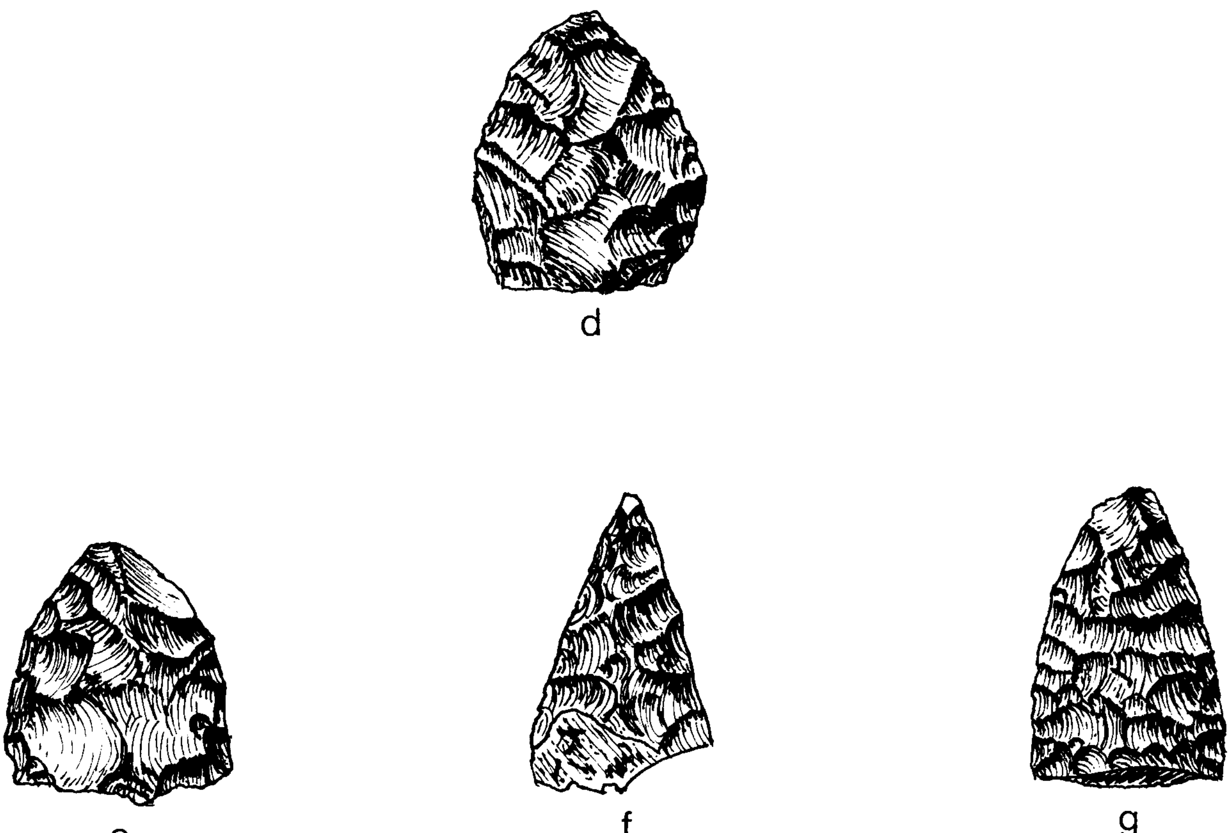


FIGURE 13



finished form, but size and relative completeness distinguish them from smaller biface fragments. All are broken, suggesting hafting breaks or other heavy usage. Function is inferred to be heavy cutting as characterized by crushing and microflaking of working edges. Two basalt medial sections complete this class.

Large biface scrapers.

N = 4. (Figure 14 a-c).

Material: Sandstone (1), Micaceous schist (3).

These scrapers are noteworthy due to their large size and bifacial retouch. All exhibit bifacial battering, forming one or more straight to sinuous working edges. Functional interpretation of the working edges is difficult, but rounded projections of the macrocrystalline structure indicate a scraping usage.

Preforms.

N = 2. (Figure 15 f,g).

Material: Basalt (2).

Preforms are poorly formed, bifacially flaked objects with little or no secondary retouch. Each specimen is assumed to be a roughed out or preliminary tool form.

Drills.

N = 8. (Figure 15 a-e).

Material: Basalt (5), Silicates (3).

Drills are bifacial tools exhibiting a sharp to blunt

Figure 14. Complete Artifacts and Measurements (cm).

Formed Bifaces:

Large Biface Scrapers (a-c)

	Assemblage	N	Range	Mean	S.D.
Length	A	2	8.5-11.9	10.20	2.40
	B	1	6.8		
Width	A	2	9.1-10.6	9.85	1.06
	B	2	4.9-6.2	5.55	0.92
Thickness	A	2	1.0-2.6	1.80	1.13
	B	2	0.7-0.8	0.75	0.07
Working edge	A	1	15.1		
length	B	2	11.6-19.5	15.55	5.59

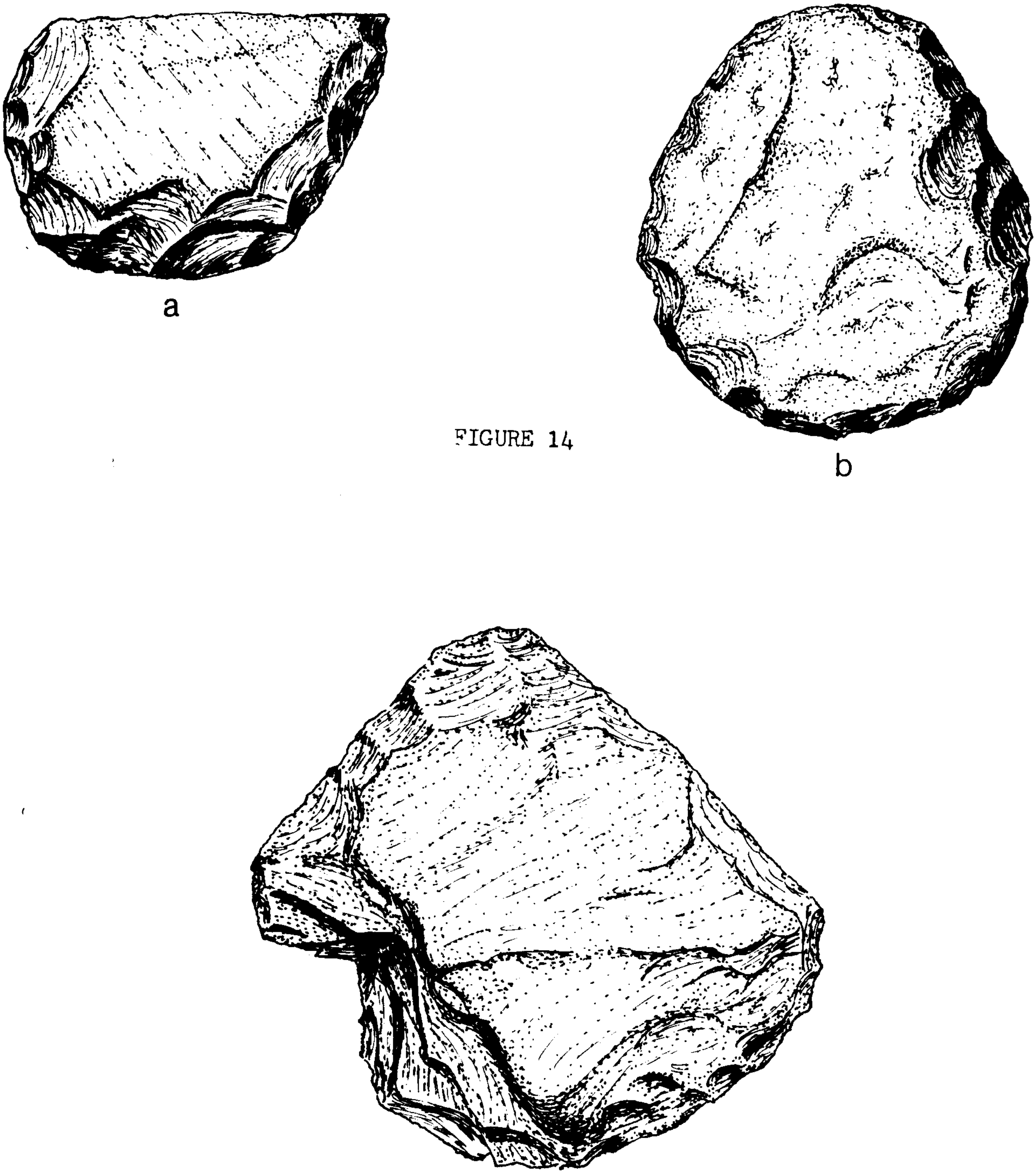


FIGURE 14

Figure 15. Complete Artifacts and Measurements (cm).

Formed Bifaces:

Drills (a-e)

	Assemblage	N	Range	Mean	S.D.
Length	A	3	2.5-3.5	3.13	0.55
	B	4	1.5-4.8	2.85	1.44
Width	A	3	1.0-2.6	1.73	0.81
	B	4	0.7-1.9	1.35	0.59
Thickness	A	3	0.4-0.8	0.60	0.20
	B	4	0.3-0.9	0.53	0.26

Preforms (f,g)

Assemblage	N	Length	Width	Thickness
A	1	5.0	2.1	0.9
B	1	4.8	3.6	1.0

Formed Unifaces:

Awl-gravers (h-k)

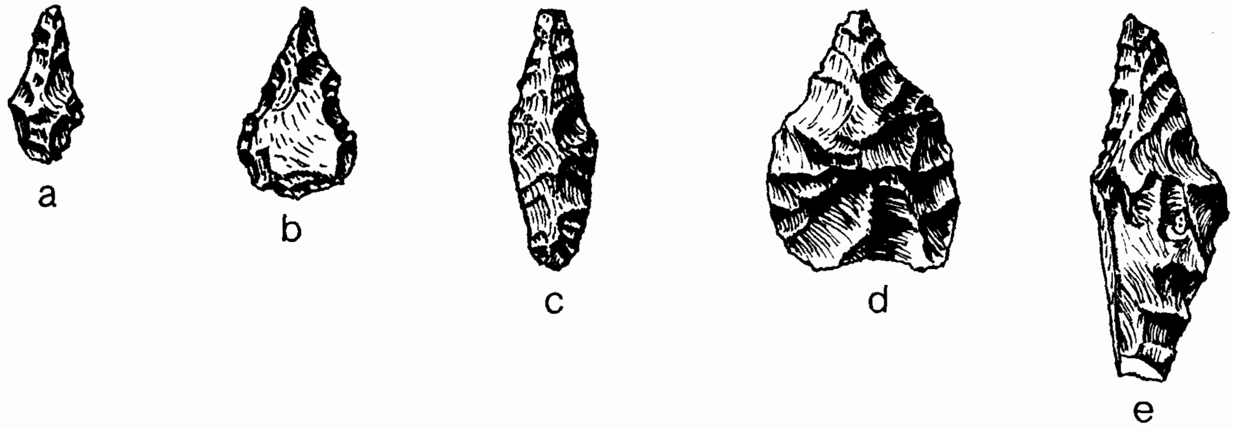
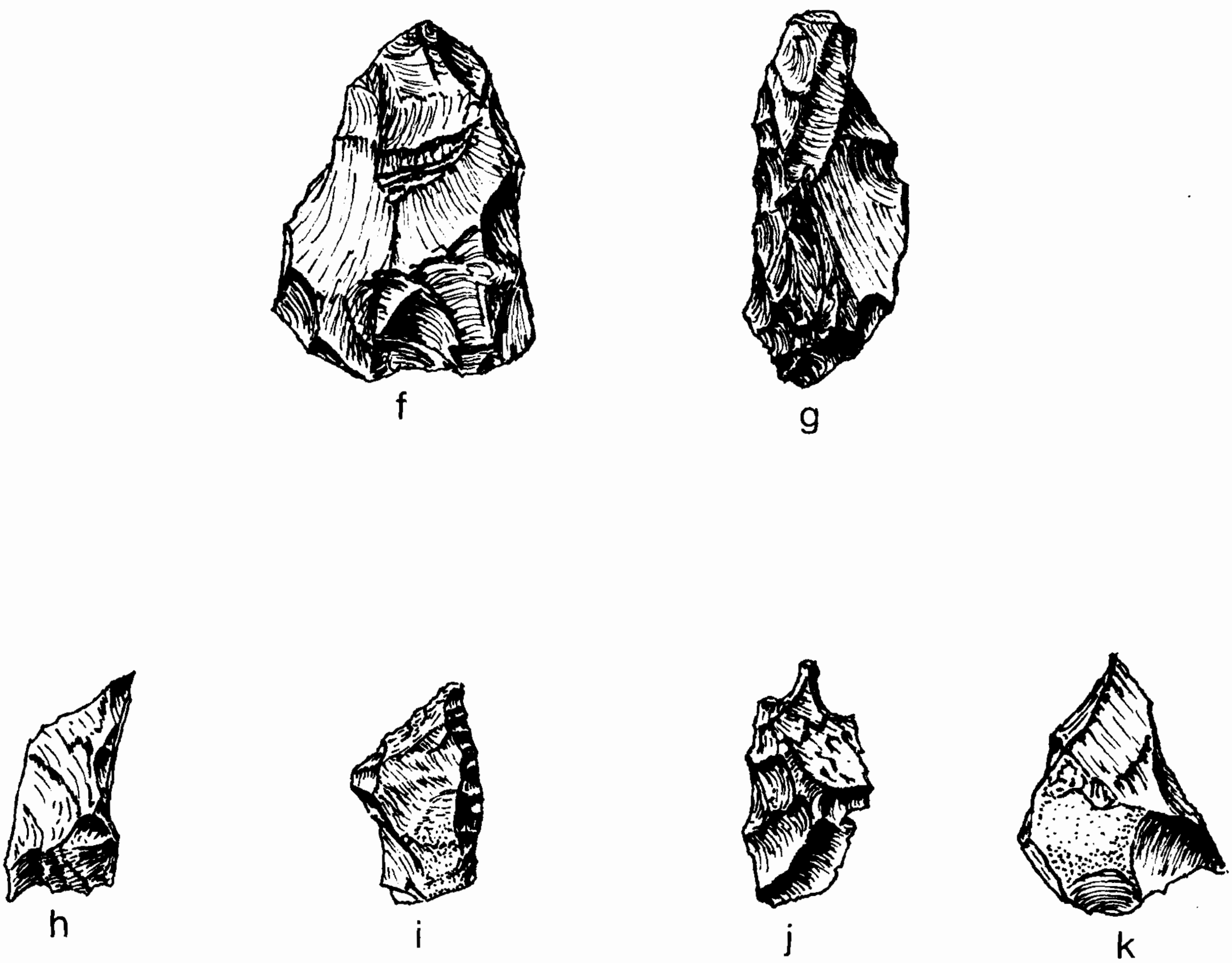


FIGURE 15



projection, or shaft. Shaft cross sections are bilaterally symmetrical with the exception of sharp-pointed forms. Microwear analysis of the projecting shaft indicates a rotary motion was employed during use, presumably on both nonyielding and pliant materials. Edge damage by microflaking consists of crushing and step fractures. Edge wear is also evident by the rounding and smoothing of extreme tips on a few specimens. The drills differ in shaft and butt morphology, including: bipointed (N = 1), tear shaped (N = 2), sharp-pointed (N = 2), concave butt (N = 1), flanged (N = 1), and one miscellaneous shaft fragment.

Unformed Bifaces:

N = 33

Unformed bifaces differ from formed bifaces in that only the working edges have been bifacially altered. Bifacial retouch does not extend across the dorsal or ventral faces of the tools.

Tabular scraper-knives.

N = 21. (Figure 16 a-c).

Material: Micaceous schist (14), Siltstone (7).

This class consists of complete and broken specimens of the above materials, and is characterized by continuous percussion retouch along one or more edges. In all cases cleavage breaks along other edge margins form a backing to the working edge. These artifacts are placed into four subtypes based upon the

Figure 16. Complete Artifacts and Measurements (cm).

Formed Bifaces:

Tabular Scraper-knives (a-c)

Group 1: Single convex working edge.

	Assemblage	N	Range	Mean	S.D.
Length	A	2	3.4-5.2	4.30	1.27
	B	8	2.6-8.6	5.75	2.08
Width	A	2	1.2-3.8	2.50	1.84
	B	8	1.7-5.1	3.41	1.06
Thickness	A	2	0.50		
	B	8	0.3-1.0	0.59	0.26
Working edge	A	2	4.1-5.1	4.60	0.71
length	B	8	2.8-9.3	5.50	2.22

Group 2: Single straight working edge.

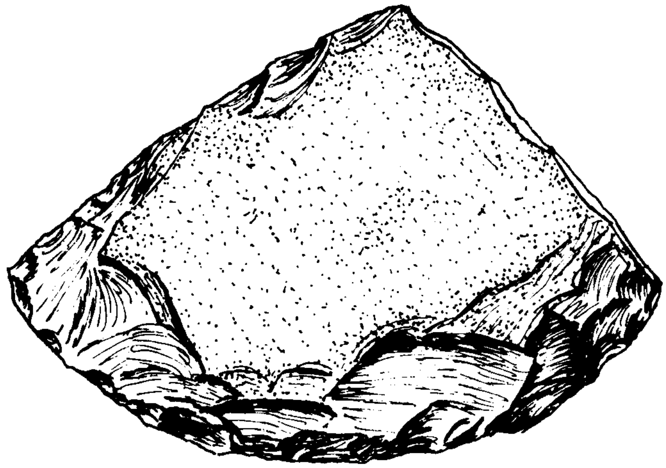
	Assemblage	N	Range	Mean	S.D.
Length	A	3	3.7-14.7	10.87	6.21
	B	2	4.7-7.2	5.95	1.77
Width	A	3	1.2-6.4	4.57	2.92
	B	2	4.6-7.9	5.25	0.92
Thickness	A	3	0.3-1.7	0.97	0.70
	B	2	0.6-0.8	0.70	0.14
Working edge	A	3	3.2-13.5	9.77	5.70
length	B	2	3.7-7.1	5.40	2.40

Group 3: Double convex-straight working edge (a)

	Assemblage	N	Range	Mean	S.D.
Length	B	2	3.3-7.0	5.15	2.62
Width	B	2	3.5-6.4	4.95	2.05
Thickness	B	2	0.4-0.8	0.60	0.28
Working edge	B	2	4.0-7.0	5.50	2.12

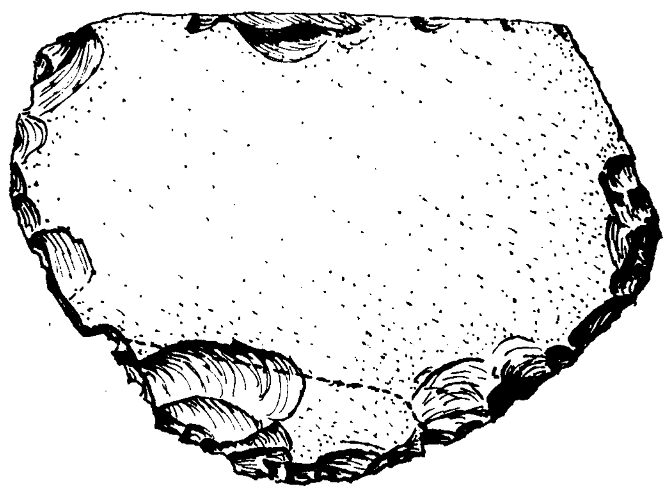
Group 4: Continuous working edges (b,c)

	Assemblage	N	Range	Mean	S.D.
Length	A	1	7.80		
	B	2	6.6-8.7	7.65	1.48
Width	A	1	6.8		
	B	2	5.9-6.9	6.40	0.71
Thickness	A	1	0.55		
	B	2	0.5-0.6	0.55	0.07
Working edge	A	1	17.7		
length	B	2	14.4-16.4	15.40	1.41

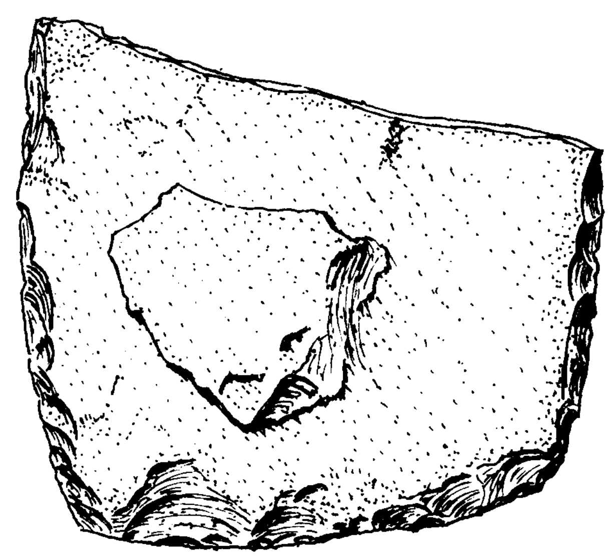


a

FIGURE 16



b



c

number and shape of the working edges. The majority of specimens appear to be broken fragments of larger tools.

The four subtypes are: a) single convex working edge (N = 10), b) single straight working edge (N = 6), c) double convex-straight working edges, (N = 2), and d) continuous working edges (N = 3). Crushing of working edges and rounding of projections indicate a multipurpose cutting and scraping function.

Bifacially retouched flakes.

N = 12

Material: Basalt (6), Silicates (6).

Bifacially retouched flakes are present in four varieties of retouched edge margin morphology. All specimens exhibit one or more edge margin breaks, hence may be considered broken or reused flake tools. Flake edge morphologies are concave (N = 1), convex (N = 5), and continuous convex to straight (N = 6).

Formed Unifaces:

N = 76

Awl-gravers.

N = 20. (Figure 15 h-k).

Material: Basalt (11), Silicates (9)

Awl-gravers are artifacts, formed on flakes, possessing one or more projecting shafts or spurs, either of which may be formed by intentional retouch or by the intersection of one or more cleavage planes. Retouch, if present, is both unifacial and minimal, being used to form the shaft and sometimes extending along one lateral edge margin. Function is inferred to be an incising or cutting action similar to that of a burin. Other rounded and smoothed edge wear on thin projections also indicates use on hide, or for soft material piercing.

Scrapers.

N = 80

Material: Basalt (23), Silicates (54), Granite (1),
and Micaceous schist (2).

Scrapers are characterized by intentional retouch forming a steep spine plane angle (as opposed to the working or damage angle), with convex working edge margins forming angles greater than 45 degrees. This class is further characterized by edge smoothing and rounding, striations on the ventral face, and microflaking on working edges along leading edges of the ventral face, corresponding to the area below the retouched dorsal edge. The juncture of retouched dorsal and utilized ventral faces is referred to as the working edge. Working edges occur at various locations along the lateral margins of the tool, suggesting the separation of this class into sub-types.

Scrapers are usually presumed to function in the preparation of raw hides; either in stripping subcutaneous fatty tissues, in removal of surface hairs, or in softening and burnishing of finished hides. However, recent experimentation and microwear analysis indicates that a steeply retouched working edge also provides a suitable edge for working bone, antler and wood (Copp 1973). Cross sections are all plano-convex.

Group 1: Small tabular scrapers.
N = 3. (Figure 17 g,h).
Material: Micaceous schist (2), Granite (1).

These are similar to the large biface scraper class. Working edge (or damage) angles are 80 degrees on two specimens and 85 degrees on the other. Tapering butts indicate that these tools were probably hafted onto a shaft and used for hide scraping.

Group 2: End scrapers.
N = 7. (Figure 17 c).
Material: Basalt (4), Silicates (3).

End scrapers are characterized by steep unifacial retouch only along single distal flake margins. Cross sections are plano-convex and retouch is steep, over 75 degrees. Specimens retouched along other edges are subsumed under groups 3 and 4.

Figure 17. Complete Artifacts and Measurements (cm).

Formed Unifaces:

Small Unifacial Scrapers (a-h)

	Assemblage	N	Range	Mean	S.D.
Group 1: (g,h)					
Length	A	2	4.2-5.3	4.75	0.78
	B	1	5.2		
Width	A	2	4.4-4.8	4.68	0.49
	B	1	4.1		
Thickness	A	2	0.6-0.7	0.65	0.07
	B	1	0.6		
Group 2: (c)					
Length	A	2	2.5-4.0	3.25	1.06
	B	4	2.8-3.3	2.95	0.24
Width	A	3	1.9-2.0	1.93	0.06
	B	4	1.9-2.5	2.13	0.29
Thickness	A	3	0.6-1.0	0.80	0.20
	B	4	0.3-0.8	0.55	0.24
Group 3: (d-f)					
Length	A	6	1.7-4.5	2.83	1.12
	B	13	1.4-3.8	2.15	0.71
Width	A	5	1.2-3.1	2.08	0.75
	B	13	1.2-2.7	1.75	0.42
Thickness	A	6	0.3-0.8	0.55	0.22
	B	13	0.3-0.7	0.51	0.12
Group 4: (a,b)					
Length	A	2	1.0-1.6	1.30	0.42
	B	7	2.0-3.4	2.20	1.06
Width	A	2	1.7-2.7	2.20	0.71
	B	7	1.3-2.8	2.20	0.61
Thickness	A	2	0.3-0.5	0.40	0.14
	B	7	0.3-1.2	0.66	0.30

		Length	Width	Thickness
Group 5:	A	3.0	2.4	0.8
	B	2.8	1.8	0.7
Group 6:	B	3.5	1.6	0.4

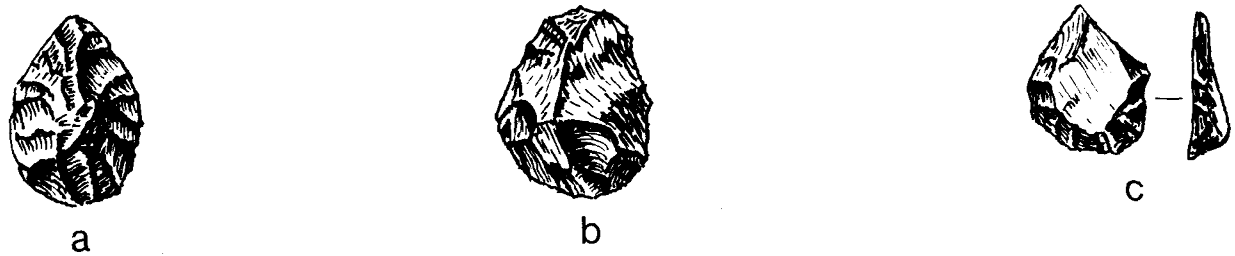
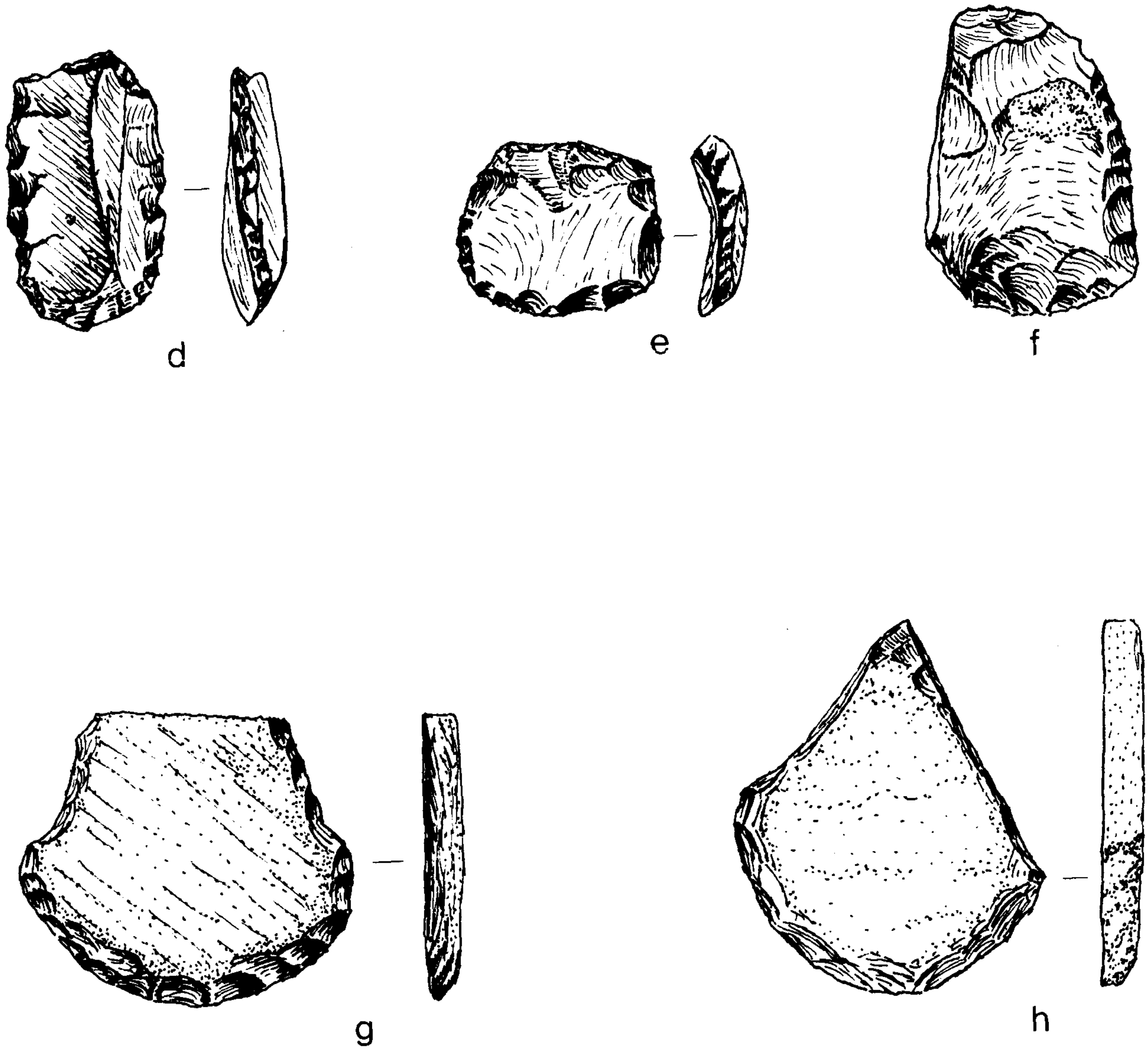


FIGURE 17



Group 3: End and side scrapers

N = 16. (Figure 17 d-f).

Material: Basalt (4), Silicates (12).

End and side scrapers are flakes with steep dorsal unifacial retouch along distal edges as well as along a major portion of a single lateral edge. In all cases distal working edges are convex, whereas lateral working edge margins vary from convex to straight.

Group 4: Continuous scrapers.

N = 16. (Figure 17 a,b).

Material: Basalt (3), Silicates (9).

Continuous scrapers are characterized by steep unifacial dorsal edge retouch along three consecutive edge margins; usually distal and opposing lateral edges. A fourth edge may be represented either by the striking platform or a truncation. In all cases the distal working edges are convex, although lateral edges may be straight, convex or sinuous.

Group 5: Side scrapers.

N = 36.

Material: Basalt (11), Silicates (25).

These specimens exhibit single steeply retouched lateral edges. Edge angles vary from ca 65 to 80 degrees.

Most are incomplete, the result of breakage along lateral edge margins. One has been thermally altered as evidenced by a pot lid fracture. All specimens exhibit microflaking along ventral working edge margins and microstep fractures of dorsal retouched edges.

Group 6: Transverse scraper.

N = 1

Material: Silicates (1).

This single specimen exhibits a working edge angle of 70 degrees along the transverse that is, distal-lateral, edge margin. Edge rounding is not present. Wear consists of ventral microflaking along the working edge and discontinuous dorsal microstep fracturing of the retouched edge.

Group 7: Miscellaneous scraper fragments.

N = 5

Material: Basalt (1), Silicates (4).

These five amorphous fragments are not classifiable under any of the preceding types. Working edge angles are steep, between 70 and 80 degrees, with wear present in the form of edge rounding on two specimens.

Perforators:

N = 4 (Figure 18 f,g)

Material: Silicates (4)

Perforators, as opposed to the bifacially flaked drills, are unifacially flaked objects with a single long shaft suitable for piercing materials such as hides, bark and soft woods. Shaft retouch varies from pronounced to marginal. Bases are unmodified and the tools were presumably hand held. Only one tip evidenced wear in the form of microstep fractures. Others exhibit steep edge retouch with rounding on single lateral edges, or have been utilized along a single lateral edge margin with slight smoothing of the dorsal shaft surface.

Tailed scraper-gravers:

N = 10 (Figure 18 a-e)

Material: Cryptocrystallines (10)

Scraper-gravers are multi-purpose tools similar in form to the previously defined awl-gravers. They differ primarily in that they exhibit moderate to steep unifacial retouch, ca 40-60 degrees. This retouch forms a notch or concavity on one side of the artifacts. The concave working edge exhibits heavy step fractures and crushing through use. In overall shape, these artifacts exhibit a curved or "tailed" distal section which tapers to a sharp, unifacial graving tip.

Figure 18. Complete Artifacts and Measurements (cm).

Formed Unifaces:

Tailed Scraper-gravers (a-e)

	Assemblage	N	Range	Mean	S.D.
Length	A	1	3.3		
	B	3	2.0-3.7	2.93	0.86
Width	A	1	1.8		
	B	6	1.0-2.2	1.72	0.47
Thickness	A	1	1.0		
	B	6	0.4-1.3	0.70	0.32
Working Edge Angles (degrees):					
Concave	A	1	70		
	B	6	65-70	65.83	3.76
Convex	A	1	65		
	B	6	45-55	52.50	4.18
Opposite Lateral	A	1	105-115		
	B	6	40-60	50.00	7.07

Perforators (f,g)

	Assemblage	N	Range	Mean	S.D.
Length	B	3	3.4-4.3	4.17	0.71
Width	B	3	2.2-2.4	2.33	0.12
Thickness	B	3	0.6-0.8	0.70	0.10

Cores:

Pieces Esquilles (h-k)

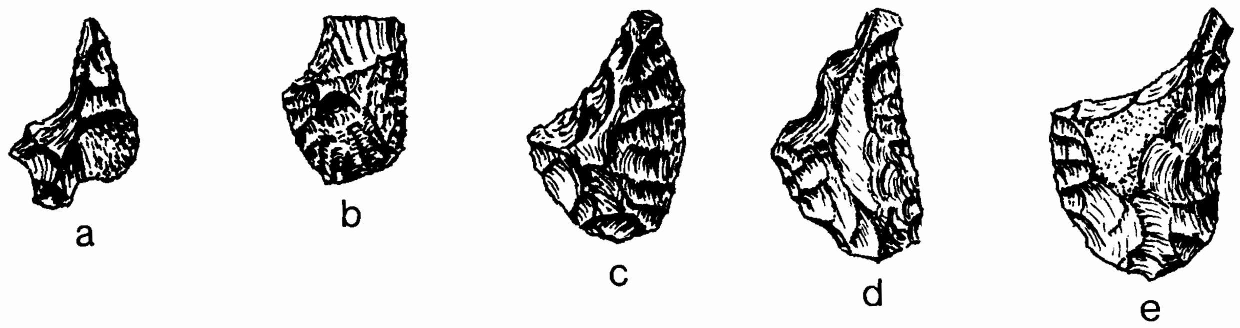
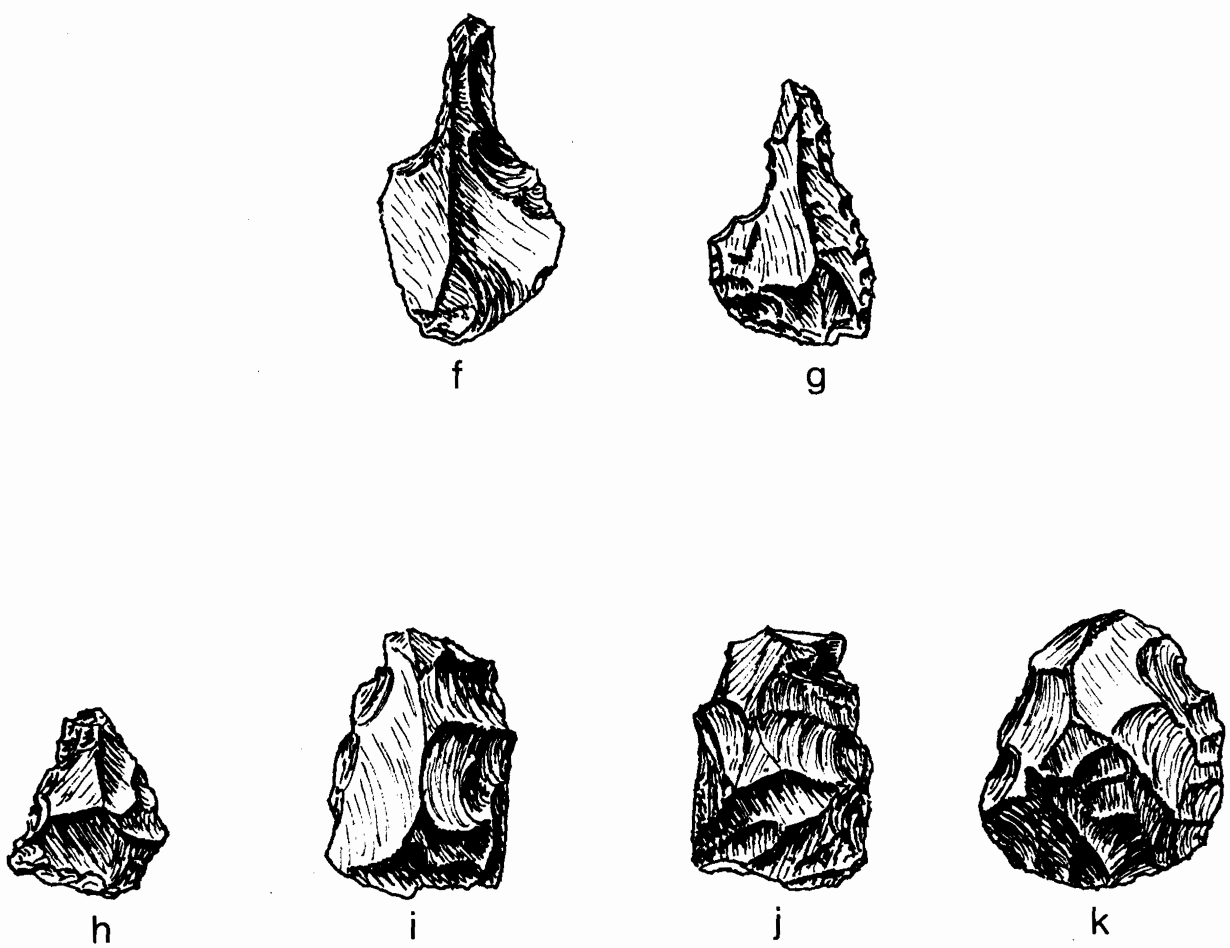


FIGURE 18



Unformed Unifaces: Flakes.

N = 1867

Material: Basalts (1274), Silicates (593)

Primary and unretouched flakes and debitage are remnants of a core reduction process. Secondary remnants or debitage are those flakes less than one cm square which are byproducts of flake and/or tool modification and production. Any sizes and shapes of flakes were selected for modification or utilization.

Unretouched flakes showing no evidence of use wear are assumed to be waste products even though they are morphologically similar to retouched or utilized forms. Utilized flakes exhibit damage in the form of small step, feather, or hinge fractures along segments of edges.

The number and types of flakes recovered are shown in Table 11.

Type 1: Retouched flakes.

N = 210

Material: Basalts (113), Silicates (97)

Four varieties of retouched flakes are present, based on type and location of edge margin modification. These are: 1) single edge, 2) double edge, 3) multiple edge, and 4)

Table 11. Interassemblage Flake Variability.

	Assemblage A			Assemblage B		
	N	Si	Ba	N	Si	Ba
Group 1: Retouched Flakes						
Single Working Edges:						
Straight	11	5	6	38	25	13
Convex	8	4	4	22	16	6
Concave	4	4	0	9	5	4
Convexo-concave	6	4	2	8	4	4
Double Working Edges:						
Straight	11	5	6	8	5	3
Straight-convex	3	0	3	3	2	1
Straight-concave	2	0	2	1	0	1
Double convex	1	1	0	1	0	1
Convexo-concave	2	1	1	0	0	0
Double concave	2	1	1	2	1	1
Multiple Working Edges:						
Convergent	2	2	0	11	5	6
Continuous	0	0	0	2	2	0
Miscellaneous	13	4	9	40	19	21
Group 2: Utilized Flakes						
Striking Platform	20	9	11	84	30	54
No Striking Platform	19	8	11	37	27	10
Angular Shatter	1	1	0	1	0	1
Group 3: Unretouched Flakes						
Striking Platform	96	37	59	678	179	499
No Striking Platform	88	23	65	397	80	317
Angular Shatter	25	11	14	68	26	42
Blade-like Flakes	53	31	22	70	43	27
Thermal Alteration	4	0	4	13	0	13
Totals:	371	151	220	1493	469	1024

Key: Si = Silicates, Ba = Basalts

unidentifiable or incomplete specimens which exhibit only casual retouch. Striking platforms are straight and battered, indicating lack of platform preparation, or facetted, indicating some preparation. Edge angles are less than 65 degrees on all specimens.

Type 2: Utilized flakes.

N = 162

Material: Basalts (88), Silicates (74)

These irregular flakes exhibit use wear along one or more edges. In a few cases attrition in the form of rounding was noted on small edge margin projections.

Type 3: Unretouched flakes.

N = 1492

Material: Basalts (1062), Silicates (430)

Unretouched flakes are produced by core reduction and biface trimming. The majority are irregular although a number of smaller flakes have blade-like configurations. Thermal alteration, based on the presence of pot-lid fractures, of unretouched silicate flakes was observed in limited frequencies. Unretouched flakes include 12 large primary and secondary decortication flakes.

Debitage.

N = 17

Material: Basalt (1), Micaceous schist (16).

The term debitage is a catch-all category for irregular lithic by-products of stone tool manufacture. Two types are noted; 1) spall shatter, and 2) tabular schist fragments. The spall shatter consisted of a single, long, triangular basalt fragment with cortex backing. The other spall fragment is a subrectangular micaceous schist object which exhibits battering on two edges.

The tabular schist fragments are probably raw material for tabular scraper-knives. All exhibit fracturing along straight bedding planes and most show snapping across the bedding planes, producing straight to slightly angled breaks. Two specimens are battered.

Pseudo-burin spalls.

N = 4

Material: Basalt (2), Silicates (2)

Four specimens are identified as burin spalls. However, close examination of three revealed extreme crushing of striking platforms, indicating by-products of bipolar core reduction. A single specimen exhibiting the morphology of a true burin spall is assumed to be fortuitous.

Blades.

N = 4

Material: Silicates (4)

Four blades were recovered. All are incomplete, lacking proximal ends and striking platforms. Lack of a prepared blade core technology in the site indicates that these are fortuitous. One thermally fractured specimen has continous retouch along opposite edge margins. The remaining two specimens exhibit continuous removal of small edge margin flakes along opposite parallel edge margins.

Pieces esquilles.

N = 9 (Figure 18 h-k)

Material: Basalt (4), Silicates (5)

Pieces esquilles exhibit bipolar crushing and battering on one or two opposing edge margins following MacDonald's (1968:85) description. Shapes range from subrectangular to disccidal and cross sections are lenticular. This artifact type has been proposed as serving as wedges for slotting or splitting bone, wood or antler; an interpretation supported by experiments with "tabular and broad-based wedges ... often worked with bipolar techniques." (Ranere 1976:190-2).

Bipolar cores.

N = 4

Material: Basalt (1), Silicates (3)

These small pebbles display characteristic crushing and shearing of opposing platforms indicative of bipolar reduction. These cores were abandoned after having been split approximately in half. Specimens range in size from less than four cm to ca five cm in diameter.

Multidirectional cores.

N = 11

Material: Basalt (8), Silicates (3).

Three multidirectional cores have one or more naturally flat cortex planes used as striking platforms, showing that the core was rotated during reduction. Two are rounded cobbles, with one bifacially reduced specimen that lacks cortex. This piece may represent an aborted attempt at biface production from a core. In all cases flake scar remnants indicate production of large flakes accompanied by angular shatter. The lithic raw material is poor and flake scars are poorly defined.

Miscellaneous chipped stone implements:

Pendant.

N = 1. (Figure 19h).

Material: Silicates (1)

This cylindrical chipped stone biface with two wide side notches on the proximal end has no known functional analog, and is provisionally classed as a pendant.

Sinker.

N = 1

Material: Granite (1).

This single flat pebble exhibits two small flakes struck from opposing faces on one longitudinal end. Function is assumed to be a weight for a line or net.

Pecked and ground stone industry:

Milling stone.

N = 1

Material: Granite (1).

A boulder with a cup shaped depression in the upper flat surface was located in area B. Situated alongside it was a larger triangular boulder deposited apex down which presumably provided a seat while processing food materials by grinding and pounding. In this case lack of pigment stains rules out preparation of paints.

Maul.

N = 1

Material: Granite (1).

This specimen is formed by pecking and grinding and is conical in form, tapering from a broad base to a narrow-rounded top. The base has two flakes removed by battering and one large flake had been removed from the top and side of the specimen. It was found in area B.

Ground stone industry:

Handstone.

N = 1

Material: Granite (1).

This single small cobble exhibits a ground facet on one surface and opposing longitudinal edges are battered. It was found in area A. Function is probably related to grinding and pounding in food production.

Bead.

N = 1. (Figure 19b).

Material: Steatite.

A single green-brown steatite bead was recovered from area B. The hole is biconically drilled. All surfaces are polished to a fine gloss, except where minute inclusions break the surface.

Pendant.

N = 1. (Figure 19i).

Material: Steatite.

This pendant has been made from two parts of a broken pipe stem. Identification is by a single groove extending longitudinally along the inner concave face of the object. The outer convex surface is ground and polished to a jet black. Two lateral side grooves on the thinnest end probably represent a

Figure 19. Miscellaneous Formed Artifacts

Bone disc bead (a)

Steatite disc bead (b)

Olivella shell bead (c)

Incised bone fragment (d)

Bilaterally incised bone object (e)

Biconically drilled bone plaques (f,g)

Chipped stone pendant (h)

Ground stone pendant and fragment (i)

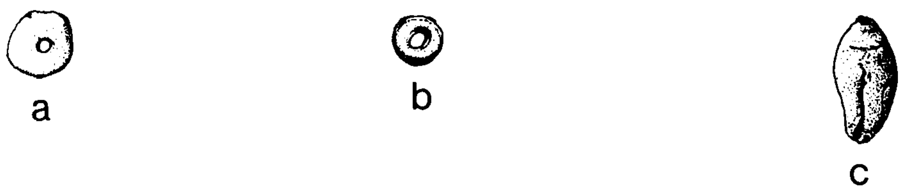
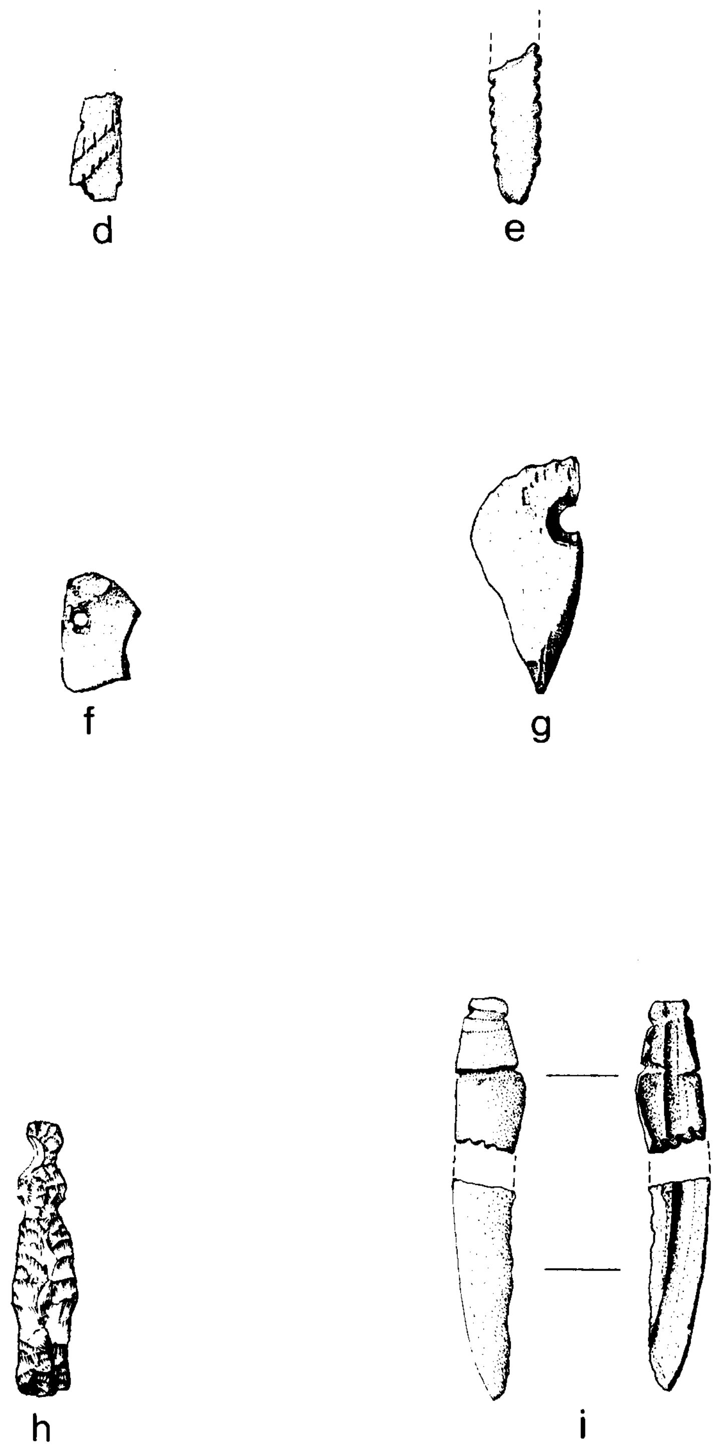


FIGURE 19



string attachment. In addition, there is a pattern of incised lines on the surface consisting of three thin parallel grooves.

Pictographic object.

N = 1 (Figure 20)

Material: Basalt (1).

One bifacially flaked and battered elongated basalt cobble with all edges and both faces ground smooth was located in assemblage B. On one ground face are a number of ill-defined ochre designs or pictographic symbols. The face bearing these markings was discovered _in situ_, symbol side down. In overall shape this artifact resembles stone war clubs described for the Okanagan and Thompson by Teit (1900,1930). Although stone clubs were noted to have been painted with red ochre, no mention of specific pictographic symbols are recorded.

Red ochre.

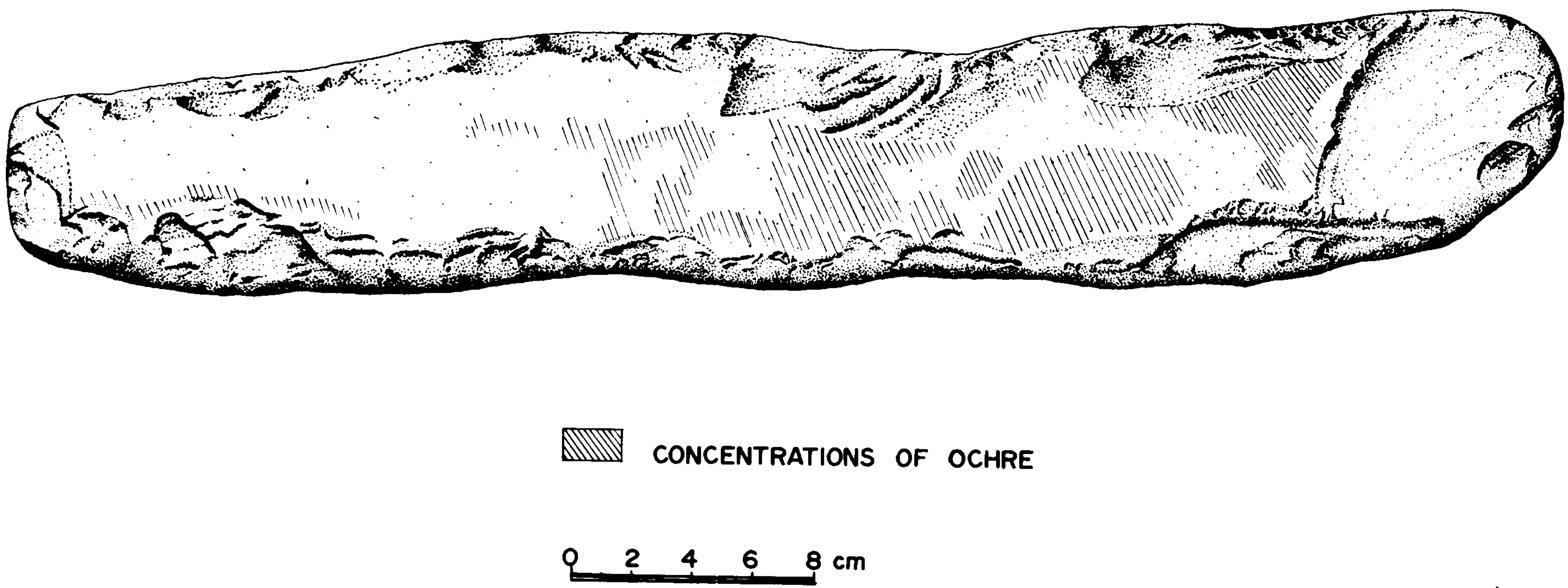
N = 17

Material: Hematite (iron oxide).

Seventeen irregular fragments of red ochre were recovered from excavation area B. All are presumed to be fragments of larger nodules. The nearest known source for this material is in the Tulameen valley near Princeton, B.C., about 70 km to the northwest.

Figure 20. Pictographic Object.

FIGURE 20



Mica

N = 1

A single small fragment of sheet mica was recovered from area A. Sheet mica is not a naturally occuring material in on-site rocks and is inferred to be a cultural addition.

Bone industry:

N = 14

Artifacts manufactured of bone are well preserved, owing to the alkaline nature of the site deposits. The deposits measured between pH 7.0 and 8.0 in general (Copp 1977a:267). Most of the bone tools recovered are assumed to be fragments of larger tools.

Incised fragment.

N = 1. (Figure 19d).

A small rectangular bone fragment incised with two parallel longitudinal grooves, with eight shorter perpendicular grooves intersecting at regular intervals was recovered. Microscopic examination indicates that the longitudinal grooves were incised prior to the shorter grooves. While assumed to be a part of a larger artifact, the function of this piece is unknown.

Bone disc bead.

N = 1. (Figure 19a).

Originating in area A, this circular biconcially drilled bead exhibits grinding on both horizontal flat surfaces. Randomly crossed striae are present on upper and lower surfaces of the disc with parallel striae along lower portions of the rim. These are interpreted as manufacturing marks, assuming the bead was finished by polishing.

Bone plaque fragments.

N = 2. (Figure 19 f,g).

One roughly triangular fragment is broken across a biconically drilled hole and along one edge. Surface polish is evident on both faces along with random striae. This piece also exhibits a bevelled outer rim segment. The other specimen has one biconically drilled hole. Two sharp breaks along edge margins are major damage areas. There are no striae on the inner surface and few random striae on the outer surface.

Bilaterally incised bone object.

N = 1. (Figure 19 e).

This biplano cross section specimen tapers to a blunt semi-convex tip with a single v-shaped groove. Slightly excurvate edge margins include a number of v-shaped incisions, seven on one side and eight on the opposite. Both faces feature longitudinal striae and surface polish. Function is unknown although it resembles the tail rattles of a rattlesnake.

Bone points.

N = 6. (Figure 21 a-d).

All six points have longitudinal grinding striae on all faces from tip to base and have been broken at the widest portion. Tip sections range from sharply pointed to blunt, depending upon relative thickness of the tip. One thicker specimen has been classified as a point rather than as a bone awl tip (see below) since it lacked the diagnostic polish and striae associated with such tools.

The term "bone point" indicates a pointed object capable of sufficient penetration to disable game when propelled or thrust. These artifacts could have functioned equally well as hunting or fishing equipment.

Bone awl.

N = 1. (Figure 21 f).

This single ungulate metapodial has been distally ground to a sharp tip. Use polish extends along all faces, up to the epiphyseal juncture. The extreme point is broken but use rounding on projecting tip portions is evidence of continued use after extreme tip loss. Striae running parallel to and at 90 degrees to the longitudinal axis indicate use as a perforator or awl or resharpening of the point by rotational grinding. While use polish could be from hand polish as well as hide working, an

Figure 21. Worked Bone Artifacts.

Bone points (a-d)

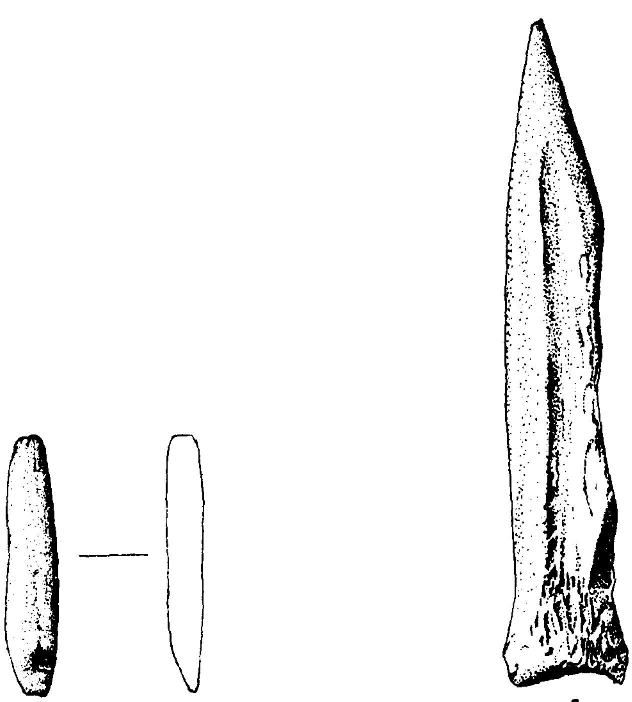
Bevelled object (e)

Awl (f)

a b

FIGURE 21

c d



e f

alternate function would be that of bark piercing in basketry construction.

Bevelled bone.

N = 1. (Figure 21 e).

This artifact was manufactured by longitudinal grinding on all faces, as well as by bevelling of one end. Use wear is present along the bevelled edge, as a smoothing and near obliteration of longitudinal striae. Function is unknown.

Miscellaneous ground bone.

N = 1

One object from area A consists of an incomplete ground epiphyseal fragment, presumably a portion of a larger artifact. Included on one face is a curvilinear groove, either the result of design or use. It has also been partially charred.

Antler industry:

Antler preservation was good due to soil alkalinity. This industry is poorly represented, consisting of three fragments.

Antler tine.

N = 3

Two burnt fragments of antler tine were recovered. One is a tip section and the other is a mid-section. Both are assumed to be portions of antler pressure flakers or other implements. The other identifiable antler piece is a single section of tine. It is not complete enough to identify as to function.

Shell industry:

The single shell artifact was well preserved, as were the unmodified mussel valves found in the site. None of the locally available shell exhibited modification.

Olivella bead.
N = 1. (Figure 19 c).

A single Olivella sp. specimen from area B comprises this industry. Modification consists of turret grinding, presumably for stringing as a bead.

Historic artifacts:
N = 24

A number of recent artifacts of Euroamerican and Canadian manufacture were recovered from the plow zone. These include:

Type	N	Material	Comment
Nail	1	Metal alloy	Modern wire type
Wire	2	Metal alloy	Clothes hanger
Bottle cap	1	Metal and cork	Soft drink type
Washers	2	Metal alloy	Machinery parts
Screw bolt	1	Metal alloy	Machinery part
Screw fragment	1	Metal alloy	
Eye bolt	1	Metal alloy	Machinery part
Can key	1	Metal alloy	Food container type
Metal fragments	6	Metal alloy	Badly corroded
Metal fragment	1	Lead	
Glass	1	Glass	Auto windshield
Glass	3	Glass	Transparent bottle
Glass	2	Glass	Unidentified
Ceramic	1	Ceramic	Saucer fragment

5.6 Feature Description.

An archaeological feature is considered to be a non-portable complex or patterned association of objects. Features include rock alignments, hearths and hearth stone clusters of fire cracked rock or clusters of faunal remains. In order to aid description, features are described by excavation area. All features in the McCall site were located in Stratum 3 with the exception of feature #7 which intruded into Stratum 2.

Excavation Area A.

Four features are recognized. They are as follows:

1). Cluster of fire cracked rock.

Unit 154-156E,16-20N.

Levels 3-8 (15-40 cm below surface).

This localized cluster of fire cracked rock probably represents the disturbed plow zone remnants of a food preparation area, either an open hearth, steaming pit or oven. Lack of evidence for excavated pits suggests an open hearth with maximum density at levels 5-8 (21-40 cm below surface).

2). Localized shell cluster.

Unit 156-158E,16-18N.

Levels 5-8 (21-40 cm below surface).

This irregularly shaped cluster of unburnt crushed, broken and whole mussel valves, intermixed with fire cracked rock, measured 105 by 70 cm, with a maximum concentration occuring 28-32 cm below surface.

3). Localized shell cluster.

Unit 155-156E,16-18N.

Levels 4-6 (16-30 cm below surface).

This small cluster of whole and fragmented mussel shell measured 58 by 45 cm. Small numbers of fire cracked rock were mixed with the shell.

4). Tree root disturbance.

Units 152-154E,18-20N and 154-156E,16-18N.

Levels 3-6 (11-30 cm below surface).

A linear arrangement of fire cracked rock transected two excavation units, indicating repositioning of cultural material by a large pine root. After the root was removed, displacement was noted to be more horizontal than vertical, although some vertical movement was noted.

Excavation Area B.

Nine features were recorded for this area. They are:

5). Milling stone and seat.

Unit 142-144E,3-5N.

Levels 3-6 (14-30 cm below surface).

This large boulder milling stone and flat surfaced companion stone occured together 14-30 cm below surface (measured from the bottom of the milling stone). Dimensions of the milling stone are ca 40 cm in diameter by 16 cm high, with a central depression measuring 15-17 cm in diameter and one cm deep.

6). Spall hearth.

Unit 146-148E,7-9N.

Levels 5-6 (21-30 cm below surface).

This feature was a subrectangular arrangement of large flat spalls horizontally interspersed between four large fire scarred boulders. A number of smaller fire cracked rocks were located within this spall and boulder alignment, along with small lenses of shell, indicating a steaming pit, oven, or open hearth.

7). Refuse pit.

Unit 142-144E,7-9N.

Levels 11-16 (55-80 cm below surface).

An indistinct pit was uncovered ca 55 cm below surface in this unit. No outline was apparent in profile or floor levels except in the southern half of the excavation unit. Cultural material included a number of retouched and unretouched flakes, one large basalt biface and a number of mammal bone fragments. Heavy concentrations of crushed and fragmented shell served as the main delimiter of the feature. Function is thought to be a refuse or cache pit.

8). Fire cracked rock and bone cluster.

Unit 144-146E,5-7N.

Levels 4-6 (20-30 cm below surface).

This feature comprised a 90 by 30 cm arrangement of fire cracked rock enclosing two clusters of butchered land mammal bones, assumed to be associated with the practice of rendering bone into stock for marrow.

The following remains were identified:

Ovis canadensis; atlas vertebra (1), femur fragment (1), radius fragment (1), tibia fragment (1), tarsal fragments (7), and a carpal fragment (1).

Odocoileus hemionus; carpal fragment (1).

Odocoileus spp.; carpal fragments (2).

Artiodactyla; tibia fragment (1), and a tarsal fragment (1).

9). Bone clusters.

Unit 142-144E,5-7N.

Levels 4-6 (20-30 cm below surface).

Two clusters of smashed and butchered mammal bone fragments measured 30 by 20 cm apiece. Both were associated with numbers of modified and unmodified basalt and cryptocrystalline flakes. This cluster appears to be a secondary deposition of these materials. These specimens are primarily Artiodactyla. They include: vertetral fragments (15), atlas vertebrae (3), thoracic vertebrae (4), rib fragments (11), metapodial fragment (1), and unidentifiable bone fragments (226).

10). Bone cluster.

Unit 146-148E,5-7N.

Levels 3-5 (15-25 cm below surface).

This cluster of bone consisted of the first and second cervical vertebrae of white tail deer (Odocoileus virginianus). The ventral face of the axis vertebra exhibited a number of transverse parallel striae interpreted as butchering marks. Other skeletal elements include:

Ovis canadensis; an ulna fragment (1) and a tarsal fragment (1).

Artiodactyla; a rib fragment (1), a femur fragment (1), ilium fragments (2), an ischium fragment (1), a pubis fragment (1), tibia fragments (4), a humerus fragment (1) and tarsal fragments (4).

Large land mammal; skull fragments (12), vertebral certrum fragments (3), epiphyseal plates (6), rib fragments (3), an ilium fragment (1), radius fragment (1), femur fragment (1), tarsal fragment (1), diaphysis fragments (18) and unidentified small bone fragments (626).

This feature is assumed to be a primary refuse dump containing the remains of a single animal.

11). Bone cluster.

Unit ca 148E,4.78-4.98N.

Levels 4-7 (18-32 cm below surface).

This cluster of smashed and butchered post-cranial bones represents more than one individual ungulate as well as a few fragments of freshwater mussel shell. Individual ungulate bones were immature, indicated by numerous epiphyseal fragments. This is probably a primary refuse deposit resulting from butchering activities.

Faunal remains include:

Ovis canadensis; radius fragments (2), ulna fragment (1), pubis fragment (1), and an ilium fragment (1).

Artiodactyla; vertebral fragments (15), lumbar vertebrae fragments (4), thoracic vertebrae fragments (5), rib fragments (6), radius fragments (3), ulna fragments (2), humerus fragments (2), ilium fragment (1), ischium fragment (1), tibia fragments (2), tarsal fragments (3), proximal phalanges (4), medial phalange (1), and a distal phalange (1).

Large land mammal; vertebral fragments (5), epiphyseal plates (4), rib fragments (3), ossified costal cartilage (2), a femur fragment (1) and unidentified bone fragments (75).

12). Shell cluster.

Units 144-146E,3-5N and 146-148E,3-7N.

Levels 2-8 (10-40 cm below surface).

This band of shell, measuring 320 by 180 cm in extent and intermixed with fire cracked rock, is the result of primary or secondary refuse deposition. It is of interest as its provenience of 10-40 cm below surface extends from the plow zone down to the levels of greatest cultural material density indicating that plow disturbance has not greatly affected lateral distribution of materials within features.

13). Shell cluster.

Unit 146-148E,9-9.16N.

Levels 4-7 (17-34 cm below surface).

This isolated cluster of complete mussel valves measured 32 by 18 cm in extent. Location was immediately north of feature #6 (the spall hearth) in the north wall of the excavation unit. The cluster was recovered even though it extended beyond the limits of the block unit. It is a primary refuse deposit, perhaps a single basket dump of steamed mussels.

14) Shell Cluster.

Unit 142-144, 7-9N.

Levels 1-2 (0-20 cm below surface).

This disturbed shell cluster in the plow zone measured 150 by 150 cm and was comprised of both whole and fragmented mussel valves.

15) Shell Cluster.

Unit 144-146, 7-9N.

Levels 1-2 (0-20 cm below surface)

This disturbed shell cluster was similar to No.14, measuring 170 by 180 cm in extent.

5.7 Faunal Analysis.

The total number of faunal remains recovered number 3131. Of these, 351 originated from area A and 2780 from area B. The remains were identified by Ms. Jean Williams although tabulation and interpretation of these is solely my responsibility. Tables 12 and 13 indicate the number and nature of these remains. Where possible, species are listed. However, as species designation was not always possible, identification for many bones is limited to the genus, family or order level.

It is apparent from these two tables that differences in number and types occur between the two assemblages. Both contain fish, represented by precaudal, caudal and thoracic vertebrae. Assemblage A exhibits species which are currently available in both river and lake systems in the Okanagan valley. All are freshwater species with burbot (Lota lota) only restricted to freshwater lakes.

Assemblage B contains burbot as well as other lake and stream fishes (Catostomidae/Cyprinidae spp.). In addition, this assemblage contains anadromous salmon (Oncorhyncus spp.) and trout (Salmonidae spp.). Both of these are lacking in assemblage A. It should be noted that actual numbers of vertebrae are few, consequently statements cannot be generated about relative differences in fish occurence except on a very general level. In this case, it appears that both assemblages indicate a pattern of fish exploitation that utilized both riverine and lacustrine zones.

R. Casteel identified the fish vertebrae and provided live weight estimates based on modern samples from the same fish

Table 12. Identified Faunal Remains: Area A.

Fauna	No.	Skeletal Elements 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pisces.																								
Oncorhynchus spp.	0																							
Salmonidae spp.	0																							
Catostmus spp.	2				2																			
Catostimidae/Cyprinidae spp.	9				9																			
Coregomidae spp.	1				1																			
Ptychocheilus spp.	2				2																			
Lota lota	1				1																			
Reptilia.																								
Chrysemys spp.(?)	18																					18		
Aves.	20	1	1	1	2	1	3	1	1	1	2	1	1	4										
Mammalia.	146	2	8		1	1			1														95	39
Lepus spp.	20					1		2		3	5	2		3		3	1							
Marmota spp.	13	3	4	1						1	3			1										
Spermophilus spp.	2	1		1																				
Castor canadensis	2		2																					
Ondatra spp.	4				1					1			1		1									
Carnivora	0																							
Canis spp.	0																							
Ursus spp.(?)	0																							
Lynx spp.	0																							
Lynx rufus	2			2																				
Artiodactyla	78	1	36	2	4	1		2	1	4	1			1	13	2	2	1	1	6				
Odocoileus spp.	7	1	3		1											1			1					
Odocoileus hemionus	1																		1					
Odocoileus virginianus	2																		2					
Alces/Cervus sp.(?)	1															1								
Oreamnos/Ovis sp.(?)	12		11																	1				
Ovis canadensis	8		7													1								

MAMMALS KEY:

01 Skull
02 Teeth
03 Mandible
04 Vertebrae
05 Scapula
06 Sternum
07 Illium/ischium/pubis
08 Ribs
09 Humerus
10 Radius/ulna
11 Femur
12 Patella
13 Tibia/fibula
14 Metapodial
15 Tarsals
16 Metatarsals
17 Carpals
18 Metacarpals
19 Phalanges
20 Sesamoids
21 Carapace
22 Unidentified bone fragments
23 Diaphysis fragments

AVES KEY:

01 Skull
02 Bill
03 Mandible
04 Humerus
05 Ulna
06 Coracoid
07 Sternum
08 Synsacrum
09 Scapula
10 Tibiotarsus
11 Tarsometatarsus
12 Phalange
13 Diaphysis fragments

Table 13. Identified Faunal Remains: Area B.

Fauna	No.	Skeletal Elements 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pisces.																								
Oncorhynchus spp.	2				2																			
Salmonidae spp.	3				3																			
Catostmus spp.	0																							
Catostimidae/Cyprinidae spp.	8				8																			
Coregomidae spp.	0																							
Ptychocheilus spp.	0																							
Lota lota	5				5																			
Reptilia.																								
Chrysemys spp. (?)	28																					28		
Aves.	4							1			1		1	1										
Mammalia.	2397	17	21		28				34			2											2245	50
Lepus spp.	3									1	1			1										
Marmota spp.	3					1								1		1								
Spermophilus spp.	1			1																				
Castor canadensis	10				1	3				1	2			1	2									
Ondatra spp.	14			1	4					1	1	5		1		1								
Carnivora	2														2									
Canis spp.	5		1							1						1	1			1				
Ursus spp. (?)	1																			1				
Lynx spp.	2																			2				
Lynx rufus	0																							
Artiodactyla	226	1	20	1	55	1	1	7	24	12	15	6	1	11	13	18	2	1	7	16	14			
Odocoileus spp.	11		2	3				1					1			2	1	1						
Odocoileus hemionus	6										1						3	2						
Odocoileus virginianus	5				2	1										2								
Alces/Cervus sp. (?)	2										1	1												
Oreamnos/Ovis sp. (?)	7		3								1					1				2				
Ovis canadensis	35			1	1	1		3			4		1	1		8	2	7	2	4				

MAMMALS KEY:

01 Skull
02 Teeth
03 Mandible
04 Vertebrae
05 Scapula
06 Sternum
07 Illium/ischium/pubis
08 Ribs
09 Humerus
10 Radius/ulna
11 Femur
12 Patella
13 Tibia/fibula
14 Metapodial
15 Tarsals
16 Metatarsals
17 Carpals
18 Metacarpals
19 Phalanges
20 Sesamoids
21 Carapace
22 Unidentified bone fragments
23 Diaphysis fragments

AVES KEY:

01 Skull
02 Bill
03 Mandible
04 Humerus
05 Ulna
06 Coracoid
07 Sternum
08 Synsacrum
09 Scapula
10 Tibiotarsus
11 Tarsometatarsus
12 Phalange
13 Diaphysis fragments

(Casteel 1972:404-419). Estimates varied from ca 200g for small suckers or minnows (Catostomidae/Cyprinidae spp.) to a maximum of ca 3600g for suckers (Catostomus spp.). Burbot were estimated to weigh between ca 1000-2000g (Casteel: pers. comm.). No other weight estimates were provided. However, if these weights represent realistic sizes for fish taken by the prehistoric site inhabitants they most likely represent an added protein base supplemental to other animals taken for food.

Reptile remains consist primarily of turtle carapace fragments plus a few unidentified small animal bones which may also represent these animals (J. Williams: pers. comm.). Although lack of comparative materials denies a positive identification, it is suggested that the most likely species is Western painted turtle (Chrysemys picta) which is currently available in the area around the McCall site (Cowan and Guiguet 1959). Turtle remains were recovered from both assemblages.

A small number of avian bones were recorded in both assemblages. None of these could be positively identified although at least two elements, one from either assemblage, could be from a duck-sized animal (J. Williams: pers. comm.). In addition, two coracoid elements from assemblage A suggest a larger bird was present. Since positive identifications were not possible, it is suggested that these skeletal elements may be derived from waterfowl species similar to those described in Chapter 3, all of which are currently present in the area.

More success was achieved in identification of mammalian faunal remains even though the majority of bones were fragmented. Almost all metapodial bones were broken, with the largest portions measuring no more than 10 cm long. The presence of smaller, fragmented bones suggests that they were broken apart in order to render grease from them as they are much more fragmented than simple marrow extraction activities would indicate.

The majority of the fragmented bones are identified only as large land mammal, although sometimes designation to Order Artiodactyla was possible (Tables 12-13). Otherwise, identifiable bones belonged primarily to the Order Artiodactyla with elements identified as Odocoileus spp., Odocoileus hemionus, Odocoileus virginianus and Ovis canadensis. Moose or elk (Alces/Cervus sp.) and mountain goat (Oreamnos spp.) were only tentatively identified.

Summary.

The faunal remains indicate that similar hunting and fishing patterns are represented in both assemblages. Lake and river fish were exploited as were birds although skeletal elements were few and definitive statements about quantities or relative importance of these animals cannot be made. Rodents were also taken and included hare, marmot, ground squirrel, beaver and muskrat. Carnivore remains are scant, but include dog or coyote, bear(?), bobcat, and Lynx spp. Artiodactyla or other large land mammals form the largest number of recovered remains. These include mule and white-tailed deer, and bighorn sheep. Moose or elk and mountain goat remains were not positively identified but a few bones suggest their presence.

Tables 14 and 15 indicate the distribution of identified fauna per five cm level for both assemblages. From these tables it can be seen that no single genus or species is restricted to any particular depth in the site deposits, rather they occur throughout the deposits but tend to be concentrated ca 10-40 cm below surface.

Table 14. Fauna Per 5 cm Level: Area A.

Fauna (No. of elements)

Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
01											2	3									1						1
02								1	1	2	1										5					1	1
03								1		7	1	1									5	2	1				
04				1					6	26		3		2	1						22	4		1		4	1
05								3	3	50	3	1			1						7	1					2
06				5	1	2		13	6	48	5	4	1		1					2	17			1	1	2	2
07									2	5											5						
08				1			1		2	3	4	1			1						10					1	
09			2	1						1											1						
10				1						1	3										4						1
11										3	1		1													1	
12																					2					1	
13																											
14																											

KEY:

PISCEA
01 *Oncorhynchus* spp.
02 *Salmonidae* spp.
03 *Catostomus* spp.
04 *Catostomidae*/*Cyprinidae* spp.
05 *Coregomidae* spp.
06 *Ptychocheilus* spp.
07 *Lota lota*
REPTILIA
08 *Chrysemys* spp. (?)
09 AVES
10 MAMMALIA
11 *Lepus* spp.
12 *Marmota* spp.
13 *Spermophilus* spp.
14 *Castor canadensis*
15 *Ondatra* spp.
16 Carnivora
17 *Canis* spp.
18 *Ursus* spp. (?)
19 *Lynx* spp.
20 *Lynx rufus*
21 ARTIODACTYLA
22 *Odocoileus* spp.
23 *Odocoileus hemionus*
24 *Odocoileus virginianus*
25 *Alces*/*Cervus* sp. (?)
26 *Oreamnos*/*Ovis* sp. (?)
27 *Ovis canadensis*

Table 15. Fauna Per 5 cm Level: Area B.

Level	Fauna (No. of elements) 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
01									1	1				1	1						1						1
02										11				4	3		2		1		11	2				1	1
03				1			1			87		1		1	1		1				5	1	1			1	1
04	1	2		1			1	23	2	207	1	2			3						20						1
05								2		266											31	1					1
06	1			2			2	1		1099	1			4	2		1	1			93	5	4	3	1	1	15
07				2			1			690					1						42	2	1		1	2	12
08		1		1				11		25	1				2	2	1		1		17						1
09				1																	1						
10								1	1	6											4						1
11																											
12										7			1								2						
13																											
14																											

KEY:

PISCEA
01 *Oncorhynchus* spp.
02 *Salmonidae* spp.
03 *Catostomus* spp.
04 *Catostomidae/Cyprinidae* spp.
05 *Coregomidae* spp.
06 *Ptychocheilus* spp.
07 *Lota lota*
REPTILIA
08 *Chrysemys* spp. (?)
09 AVES
10 MAMMALIA
11 *Lepus* spp.
12 *Marmota* spp.
13 *Spermophilus* spp.
14 *Castor canadensis*
15 *Ondatra* spp.
16 Carnivora
17 *Canis* spp.
18 *Ursus* spp. (?)
19 *Lynx* spp.
20 *Lynx rufus*
21 ARTIODACTYLA
22 *Odocoileus* spp.
23 *Odocoileus hemionus*
24 *Odocoileus virginianus*
25 *Alces/Cervus* sp. (?)
26 *Oreamnos/Ovis* sp. (?)
27 *Ovis canadensis*

Chapter 6: Spatial Analysis and Definition of Assemblages.

6.1. Introduction.

The artifact and faunal assemblage from the two excavation areas are significantly different when compared against one another. Area A contains different types and frequencies of artifacts than does Area B (Table 16).

6.2. Spatial Analysis.

Prior to establishing a temporal framework for the McCall site cultural material, the spatial distribution of certain common cultural elements was examined in order to establish whether the two major excavation areas contained associated materials. The three most common cultural elements examined consisted of fire cracked rock, unretouched flakes, and freshwater mussel shell including shell fragments. These cultural materials were chosen because they were numerically superior to any other class of data. Density of occurence was recorded by dividing the total excavated site area into one metre square analytical units, including the trench connecting excavation areas A and B. Densities were determined from raw data counts per analysis unit for both fire cracked rock and unretouched flakes. Shell density was recorded by weight. These

Table 16: Artifact Distribution by Area.

Chipped Stone Industry:	N	A	(%)	B	(%)
		Area			
Formed Bifaces:					
Projectile Points:					
Group 1	14	8	(1.61)	6	(0.32)
2a	19	10	(2.01)	9	(0.48)
2b	18	10	(2.01)	8	(0.48)
2c	6	2	(0.40)	4	(0.21)
3a	2	0		2	(0.11)
3b	12	0		12	(0.64)
3c	4	0		4	(0.21)
3d	2	0		2	(0.11)
4	4	0		4	(0.21)
5a	13	0		13	(0.69)
5b	3	0		3	(0.16)
6	6	0		6	(0.32)
Incomplete points:					
Identifiable bases:					
Group 2a	29	15	(3.01)	14	(0.75)
Group 2b	6	3	(0.60)	3	(0.16)
Group 2c	10	3	(0.60)	7	(0.37)
Tips	41	8	(1.61)	33	(1.76)
Unidentifiable Bases	12	0		12	(0.64)
Medial	17	3	(0.60)	14	(0.75)
Bifaces: Tear	5	0		5	(0.27)
Pentagonal	1	0		1	(0.05)
Broken bifaces	7	0		7	(0.37)
Biface fragments:					
Proximal	17	3	(0.60)	14	(0.75)
Distal	10	0		10	(0.53)
Large biface scrapers	4	2	(0.40)	2	(0.11)
Preforms	2	1	(0.20)	1	(0.05)
Drills	8	2	(0.40)	6	(0.32)
Unformed Bifaces:					
Tabular scraper-knives	21	7	(1.41)	14	(0.75)
Retouched Flakes	12	2	(0.40)	10	(0.53)
Formed Unifaces:					
Awl-gravers	20	2	(0.40)	18	(0.96)
Scrapers					
Group 1	3	2	(0.40)	1	(0.05)
2	7	2	(0.40)	5	(0.27)
3	16	5	(1.00)	11	(0.59)
4	12	5	(1.00)	7	(0.37)
5	36	11	(2.21)	25	(1.33)
6	1	0		1	(0.05)
7	5	2	(0.40)	3	(0.16)
Perforators	4	0		4	(0.21)
Tailed scraper-gravers	10	1	(0.20)	9	(0.48)

Table 16 Continued.

Unformed Unifaces:					
Retouched flakes	210	40	(8.03)	170	(9.05)
Utilized flakes	162	40	(8.03)	122	(6.50)
Unretouched flakes	1492	279	(56.02)	1213	(64.59)
Debitage	17	3	(0.60)	14	(0.75)
Pseudo-burin spalls	4	1	(0.20)	3	(0.16)
Blades	4	0		4	(0.21)
Piece esquilles	9	6	(1.20)	3	(0.16)
Bipolar Cores	4	3	(0.60)	1	(0.05)
Multi-directional Cores	11	6	(1.20)	5	(0.27)
Miscellaneous Chipped Stone:					
Pendant	1	0		1	(0.05)
Sinker	1	0		1	(0.05)
Pecked and Ground Stone Industry:					
Milling stone	1	0		1	(0.05)
Maul	1	0		1	(0.05)
Ground Stone Industry:					
Handstone	1	1	(0.20)	0	
Bead	1	0		1	(0.05)
Pendant	1	0		1	(0.05)
Pictographic object	1	0		1	(0.05)
Red ochre	17	0		17	(0.91)
Mica	1	1	(0.20)	0	
Bone Industry:					
Incised fragment	1	0		1	(0.05)
Disc bead	1	1	(0.20)	0	
Drilled plaques	2	1	(0.20)	1	(0.05)
Bilaterally incised	1	0		1	(0.05)
Points	6	4	(0.80)	2	(0.11)
Perforator-awl	1	0		1	(0.05)
Bevelled object	1	0		1	(0.05)
Miscellaneous bone	1	1	(0.20)	0	
Antler Industry:	3	2	(0.40)	1	(0.05)
Shell Industry:	1	0		1	(0.05)
Total:	2376	498		1878	

figures were then compiled and submitted to a computer contour mapping program (SYMAP) (Dougenik and Sheehan 1975). This program produced both an interval contour plot of the data and a coded contour matrix. In order to provide a better visual presentation of the data, contour matrices were then submitted to a further mapping program (ASPEX) (Hanson 1978) which produced three-dimensional distribution maps. These maps are presented in Figures 22-24. All programs and generated output were produced using facilities at Simon Fraser University.

It should be noted that maps generated by the SYMAP and ASPEX programs are included here in order to present gross patterns of cultural materials only. The smaller peaks and dips indicated in the maps are most likely the result of data interpolation or smoothing between data points by the program. This interpolation was necessary as raw data was in the form of counts per one metre square. Regardless of this, the resultant maps present gross patterns from which meaningful information can be derived.

It can readily be seen from these maps that there are major differences in spatial data patterning between excavation areas A and B. All three maps indicate a low density core area of cultural remains with major foci of materials at opposite ends of the excavations. In general, most material occurs at the eastern

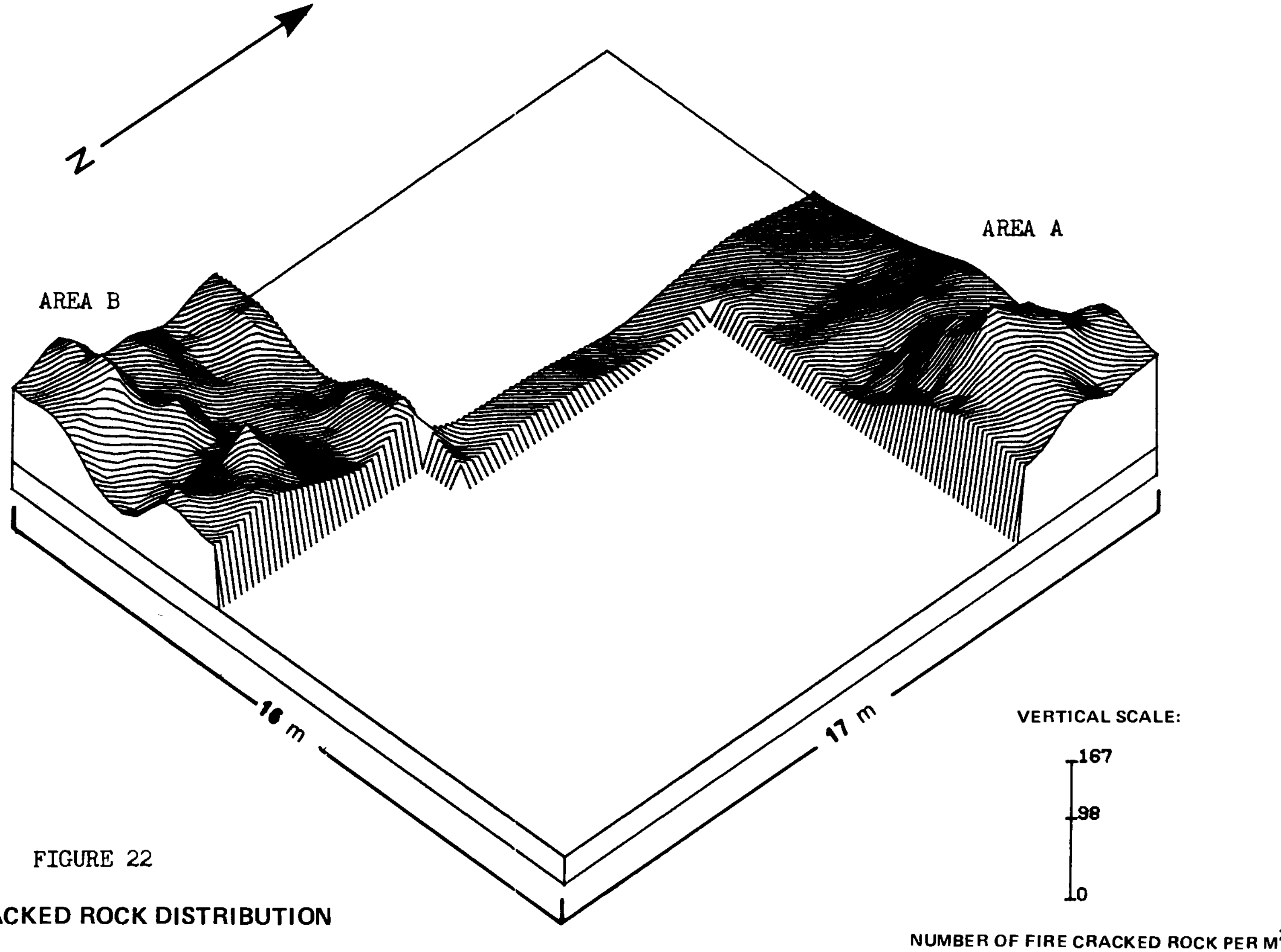


FIGURE 22

FIRE CRACKED ROCK DISTRIBUTION

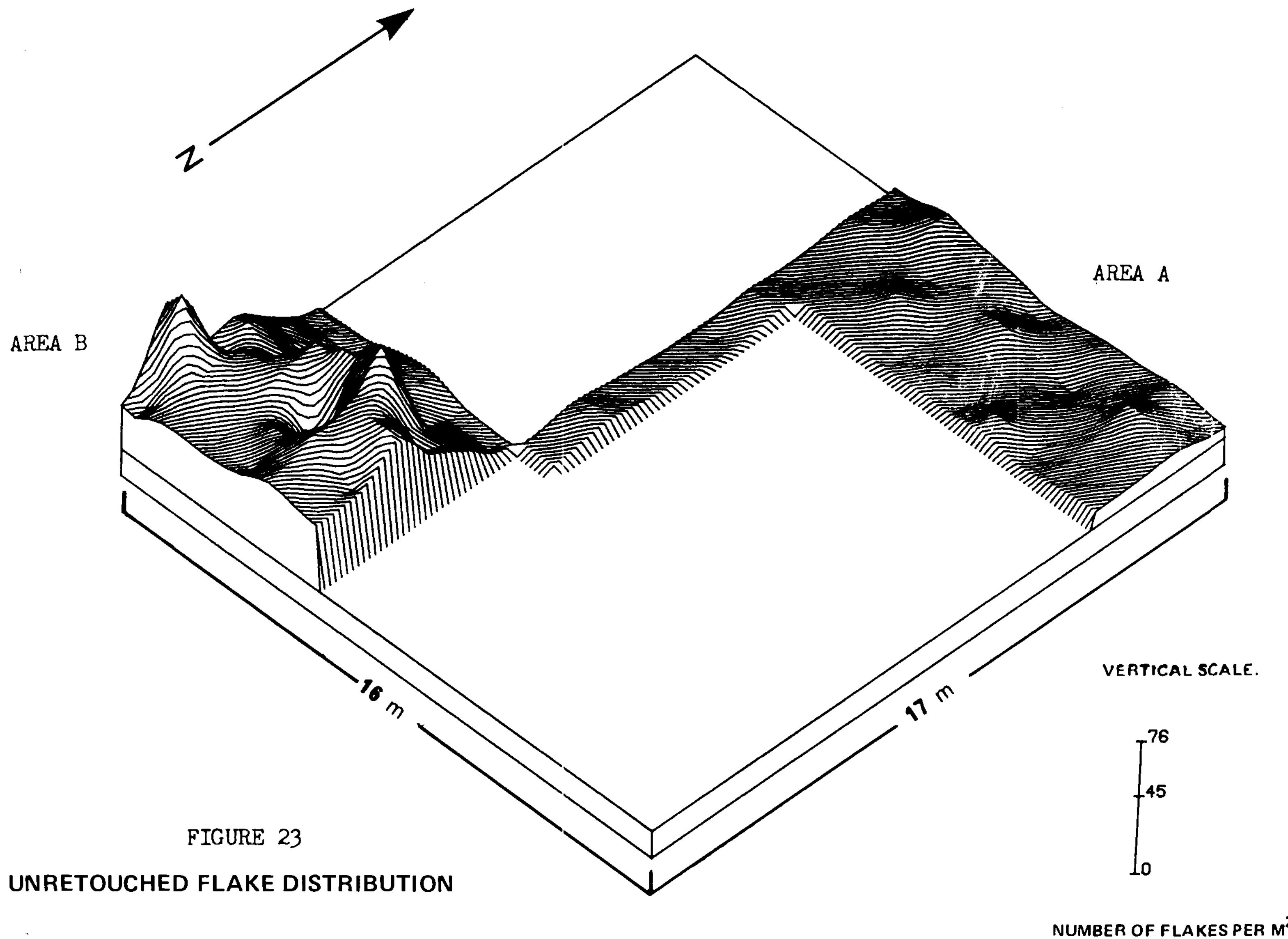


FIGURE 23

UNRETOUCHED FLAKE DISTRIBUTION

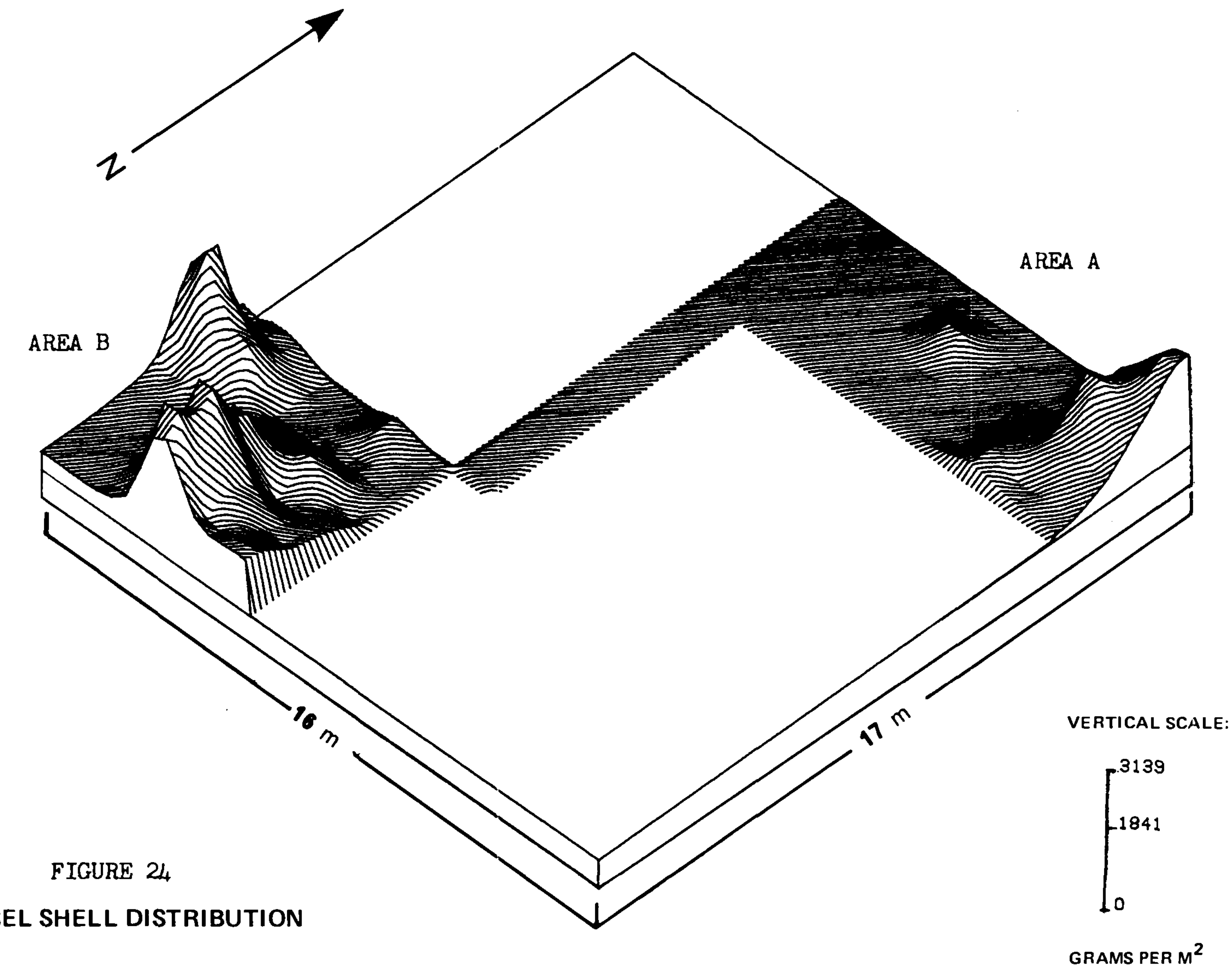


FIGURE 24

MUSSEL SHELL DISTRIBUTION

end of area A and throughout most of area B. The area of low density is represented by the inter-connecting trench and the entire western portion of area A. This low density area is interpreted as a zone of less intensive occupation or cultural acitivity relative to other parts of the excavation. It can also be seen that the density of materials in area B is generally more intense than that of area A, particularly with respect to amounts of flake and shell. I suggest that this is a result of a more intensive occupation and/or utilization of area B. The following discussion examines the horizontal spatial patterning of cultural materials in more detail.

The study of horizontal artifact patterning within sites has recently received much attention in archaeological literature. Analyses of this type range from intuitive judgements of artifact clustering (Minni 1976, Brauner 1976) to more elegant statistical methods involving such disparate techniques as multi-dimensional cluster and scaling (Whallon 1973, Ham 1976), nearest neighbour anlaysis (Whallon 1974, Blake 1974), factor analysis (Binford and Binford 1966, Binford 1972b), analysis of ethnoarchaeological data patterns using the Fisher Exact test (Hayden and Spurling 1978), and use of the binomial distribution (Blake 1976).

Most spatial analyses have been concerned with the definition or delineation of tool kits, usually comprised of stone tools, in attempts to reconstruct specific activities. Most analyses of these types operate under the assumption that archaeological materials found in situ retain enough original patterned spatial relationships between individual and clustered artifacts to enable reconstruction of the original activity.

Current opinion is divided as to the amount and relevance of information which can be derived from archaeological materials in the reconstruction of past behavioural processes. Lewis Binford (1962:219, 1972a:136) maintains that the archaeological record represents a fossilized picture of prehistoric life and that entire socio-cultural systems are reflected in the data provided that the researcher is equipped with the proper tools and procedures for examination. On the other hand, Doran and Hodson (1975) raise practical questions concerning the applicability of numerical procedures when dealing with archaeological data. Cowgill (1977) has reassessed the use and misuse of significance tests by archaeologists unfamiliar with their underlying principles. Schiffer (1976) outlines some of the problems caused by post-depositional disturbances which skew later analysis of materials otherwise considered to be in situ. Finally, Yellen (1977) has indicated some of the factors by which cultural materials reflecting activity areas are deposited in sites. Yellen also outlines some of the cultural biases with which modern investigators view and interpret hunting and gathering group data.

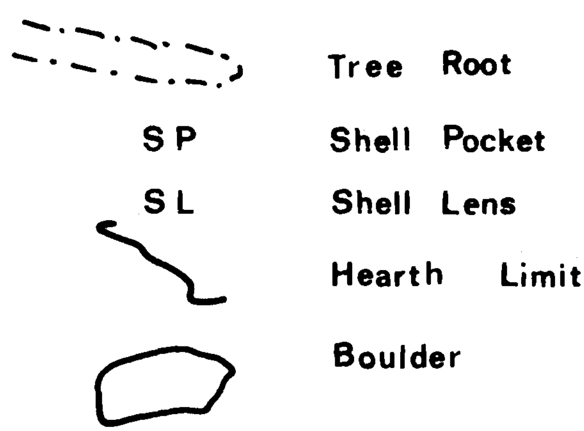
Despite the nature of archaeological data and their inherent sources of error, spatial analysis of artifact patterning within sites can lead to the identification of activity areas, where one or a number of specific tasks was carried out, particularly when areas in and around features are examined. This feature-specific stipulation is included as a result of Yellen's (1977) observations that most activities undertaken within a base camp situation tend to be carried out in close proximity to hearths or other areas where people congregate and socialize. Exceptions are those activities which require large spaces. That similar patterns can be expected of open camp situations in the Okanagan is likely, considering the nature of ethnographic band size and structure, as outlined in Chapter 3. With the above author's constraints in mind, the horizontal patterning of artifacts, faunal remains, and features in the two McCall site assemblages is examined with the goal of outlining visual evidence of activity.

6.3. Patterned Activity Analysis; Assemblage A.

The most noticeable feature in assemblage A is the scattered hearth located in the four easternmost excavation units. Smaller, more localized clusters of fire cracked rock and fragmented mussel shell (Figure 25) occur midway between the hearth and westernmost excavation units, implying that activities

FIGURE 25

FEATURE MAP - AREA A



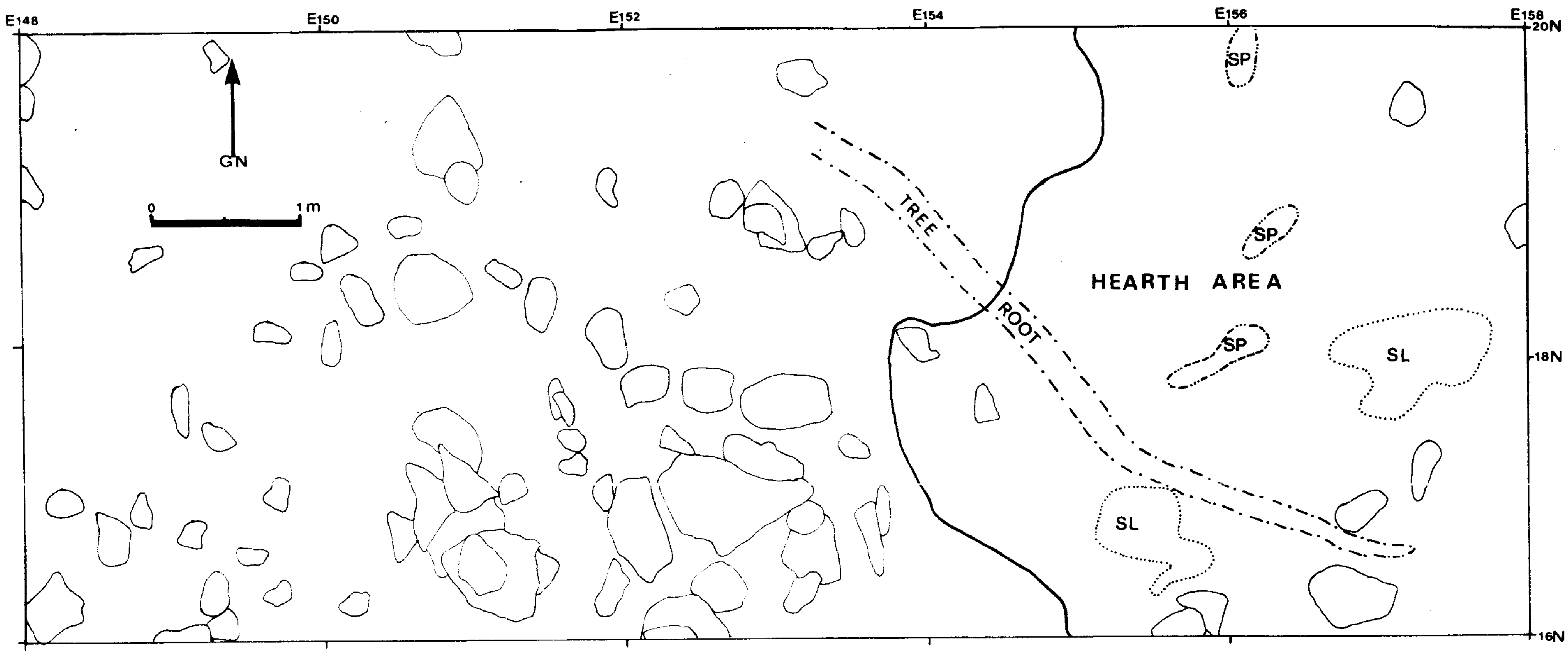


FIGURE 25 **FEATURE MAP - AREA A**

associated with these features took place in close proximity to one another. The visual assessment of artifact horizontal patterning is therefore examined in relation to the larger hearth feature, with an implicit assumption that such hearths served as foci for social activities.

Examination of spatial distributions for individual artifact categories (Appendices 2 and 3) reveals only one lithic tool class which clusters away from the hearth area. These are tabular scraper-knives for which microwear analysis reveals generalized cutting and scraping functions (Chapter 5). If these tools were used in hide preparations or a similar activity requiring a large amount of space, then clustering away from the limited space around a communal hearth is to be expected.

Artifact types which cluster in or around the hearth include all stemmed projectile points, projectile point bases, awl-gravers and utilized flakes. Leaf shaped points are distributed across the excavation, possibly indicating use as a cutting implement besides a projectile arming device. Only two leaf shaped points exhibited use wear supporting this hypothesis however, and the small number of these points does not lead to definite conclusions.

Artifacts with a bimodal distribution, both near and away from the hearth, include projectile point tips, retouched and unretouched flakes, bone tools, cores and small endscrapers. The latter exhibit a generally dispersed pattern, but with a tendency toward clustering near the hearth area.

All fish and turtle remains clustered in and around the hearth. Ungulate long bone diaphyses were found within the hearth parameters as well as across the excavation. All teeth, articular bones and other faunal remains display a scattered distribution.

Before reconstruction of activities based on the above data can be attempted, a number of underlying assumptions are accepted on an *a priori* basis, since they have yet to be tested by present archaeological theory and excavation techniques. These are:

(1) That most tools are used until loss of the working edge restricts further use, and until edge rejuvenation is no longer possible,

(2) That tools broken during use are generally discarded at the place of work,

(3) That some tools have short use-lives and are discarded immediately upon completion of the task for which they were produced.

Lithic tools located in close proximity to the hearth are indicative of activities which could generally be subsumed under the heading of extractive tasks. Such tasks are primarily concerned with reduction or preparation of foodstuffs, ranging from preliminary to final butchering depending upon animal size. The dispersion and clustering of various faunal remains in and around the hearth area also point to extractive task patterning, with larger faunal elements such as diaphyses discarded both in and away from the hearth, and smaller elements discarded nearer. This patterning indicates that activities centering around foodstuff preparation took place near the hearth.

Formed tools such as scrapers and awl-gravers, indicate tasks other than those strictly associated with foodstuff preparation. Such tasks range from preliminary to final softening and burnishing of hides, to manufacture of organic and non-organic goods. In the latter case, it should be noted that tools manufactured specifically for use in the production of other tools or finished products are usually the only objects preserved for later analysis.

The dispersed nature of unretouched flakes and cores indicates that primary steps in the production of stone tools were not restricted to a small area. Flakes resulting from core reduction are characteristic of the entire excavation area.

In summary, the assumption that artifacts and other cultural materials tend to be discarded in the location of their last use, and are not secondarily redeposited so as to obscure associations, allows reconstruction of past social behaviour on a very general level, to account for spatial artifact patterns. The simplest explanation for the patterns observed is that the scattered hearth served as a focus for both extractive and maintenance tasks associated with daily survival activities prior to dispersal of the feature. Artifacts distributed away from the hearth area are more concerned with maintenance activities. There is no indication of structural features in this part of the site, either by post hole or artifact and feature clustering. Therefore, this area is assumed to represent a locus of open air activities.

6.4. Patterned Activity Analysis: Assemblage B.

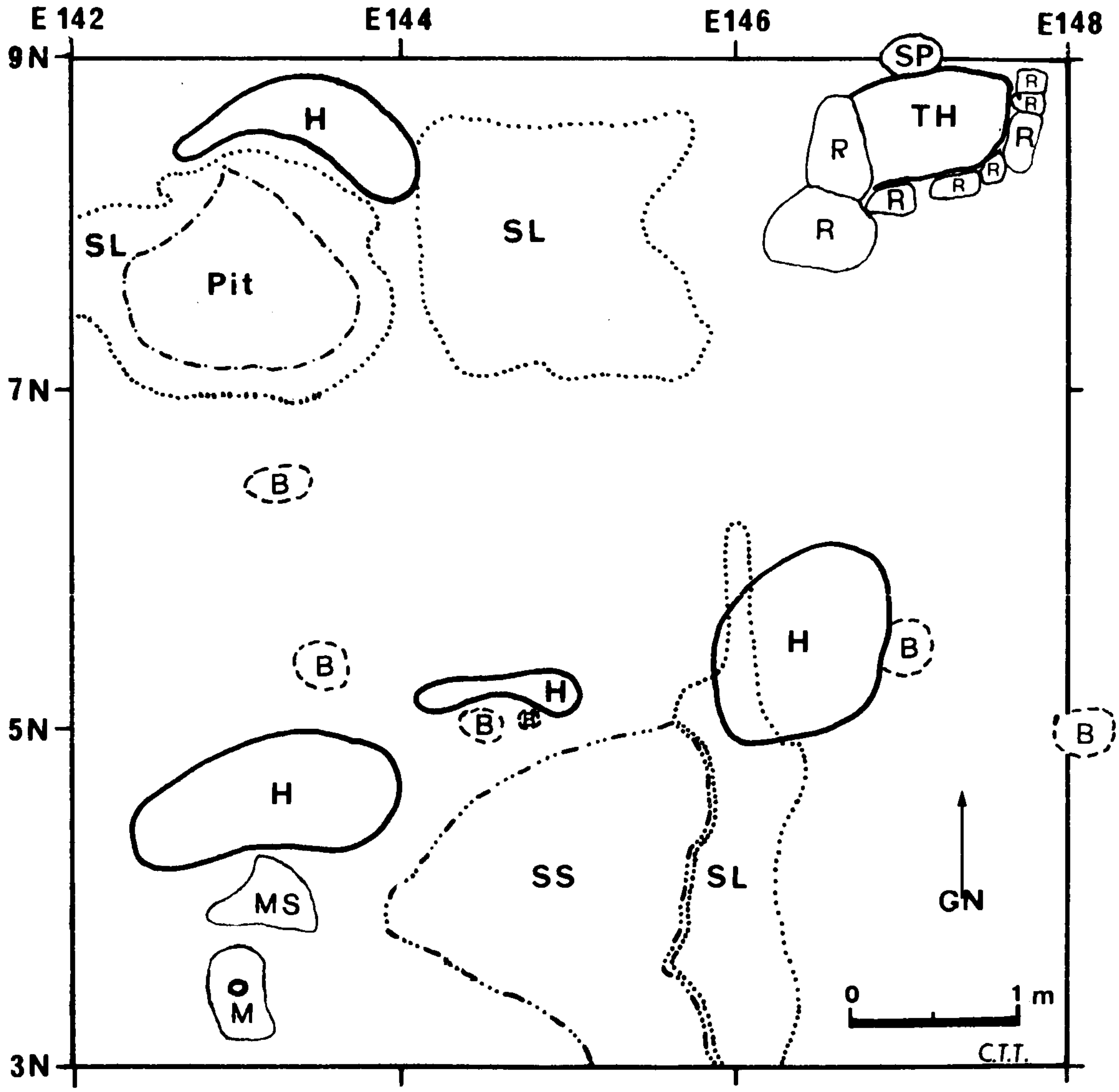
Features present in this excavation area present a more complicated pattern than that of assemblage A. A number of localized hearths are present in the southern half of the area, whereas the northern half has a single localized fire cracked rock concentration in the northwest corner and a slab hearth feature in the extreme northeast corner. The midsection of the area has only isolated fire cracked rocks (Figure 26).

FIGURE 26

FEATURE MAP - AREA B

(B)	Bone Cluster - broken bone		
SS	Scattered Shell Lens		
SL	Shell Lens - compact		
SP	Shell Pocket	M	Mortar
H	Scattered Hearth	MS	Mortar Seat
R	Rock	TH	Tabular Hearth

FIGURE 26



FEATURE MAP - AREA B

One refuse pit is present in the northwest corner, immediately downslope of a localized hearth. This pit is only stratigraphically evident 45 cm below surface and is capped by a large boulder and shell lens indicating the area was reused after the pit had been filled. Materials recovered in the pit consist primarily of whole and fragmented mussel shell, broken ungulate diaphyses, a single deer scapula, and a small number of lithic flakes. Shell lenses and bone clusters are located in both the north and south sections of the area, but are missing except for individual shell occurences in the mid-section. One other feature, the milling stone and an adjacent "seat", is located in the extreme southwest corner of the area (Figure 26).

Projectile point distributions are of two types, clustered and scattered, and vary according to classificatory subgroups. Leaf shaped, corner notched and basally notched forms have a scattered distribution across the area. Scattered patterning may indicate that these tools were deposited as a result of random loss. Alternatively, they may have been deposited as a result of breakage during manufacture or discarded after use. Contracting and rectangular stemmed points occur close to bone clusters in the western half of the area and around the outer limits of features in the southern half. Rectangular stemmed points cluster more to the northwest quadrant. Small side notched points display the most compact cluster, grouping in and around shell clusters in the south to southeast quadrant and near the milling stone. Small triangular points occur immediately west of this cluster, also near the milling stone. These point clusters may indicate activities closely associated with nearby features, in particular the association of stemmed points with bone clusters.

Small side notched points are clustered in the southeast quadrant of this area, limited horizontally and vertically. They are restricted to the uppermost 18 cm of cultural deposit. It is notable that small side notched points form the majority of narrow necked or arrow points in this sample. Two small corner notched points are the only narrow necked exceptions. The unique clustering of these points in both axes suggest they are an association that is not fortuitous. They occur in no other quadrant of the area, whereas broad necked or dart points occur throughout. Two interpretations come to mind, the first is that these points represent a separate occupation of this area. The second is that these points do not represent a separate occupation but are indicative of a weapons system distinct from that of the other points. The suggestion is that arrow points were maintained separately from dart points, or that this cluster of arrow points represents a single loss of a number of these tools. Regardless of their mode of deposition, the occurence of arrow points and dart points in the same deposit indicates the presence of two weapons systems, bow and arrow and spear thrower, during this time period.

Projectile point tips appear in the central area, and point bases occur in the central to southern half of the area. This pattern agrees with the distribution of all projectile points as a group which generally cluster in the central to southern portion of the area. This indicates that deposition may be a result of activities associated with the manufacture of weapons, or as a result of processing and butchering game.

Cores of both types occur in this central to southern area, as well as all types of flakes regardless of raw material and modification. Small formed tools such as scrapers, perforators and drills share a similar distribution with scrapers clustering southeast to southwest. Perforators occur in the southeast section only. Formed bifaces other than projectile points occur in central sections, with proximal and distal fragments in the central to northern half. Tabular scraper-knives occur only south of this central section. All faunal remains are distributed in the same central to southern sections of this area as are the majority of cultural materials, the only exception being turtle carapace fragments which occur in the southeast section. These patterns indicate that more activities leading to cultural deposition took place in the mid and southern section of the excavation area. This area is therefore interpreted as the focus for group activities, with other areas perhaps used less frequently.

In summary, it can be demonstrated by visual analysis that most artifacts cluster south or downslope from the spall hearth and refuse pit features, with flakes and cores displaying higher frequencies in the central or non-feature area. All formed tools are found in the central to southern half, with higher frequencies in and among features in this section. The only exception are contracting stemmed and rectangular stemmed points in the centre and northwest.

Another method indicating this southward patterning of activity in this area is to examine the frequency of occurence of unretouched flakes in arbitrary analysis units 1.0 by 0.5 metres wide across the easternmost deposits of assemblage E where the highest density of flakes occured as evidenced by flake provenience maps. A one tailed runs test (Siegal 1956:52-54) is used to analyse the trend of flakes per unit. The Null hypothesis states that plus (+) and minus (-) occurences are random across the deposits. The level of significance is 0.025, N of cases, in this case the number of analytical units, is 11. Table 17 indicates the conversion of artifact frequncies to runs. The results indicate that, in all cases, the critical values of r

Table 17: Area B Runs Test, Level By Unit

Unit	Level 01	02	03	04	05	06	07	08	09	10	11	12	13
12	00	00	00	00	01	00	00	00	00	00	00	00	00
	+	-	-	-	+	-	-	-	-	-	-	-	-
11	01	00	00	00	05	00	00	00	00	00	00	00	00
	-	+	+	-	-	+	+	-	-	-	-	-	-
10	01	02	01	00	01	01	01	00	00	00	00	00	00
	-	-	+	-	+	-	-	-	-	-	-	-	-
09	01	00	02	00	04	00	00	00	00	00	00	00	00
	-	+	-	-	+	+	+	-	-	-	-	-	-
08	00	01	00	00	06	02	02	00	00	00	00	00	00
	+	+	+	+	+	+	-	+	-	-	+	-	-
07	01	03	01	01	17	04	01	02	00	00	01	00	00
	+	-	-	-	-	+	-	-	+	-	-	+	-
06	04	02	01	01	13	05	00	02	02	00	01	01	00
	-	+	+	-	-	-	+	-	-	+	-	-	+
05	04	05	04	01	07	05	01	00	00	01	00	00	01
	+	-	+	-	+	-	-	-	+	-	-	+	-
04	09	00	07	01	10	01	01	00	02	01	00	02	00
	-	-	-	+	-	+	+	-	-	-	-	-	-
03	03	00	06	02	03	03	02	00	00	01	00	00	00
	-	+	-	-	-	-	-	+	+	-	-	-	-
02	00	02	02	02	03	01	01	04	02	00	00	00	00
	-	+	-	+	+	-	+	-	+	-	-	-	-
01	00	03	01	03	05	01	02	01	03	00	00	00	00
+	4	6	5	3	6	5	5	2	4	1	1	2	1
-	7	5	6	8	5	6	6	9	7	10	10	9	10
r	6	8	7	6	7	7	10	5	6	3	3	5	3
rt	2	3	3	2	3	3	3	-	2	-	-	-	-

rt is less than r, therefore Ho rejected. $p = 0.025$.

were less than the observed values. Therefore the Null hypothesis is rejected, indicating nonrandom run occurences. Nonrandom runs are interpreted to be the result of preferential selection then, of the southern section of assemblage B for activity.

It can be seen that the area with most materials is the centre to south half of the area. This area is interpreted as showing a mixture of maintenance and extractive tasks from which it is difficult to separate particular activity areas. However, assemblage B features indicate general kinds of activities. Hearths serve not only as places to prepare food but also as foci for social interaction and work as evidenced by formed tools in association. The refuse pit indicates a possible storage feature converted to a refuse dump, with shell and bone clusters indicating primary refuse deposits. Certain features such as the milling stone and seat are indicative of one mode of food preparation.

Objective statements concerning activities associated with particular artifacts are less easy to make. Higher frequencies of flakes and cores occur in locations intermediate between hearths and refuse areas. This pattern suggests an open or common work space for activities which require more room to complete than is available near a hearth. The scattered pattern of faunal remains in the central to south section, along with clusters of smashed and heavily fragmented ungulate bones suggest extractive tasks relating to final dismemberment of game.

In conclusion, it can be said that the distribution of artifacts and related faunal remains in this area visually indicate that a number of related activities were carried out which cluster in the downslope, flatter section of this portion of the site.

6.5. Statistical Analysis of Activity Areas.

Two statistical tests were implemented in order to test the artifact patterns discussed above. These were; (1) multi-dimensional cluster and scaling, and (2) principle components analysis. Each assemblage was condensed into artifact class raw frequency counts per one metre square analysis unit. This unit size was chosen in order to increase sample size as over 90% of cultural material proveniences were recorded to within one metre quadrants. A distance coefficient similarity matrix was then calculated. The distance coefficient, or average taxonomic distance, is calculated as the square root of the average squared difference between two variables (Sokal and Sneath 1963).

With this distance matrix calculated, it is possible to examine statistical relationships between artifact classes per analysis unit by multidimensional cluster and scaling. This routing (Kruskal 1964) fits the distance matrix data to an ideal monotone configuration, with goodness of fit measured by a calculated value referred to as Stress. The best derived configuration is one which displays a minimum Stress value.

The assemblage A and B distance matrices were calculated and plotted using a series of NTSYS subprograms (Rohlf <u>et</u> <u>al</u>. 1974) in order to display the results such that N points are represented in a K-dimensional space, based upon the observed distances between objects in a P-dimensional space. Final Stress values and number of iterations were output by an NTSYS subprogram. Stress values ranged from fair to excellent, with better Stress achieved with number of dimensions calculated.

The maximum number of dimensions calculated for both assemblages was 6, with approximately 80% of the variation accounted for by dimension 5. In order to determine which artifact classes were represented by each dimension Pearson's rank-order correlation coefficient was calculated from the resultant matrix. Excavation units were then plotted in relation to dimensional loading factors.

In the second test a similar method using the distance matrix was employed, except that a principle components analysis was calculated. A series of NTSYS subprograms were employed transforming the distance matrix association coefficients into a scalar product and ouputting results in a manner similar to that of the multi-dimensional plots. As in multi-dimensional analysis, the artifact classes are determined by calculation of Spearman's rank-order coefficient from factor scores. In this case approximately 90% of the variation is accounted for from the first five factors.

Comparison of results obtained from these two statistical procedures indicated that principle components analysis yielded better results with regard to factors responsible for variation than did multidimensional cluster and scaling. Both programs achieve similar results by indicating that most variation is attributable to artifact frequency per class, followed by other variables. Table 18 documents factor scores calculated for each assemblage. Examination of the spatial distributions by one metre squares of those variables for which high loadings are achieved, either positive or negative, yield less discrete patterns than those which are visually apparent in two dimensional artifact distribution maps as present in Chapter 7.2 and 7.3.

The necessary collapsing of the data field into fewer

Table 18: Factor Scores.

Spearman's Rho from factor scores: Assemblage A.

Factor:	1	2	3	4	5	Ef(2)
Variable:						
All points	0.44	0.67	0.15	-0.45	0.37	1.00
Point tips	0.05	0.40	-0.42	-0.22	-0.60	0.73
Point bases	coefficient not calculated					
Formed bifaces	0.13	0.17	0.08	0.03	-0.19	0.09
Unformed bifaces	0.36	-0.46	-0.46	-0.36	-0.36	0.81
Retouched/Utilized Flakes	0.24	0.44	0.11	0.36	-0.43	0.57
Unretouched Flakes	0.96	0.05	-0.70	0.35	0.19	1.59
						4.79

Spearman's Rho from factor scores: Assemblage B.

Factor:	1	2	3	4	5	Ef(2)
Variable:						
Leaf	-0.13	0.19	0.48	0.46	0.72	1.01
Broad Notched	-0.23	0.21	-0.18	0.36	0.19	0.28
Narrow Notched	coefficient not calculated					
Pt. tips	-0.44	0.42	-0.20	0.02	-0.18	0.44
Pt. bases	-0.60	-0.08	-0.38	-0.33	0.09	0.63
Formed bifaces	coefficient not calculated					
Unformed bifaces	-0.04	0.47	-0.30	-0.11	0.44	0.51
Retouch/Utilized Flakes	-0.81	0.70	0.70	-0.20	0.63	2.07
Unretouched Flakes	-0.68	0.54	0.08	-0.12	0.46	0.98
						5.92

artifact classes yielded less information because of the relatively low number of artifacts recovered in the site. For example, Factor 3 of assemblage B yields high positive loadings on two variables - leaf shaped points and retouched/utilized flakes. When excavation units with high loadings for this factor are examined as indicated by plotted output vectors, the units displayed a spatial patterning similar to, but not identical to that observed by mapping proveniences of leaf shaped points alone. This is due to high loading on more than one variable in this factor. In addition, the fact that the artifact field is collapsed in order for the program to run, obscures differences which are otherwise readily apparent in the strictly typological artifact distribution maps.

The best that can be said for both statistical procedures is that they do not provide fine enough control for spatial analysis in sites containing as few diagnostic artifacts as are present in the McCall site. The evidence presented above indicates that the technique does work, but larger numbers of artifacts of every type are needed in order to assess otherwise intuitively defined clusters.

6.6. Summary.

The above data indicate that excavation areas A and B are representative of spatially discrete occupations or activity areas. Evidence is mainly in the form of observed differences in relative density of cultural material. The question then arises as to whether the materials from these two foci are temporally, as well as spatially, discrete occupations. Table 12 indicates that area B is numerically better represented over area A by a factor of 3.8 to 1.0. Since area B is better represented it can be used as a reference against which area A materials are compared.

From Table 12 it can be seen that the artifact assemblages differ in a number of ways. Excavation area B exhibits projectile points types 1 through 6, two pecked and ground stone artifacts (a milling stone and maul), all recovered red ochre, single occurences of stone and bone beads, as well as the single edge-ground pictograph cobble. Area A, on the other hand, lacks projectile point types 3 through 6, complete bifaces of any kind, red ochre, and pecked and ground stone artifacts. All other artifacts are similar to those of area B with the exception of a single atypical specimen of tailed scraper-graver. As well, there is a discrepancy in the number and type of features present in each area. Area B is represented by shell concentrations, hearths, bone clusters, and a pit feature whereas area A is represented by a large scatter of fire cracked rock and some small shell clusters in its eastern section. This relative lack of features may be a function of sampling design as density of fire cracked rock, shell, and unretouched flakes rise to the east of these units. However, the relative lack of features and lower frequencies of artifacts in this area support the hypothesis that it was a less intensively utilized area of the site.

Material culture differences in a few artifact classes, particularly projectile points, indicate that the two excavations represent different periods of occupation. The following section examines the known temporal relationship of projectile point and other time sensitive artifacts in the southern Plateau, followed by a description of their known distribution from sites in the Okanagan valley.

Chapter 7: Temporal Control.

7.1. Plateau Culture Sequence Description.

A more detailed outline of these sequences is presented in Appendix 1. The examination of generalized plateau culture sequences is considered here from the point of view that the two excavation areas in the McCall site represent discrete occupations. As such, each can be compared to a general Plateau projectile point seriation to establish relative dates by typological cross-dating.

Sources for the following description are as follows:

(1) The lower Fraser Canyon area (Borden 1968),

(2) The upper Fraser Valley region (Hanson 1973),

(3) The Lochnore-Nesikep locality of the Fraser River (Sanger 1970),

(4) The Lillocet vicinity (Stryd 1973a,b),

(5) The Kamloops locality (Wilson 1977),

(6) The Cariboo-Chilcotin (Donahue 1975, Fladmark 1974 and Montgomery 1978),

(7) The Nicola valley (Wyatt 1972),

(8) The Arrow Lakes (Turnbull 1977),

(9) The Kootenay valley (Bussey 1977),

(10) The Kettle Falls locality in Washington (Chance _et al_. 1977),

(11) The Yakima valley (Warren 1968),

(12) The Middle Columbia River region (Holmes 1966 and Nelson 1969),

(13) The Snake River valley (Leonhardy and Rice 1970, Brauner 1976 and Yent 1976),

(14) The Portland River Basin in Oregon (Pettigrew 1977).

In general, both the Columbia and Fraser Plateau regions exhibit a general trend in projectile point seriation. Starting ca 3000 years B.P. large leaf-shaped, contracting and rectangular stemmed types gradually became replaced by large, wide necked, expanding stemmed, barbed corner-notched and barbed basally notched points. Wide necked side notched points also occur. All wide necked forms diminish in size until by ca 2000 years B.P. there is a mixture of wide necked and narrow necked points, primarily of unbarbed or barbed, corner notched and basally notched forms.

After ca 2000 years B.P. and continuing to the historic period, wide necked, notched forms are replaced by increasing frequencies of narrow necked, barbed, corner notched and basally notched points. Small side notched points are generally present by ca 1800 to 1500 years B.P. In both Plateau areas these dominate all late prehistoric occupations, that is, after ca 500-1000 years B.P., comprising the majority of points recovered in the Fraser Plateau. In the Columbia Plateau, small narrow necked, barbed corner and barbed basally notched points tend to occur in frequencies equal to the small side notched points until ca 500 years B.P. when small side notched points occur in greater frequencies.

Previous researchers in the Fraser and Columbia Plateaus have drawn a functional distinction between wide necked and narrow necked projectile points. Neck width is related to hafting methods as a function of shaft diameter. Wide necked projectiles are equated with spear thrown projectiles, usually referred to as dart points. Dart point neck widths include a range of measurements, but a minimum of ca 1.0 cm indicates this type of projectile. Projectile point neck maximum width ranges less than 1.0 cm are equated with arrow points (Sanger 1970:107, Corliss 1972:12, Stryd 1973a:99, Wilson 1977:110, Pettigrew 1977:38). As the McCall site projectile point sample reflects this bimodal neck width range I will conform with this functional interpretation.

The microblade industry in both Plateaus tends to disappear or greatly diminish in frequency from the archaeological record by ca 2400 years B.P. (Sanger 1970, Stryd 1973a, Donahue 1975, Chance *et al*. 1977, and Wilson 1977). The relationship of this to the Okanagan valley sequence is discussed later.

Another artifact class which may serve as a temporally diagnostic indicator is the tailed scraper or scraper-graver tool. Fladmark (1978) indicates this artifact type is a possible horizon marker in the Intermontane West. He found that these artifacts date ca 3500-1200 years B.P. from the Fraser canyon, lower Fraser, Lochnore-Nesikep locality, Lillooet vicinity, and at Punchaw Lake in the Fraser Plateau. In the Okanagan valley and Columbia Plateau they are found in similarly dated contexts. They are also found in Arrow Lakes assemblages at this time period.

From the above general description, it can be stated that the archaeological materials in the McCall site generally conform to materials dating as far back as 3000 years B.P. When the microblade industry is considered the McCall site assemblages could be typologically cross-dated to non-microblade sites from ca 2400 years B.P. Lack of microblades, however, does not automatically restrict an assemblage to a time period of less than 2400 years as non-microblade assemblages from both Plateaus date earlier than this time range.

7.2. Plateau Relationships to McCall Site Assemblages.

The placement of the McCall site assemblages relative in time to generalized Plateau projectile point and microblade seriations, outlined above, suggests the following:

(1) Assemblage A, primarily distinguished from assemblage B in that it contains only leaf-shaped and contracting stemmed projectile points are similar to those present in other Plateau assemblages by at least 3000 years B.P., particularly with respect to Warren's (1968) Selah Springs Pattern materials. Other Plateau sites north and south of the Okanagan valley exhibit more varied point styles such as barbed points with expanding stems and wide neck widths however, indicating differences between assemblage A and other Plateau sites commencing ca 3000 years B.P. As well, lack of a microblade industry suggests placement of this assemblage not earlier than ca 2400 years B.P. based on the disappearance of microblades in other Plateau areas.

(2) Assemblage B is, in part, consistent with data from other Plateau sites dating prior to 2000 years B.P., with leaf-shaped, stemmed and barbed projectile points (types 1 to 6). The barbed and notched types exhibit wide neck widths and expanding stems. Here too, lack of a microblade industry suggests a maximum date of ca 2400 years B.P. However, narrow necked, notched points date from as early as ca 1800-2000 years

B.P., indicating a date centering about 2000 years B.P. as a reasonable maximum age.

7.3. The Okanagan Culture Sequence.

Grabert (1970) proposed a series of four continuous phases as a chronological model of culture process for the Okanagan valley. The following is a summary of the sequence:

The Okanogan phase, dating from the establishment of a post-glacial temperature regime, persists to perhaps 6000 years B.P. It is characterized by small assemblages of leaf shaped projectile points, large ovate blanks, and large domed and ridged "scraper-knives". The most common lithic material is basalt. Faunal remains are virtually nonexistent, consisting only of small freshwater mussel fragments. The relative paucity of cultural material is most probably a function of poor site preservation, as sites of this time period are located at higher elevations on weathered till and cemented-leached soil horizons.

The following Indian Dan phase, ca 6000-3000 years B.P., is characterized only by open and rockshelter sites lacking evidence of habitation features. Projectile points are more varied than in the Okanogan phase, including large barbed and shouldered, basal notched and stemmed forms, as well as smaller leaf shaped types. Evidence for milling stones is scant but present, with pestles indicating food grinding and processing. The pit oven is present in at least one site indicating that this technique of food preparation was also known. Faunal remains consist of large ungulate bone, fish, and freshwater mussels.

The Chilliwist phase, ca 3000-900 years B.P., is characterized by the earliest known permanent habitation structures in the Okanagan valley. These tend to be circular, deep, steep walled pithouses. Larger leaf shaped, barbed basal notched, and stemmed projectile points continue, along with large barbed corner notched forms in Wells Reservoir sites. Sites in the North Okanagan display fewer barbed forms, but greater frequencies of side notched types. Grabert (1974:72) states that basally notched and barbed forms are basic elements of lithic assemblages throughout the Okanagan valley at this time, but are replaced in the North Okanagan valley by various unbarbed, stemmed forms during or before ca 3000-2000 years B.P. A microblade industry is evident in some components of ca 2500 years B.P. and earlier. It is during the Chilliwist phase that bone artifacts become better represented in the archaeological record, possibly the result of better preservation of these materials.

The Chilliwist phase is also characterized by the introduction of the ground stone adze, indicating contacts with nephrite sources in the Fraser Canyon. Faunal remains are primarily those of large land ungulates. Fish remains, tentatively identified by Grabert (1968) as salmon, are abundant in some assemblages, as are freshwater mussels. Throughout this phase lithic material is increasingly characterized by non-basalt cryptocrystalline silicates.

The separation between the Chilliwist phase and the following Cassimer Bar phase has not been rigourously defined, due to a lack of archaeological data from ca 2000 -1000 years B.P. Available evidence, or rather the lack of it, does not preclude the advent of diagnostic Cassimer Bar phase traits during this 1000 year hiatus.

The Cassimer Bar phase, ca 900-100 years B.P., is characterized by permanent habitation features in village settlements. Shallow, saucer shaped housepit and rectangular mat lodge depressions supercede the earlier, deeper housepit forms. Projectile points are reduced in size and include stemmed, barbed corner notched, and small side notched forms. Small, barbed, basal notched and side notched forms predominate in northern Okanagan assemblages, whereas small corner notched forms are more prevalent in the south Okanagan, again reflecting a basic difference in lithic assemblages between north and south, first noted in the Chilliwist phase. Milling stones are also present, and infrequent zoomorphic stone and bone carvings occur, with incised geometric designs. The composite harpoon is present in the south Okanogan area. Trade in various nonlocal objects, such as marine shells, nephrite adzes, and hematite continues, and large ungulate remains dominate faunal assemblages, along with an increasing abundance of fish and freshwater molluscs.

Grabert (1970) states that the culture sequence for the Okanagan valley, outlined above, indicates an ongoing cultural accumulative process characterized by a lack of rapid innovation. Continuity in form in the material culture inventory indicates a rather stable hunting, gathering and fishing subsistence base. Although fishing apparatus is scant in the archaeological record, an increasing abundance of archaeologically preserved piscean and molluscan remains suggests an increasing exploitation of riverine resources through time.

Grabert (1970) further suggests that the few observable differences through time in material culture between the north and south Okanagan valleys can be attributed to more mesic northern stability during the Altithermal, which allowed for a continuation of traits similar to those of the middle Fraser region. The more stable grassland ecozone than the southern

Columbia plateau helped maintain a sufficient subsistence base in the south Okanogan region (Grabert 1970:278). This cultural ecologic gradient is assumed to be a reflection of Okanagan physiography and decreasing relief and precipitation from north to south.

7.4. Assemblage Comparison to other Okanagan Sites.

A review of Grabert's (1968,1974) site reports indicated only three sites with assemblages similar to those in the McCall site. These all date within the Chilliwist phase and are: (1) the Indian Dan site (45OK58), (2) the Hymer site (45OK78) and (3) the Marron Valley site (DiQw 2). Both the Indian Dan and Hymer sites are located in the Wells Reservoir of Washington, whereas the Marron Valley site is in the Canadian Okanagan.

The Indian Dan site (45OK58) contained two occupations; one a late prehistoric housepit occupation (45OK58B) and the other an open occupation area (45OK58A). Two zones were recognized for the open area; zones 2 and 3, in which were similar diagnostic projectile points. These included leaf-shaped, contracting stem and rectangular stem forms and broad necked, shouldered and barbed corner notched points with expanding stems. Zone 3 was radiometrically dated to 3020$\pm$150 years B.P. (I2033) on a charcoal sample taken from a small hearth feature. Zone 2 was undated, but the similar range of materials suggest a similar time depth.

In addition to diagnostic projectile points, two microblade cores and two microblades were recovered. One core derived from zone 2, the other was lacking provenience. Two microblades were recovered from zone 3. Faunal remains consisted primarily of dense clusters of freshwater mussel shells, broken ungulate bones and fish vertebrae.

The Hymer site (45OK78) was a housepit site in which four housepit features were tested in addition to interhousepit areas. Diagnostic artifacts were similar to those from the Indian Dan site, including wide necked, barbed, basal notched points with expanding stems. A charcoal sample from a hearth in housepit No.4 was estimated at 2730±160 years B.P. (I2032). This housepit was the deepest excavated. No microblades or cores were found.

The Marron Valley site (DiQw 2) is situated closer to the McCall site than the sites in the Wells Reservoir. Located on a low pass between the Similkameen valley and Skaha lake, the Marron Valley site consisted of a single housepit depression feature and three to four acres of open site area. Cryptocrystalline lithic sources are found within two miles of the site and deer, elk, and mountain sheep have been observed in this portion of the valley (Grabert 1974:28).

The excavated housepit was found to include leaf-shaped and contracting stemmed projectile points identical to types from the Indian Dan and Hymer sites but was wholly lacking the barbed, corner notched forms also characteristic of these Wells Reservoir sites. A charcoal date of 2130±130 years B.P. (NMC247) was obtained from a lower level hearth and living floor zone. A few microblades were recovered from the upper zone of the deposit but Grabert (1974:36) indicated that they derived from slump deposits originating outside of the depression feature and were not associated with the living floor.

The surrounding open site area was tested and found to contain leaf-shaped, contracting stem, rectangular stem, and weakly shouldered stemmed point types (Grabert 1974:37). Five microblade cores and 67 microblades were also recovered. A single bone collagen date of 2500±100 years B.P. (Gak2335) was obtained, providing a provisional date for this microblade component. Grabert (1974) attributes this open site area to an earlier seasonal workshop and hunting occupation, whereas the housepit occupation is dated ca 400 years later. In both cases, deer or other large ungulate provided the dominant faunal remains.

These three sites are the only radiometrically dated sites comparable to the McCall site assemblages. They can be separated into two diagnostic types; (1) those with a microblade technology present and (2) those without. All three sites date between 3000 and 2000 years B.P.

Both the Hymer site housepit and the Indian Dan site assemblages contain barbed and notched points dating earlier than 2400 years B.P. These types are not found in the only similarly dated north Okanagan assemblage, the open area of DiQw 2. This is indicative of a dichotomy between the north and south Okanagan in sites of this nature. Similarly, the non-microblade assemblage at the Marron Valley site does not contain barbed forms or notched forms but exhibits similar leaf-shaped and contracting stemmed forms as those found at the earlier dated Wells Reservoir sites. This dichotomy in projectile point styles stimulated Grabert (1974) to observe that a lack of notched and barbed point forms is characteristic of north Okanagan assemblages at this time, that is, prior to 2000 years B.P.

In placing the McCall site assemblages in time relative to the above, I suggest that assemblage A most closely resembles that of the non-microblade housepit assemblage from the Marron Valley site. Projectile point forms and sizes are identical, based on Grabert's (1974:36) photograph of the site materials.

Given the lack of notched projectile point forms in the north and the absence of microblades, assemblage B also resembles that of the Hymer site occupation. This gives a possible time range for assemblage B of between 2100-2700 years B.P. It is interesting to note the difference in the types of Okanagan site and their relationship to microblade bearing assemblages. To date, the sites which contain microblades and cores are non-housepit feature sites, whereas housepit sites dating from the same or similar time period do not contain these artifacts. This suggests that non-pithouse activity areas or seasonality of occupation may be a factor in microblade use, at least in the Okanagan valley. Sites at this time are few however, and this hypothesis cannot be rigourously tested with an overall sample of five sites alone.

Assemblage B does not closely resemble any of the above assemblages, except that it does possess barbed and notched points as well as leaf shaped or stemmed forms and lacks a microblade industry. In addition, assemblage B is represented by small side notched points which do not occur elsewhere in dated Okanagan assemblages until ca 1000 years B.P. This may be misleading however, as sites characteristic of the time period 2000-1000 years B.P. have yet to be reported.

The presence of the small side notched projectile points in assemblage B could be construed as evidence that more than one occupation is represented. It has already been stated that this type of artifact is now known to occur as early as 1800 years B.P. in the Interior Plateau of B.C. Small corner notched and basally notched points with narrow neck widths occur as early as 2000 years B.P. elsewhere in the Plateaus. As well, these forms are more prevalent than small side notched points in Columbia Plateau assemblages of this time (Appendix 1), but still represent arrow points.

The small side notched points from assemblage B are limited stratigraphically to the uppermost 18 cm of cultural deposit. However, since no other single artifact class or feature shares a similar distribution then they cannot be easily dissociated from the majority of cultural materials from this area. The only alternative to associating these artifacts with assemblage B is to generate an hypothesis that they formed a surface component along with a light scatter of cultural materials, but no definable features, which were distributed into the first 18 cm of deposit by plowing. The effect of disc plowing on small numbers of spatially limited artifacts in a slightly sloping sandy loam matrix is not known, nor is the degree to which the direction in which the plow was used, nor the speed of the tractor known on the redistribution of artifacts. Given that no other cultural materials display the limited spatial patterning of this one type, I therefore include them with the majority of materials from assemblage B.

7.5. Summary.

Typological comparisons between the McCall site and other dated Okanagan assemblages can be summarized as follows. In relation to the generalized Plateau culture sequence, assemblage A could date from ca 2700-2400 years B.P. based on similarities with Wells Reservoir sites and the relatively more recent Marron Valley site. Whether assemblage A can be considered typical of north Okanagan sites of this time period cannot be stated with a great deal of confidence as the only comparable north Okanagan site to date is the Marron Valley site. This site is atypical when compared to Wells Reservoir sites due to a lack of barbed and notched point types.

Assemblage B could date from 1800 to 2000 years B.P. based upon the earliest introduction of small arrow points in other Plateau areas. However, the presence of larger notched points with expanding stems could place it slightly earlier in time.

The assemblage B mixture of wide and narrow necked point styles could then be indicative of a time span centred about 2000 years B.P. since a dichotomy in projectile point styles exists from the south to north Okanagan. It is also possible that this mixture of notched and barbed types with earlier leaf-shaped and stemmed points reflects a merging of a northern stemmed point tradition, as typified by the Marron Valley assemblages, with a southern notched point tradition, as typified by the Wells Reservoir assemblages.

7.6. Absolute Dating.

From the above discussion it can be seen that the two McCall site assemblages date sometime between 2700 and 1800 years B.P. based upon typological similarities with sites in both Plateaus as well as with sites in the Okanagan valley. In order to provide finer temporal control to the data, three radiocarbon samples were submitted to the Harwell Laboratories in England for analysis.

A single bone collagen date was obtained from an atlas and axis vertebrae of a white tail deer (<u>Odocoileus virginianus</u>). This material originated in assemblage B deposits at 25-35 cm below surface, well within the vertical range of most cultural materials from this area. The vertebrae were part of a primary deposit of smashed and butchered axial skeletal portions of a single animal. The date achieved was 2050±80 years B.P. (Har1654). This date fits well with the typologically derived date of ca 2000 years B.P. for assemblage B outlined above.

The remaining two charcoal samples, one each from both assemblages, were run as a single sample in order to provide enough material for dating. An estimate of 790±90 years B.P. (Har1684) was the result. Since B can be typologically and radiometrically dated to ca 2000 years B.P. this would indicate (1) that assemblage A is much more recent than typology indicates, (2) that material from the sample, which was composed of scattered charcoal, contained more recent carbon from one area or another due to mixing or some other disturbance, or (3) that the collagen date from assemblage B is too old for the deposits. I do not feel that the typological evidence for assemblage A can be disregarded, nor can the validity of the collagen date be questioned. Some other factor may be responsible, including the hypothesis that a third or surface component was present on the site. The latter is a hypothesis which cannot, at this time be proven nor disproven. As such, this radiocarbon estimate is rejected.

Chapter 8: Component Definition.

8.1. Introduction.

Previous chapters dealt primarily with horizontal spatial distributions and temporal cross dating of the cultural materials recovered from the McCall site. This chapter is concerned with examining vertical relationships of these distributions in order to determine if each occupation area is single or multi-component in nature. The results of this analysis are then used in order to define the number of occupations as components of the Chilliwist phase.

When compared to analogous Plateau and Okanagan valley assemblages, the McCall site artifact and feature inventory is indicative of at least two occupations typologically dated within the time frame of 1800-2700 years B.P. The first portion of this discussion involves the refinement of some previously mentioned problems, notably as regards the following hypotheses:

(1) That assemblage A represents a separate occupation dating between 2100-2700 years B.P.

(2) That assemblage B represents a separate occupation dating between 1800-2100 years B.P.

(3) That assemblage B represents a period of multiple occupations.

The last hypothesis is based upon the presence of small side notched projectile points which are known to occur by ca 1800 years B.P. in the Interior Plateau and the fact that they occur in close proximity to a radiocarbon date of 2050±80 years B.P.

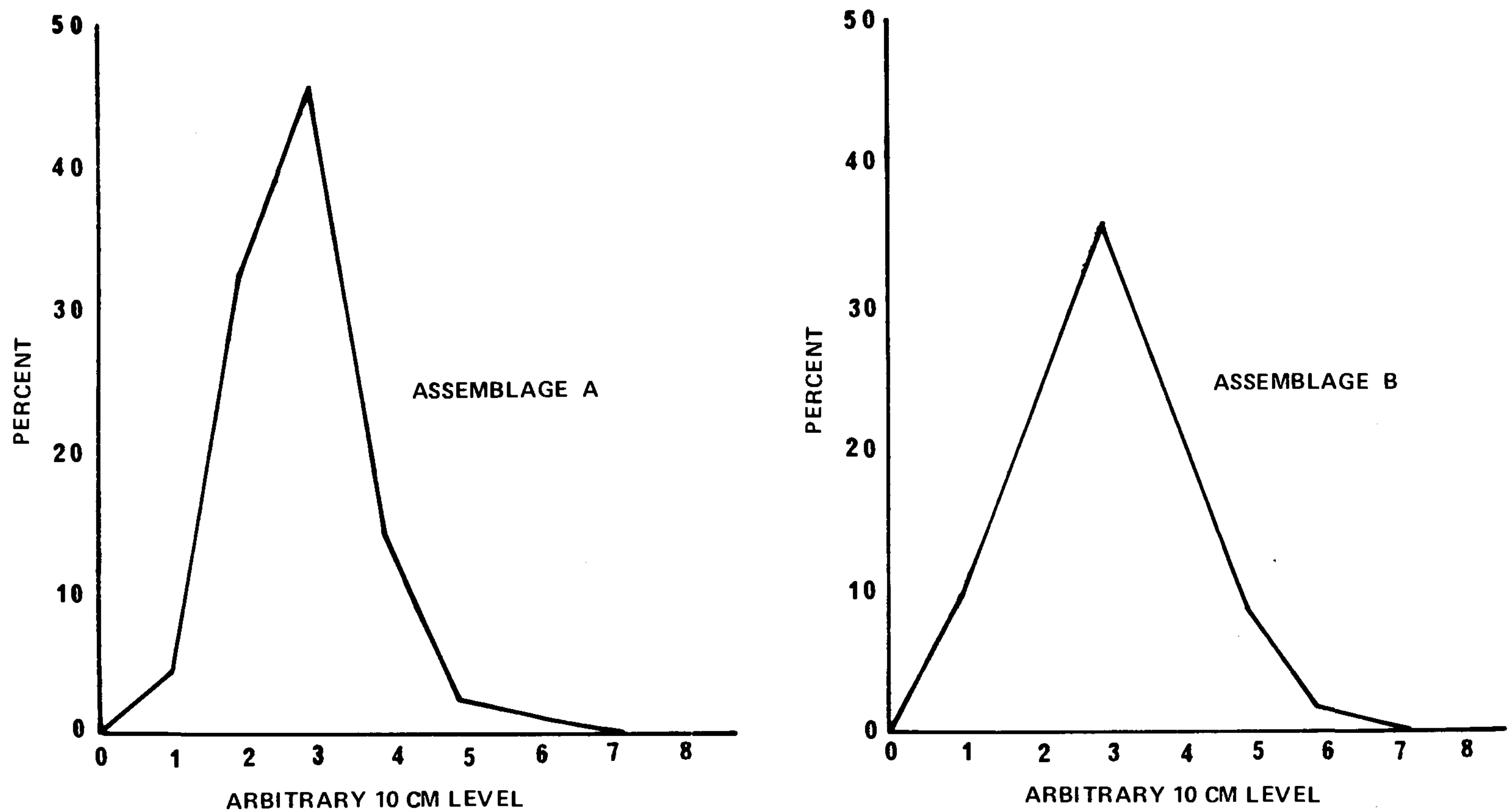
Vertical relationships between the following data are examined: fire cracked rock, features, unretouched flakes, projectile points, other formed artifacts, and broken artifact distributions.

8.2. Culture Material Relationships.

(1) Fire Cracked Rock Distribution.

Fire cracked rock was recovered and recorded only in raw counts by occurence per arbitrary 10 cm level in each excavation unit. However, graphic representation of these frequency distributions per arbitrary level could still be charted. This is presented in Figure 27. Frequency curves from both assemblages are unimodal, both peaking at approximately the same level corresponding to ca 30 cm below surface. The majority of fire cracked rock occurs between 20 and 40 cm below surface in

FIGURE 27 FIRE CRACKED ROCK: VERTICAL DISTRIBUTION PER ARBITRARY 10 CM LEVEL



both areas as well. It is felt that the unimodal nature of the curves is indicative of a singular mode of deposition, otherwise multiple peaks in the curve could be expected if one assumes that successive depositions of fire cracked rock were undisturbed by later activities.

These data alone cannot conclusively show that single depositional events account for the vertical distribution of this material. However, an alternative line of investigation supports a singular deposition period. This evidence is in the form of the horizontal pattern of fire cracked rock, taken from floor level plans, across arbitrary levels of the excavations. Individual pieces of rock, when plotted, reveal clustering. When floor plans from the upper 20 cm of cultural deposit are compared with the lower 20- 40 cm the patterning is the same. That is, the superior clusters display the same horizontal spatial configuration as the inferior clusters. This type of pattern is present in both assemblages, thus indicating either a single mode of deposition, or multiple depositions resulting from reuse of the same areas.

(2) Feature Distribution.

In assemblage A there were only two cultural features besides fire cracked rock concentrations in evidence. These were both freshwater mussel shell concentrations. When these were plotted against a vertical scale, both clusters (features No.2 and 3) extended across vertical levels in a pattern similar to that observed for fire cracked rock in that they were not confined solely to any single level. Neither feature was vertically isolated from the majority of cultural material in this area.

In assemblage B, all but two features shared vertical distributions similar to that of the fire cracked rock. The two exceptions were both shell clusters (features No.14 and 15). Both were vertically limited to the first 20 cm of cultural deposit as opposed to the other features which occur primarily between 15-40 cm below surface. The presence of these shell clusters lend credence to the hypothesis that a later occupation was present in this area, although they do not share the same horizontal distribution, originating in the northernmost units of the excavation area.

(3) Unretouched Flake Distribution.

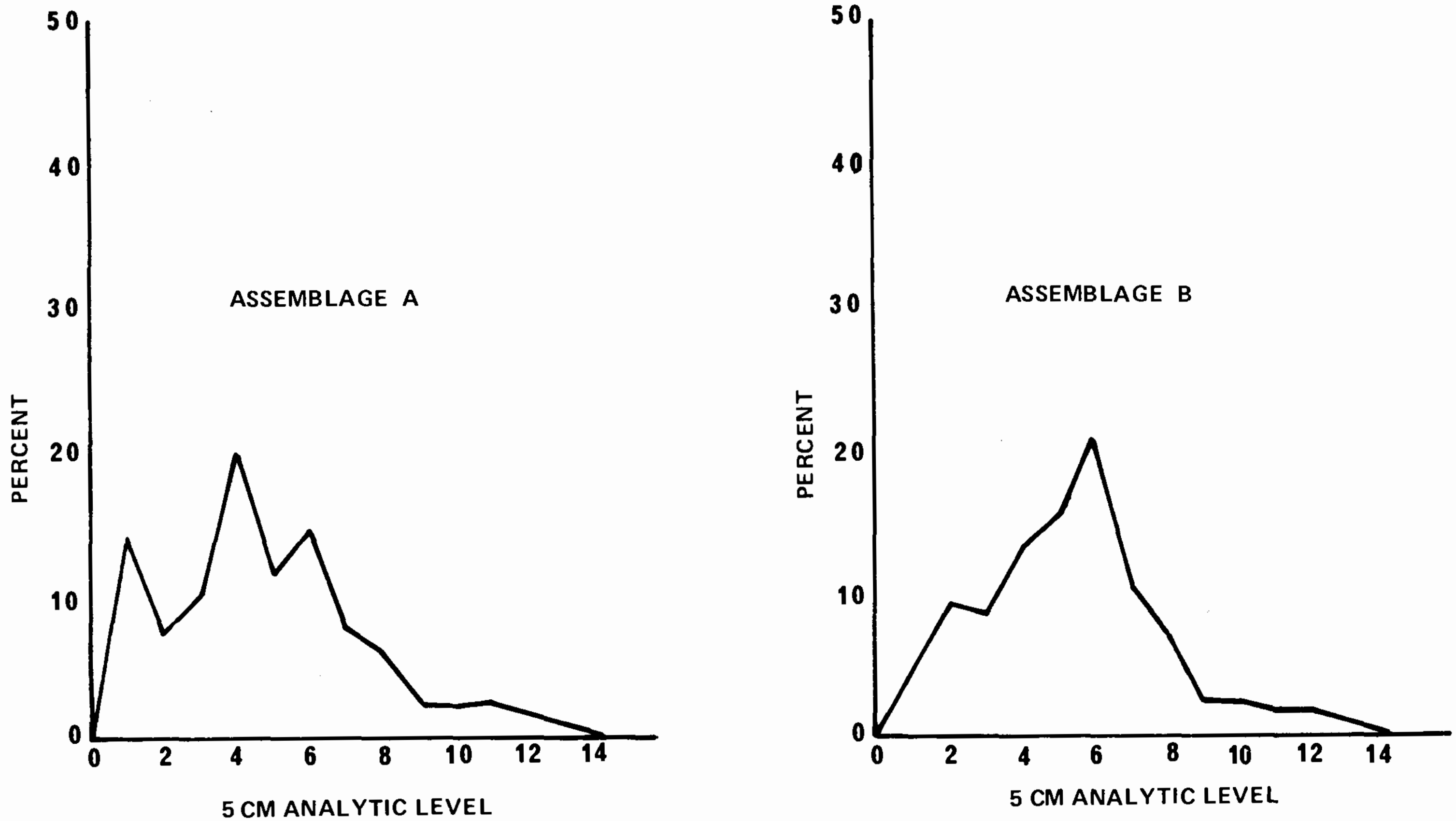
Finer stratigraphic control was kept of unretouched flakes than for fire cracked rock or features. Unretouched flakes form a large portion of the cultural material in the site and reflect activities common to both assemblages, core reduction and tool manufacture. They should therefore provide information towards answering the hypotheses in question.

Frequency counts of unretouched flakes per analysis unit were converted to graphic data for each assemblage (Figure 28). The curve for assemblage A is trimodal in nature, with the first peak ocurring in the first 10 cm of deposit, the second peak at 20 cm, and a third peak at 30 cm below surface. The curve for assemblage B, on the other hand, is less peaked and only slightly bimodal with a first small peak at 10 cm below surface, followed by a rapid rise in frequency to a maximum at 30 cm below surface.

The trimodal peaking in assemblage A could be interpreted as representing three separate depositional actions. An alternative interpretation however, could be that these peaks are the result of plowing or the fact that the depth of stratum 2, which contained some materials displaced from stratum 3, varied across this excavation area. The second alternative seems a more reasonable explanation, especially since 31% of the flakes occur in the first 15 cm of the deposit. The number rises to 51% by 20 cm below surface, to 77% by 30 cm below surface, and to 94% by 40 cm below surface.

The curve for unretouched flakes in assemblage B is not quite so contradictory in evidence, yet assemblage B is the one

FIGURE 28 UNRETOUCHED FLAKES: VERTICAL DISTRIBUTION PER 5 CM ANALYTIC LEVEL



in which a multi-peaked distribution would be expected if it were multi-component. A small percentage of flake variation is observed to occur ca 10-15 cm below surface, a depth which conforms to the plow zone. The curve then rises rapidly to its maximum peak. An interpretation that this discrepancy is attributable to plow disturbance rather than as the result of a separate occupation is indicated., particularly since 26% of all such flakes are accounted for by the first 15 cm of deposit, 30% by 20 cm, 87% by 30 cm, and 91% by 40 cm below surface. This is similar to the frequency pattern per level encountered in assemblage A.

It is necessary at this point to provide a disclaimer to the above interpretation. I state that the graphs are modal in appearance. This appears to be the case when percentages of flakes are plotted as they occur in analytical five cm levels. However, further expansion or collapsing of analytic levels alters the shape of the graph. With larger intervals the graph becomes more smooth and small peaks disappear. It may be that such peaks are not solely the result of occupation activities but rather also reflect unknown amounts of cultural disturbances notably plowing, trampling and rodent disturbances. These uncertainty factors cannot be quantified at this time.

(4) Projectile Point Distribution.

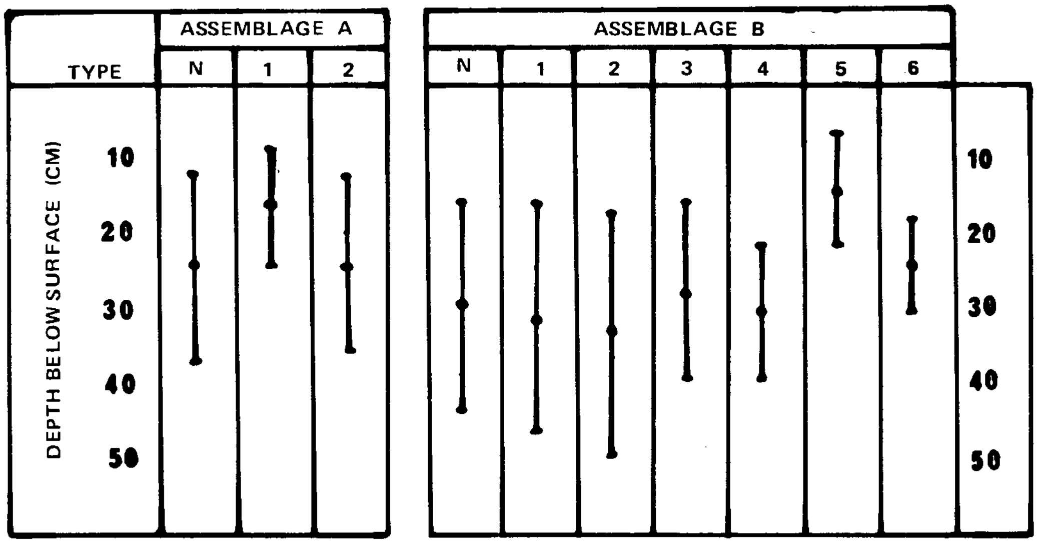
Before examination of the assemblage B projectile point sample, it is necessary to compare the stratigraphic relationship between points from both areas. Both assemblages were deposited in similar types of soil, a light sandy loam, but are of typologically different time periods. The extent of aboriginal artifact displacement due to daily occupational disturbance is an unknown factor, although some displacement can be assumed particularly in view of the cultural material present in stratum 2 but in which no features occur.

Table 19 illustrates the mean depth at which different point types occur in each assemblage. It is noted in assemblage A that point types 1 and 2 correspond closely with the mean depth of their combined sample. Vertical displacement ranges from a minimum of 10 cm to a maximum of 37 cm for this artifact class, with neither point type varying more than two cm outside this range.

A similar pattern is observed in the assemblage B points except for type 5a, the small side notched point variety. These points average 12.0 cm below surface which is at least 12.0 cm above the mean depth of the other types. On the basis of mean depth this could indicate the presence of a later component

Table 19

PROJECTILE POINT DISTRIBUTION: MEAN DEPTH BELOW SURFACE (CM)



TYPE: N 23.57 +/– 13.34
1 15.88 +/– 7,14
2 24.47 +/– 12.85

TYPE: N 29.57 +/– 13.27
1 31.33 +/– 15.36
2 33.35 +/– 15.98
3 27.11 +/– 11.82
4 30.00 +/– 8.16
5a 12.00 +/– 4.49
5b 26.33 +/– 7.77
6 24.67 +/– 5.75

5 14.87 +/– 7.73

comprised of type 5a and a smattering of other point types. However, Table 19 also indicates that the mean depth of type 5a is not outside the range of variation of the other point types, so they cannot be totally dissociated with these forms. Note that in assemblage A a similar occurence between maximum depths of types 1 and 2 also occurs, yet these two types cannot be dissociated one from the other.

(5) Other Formed Artifacts.

Tables 20 and 21 graphically represent the vertical distributions, by analytical five cm levels, of other classes of formed artifacts for both assemblages. Examination of these tables indicates that, for both assemblages, the majority of cultural materials occur between 10 and 40 cm below surface, regardless of type. Small numbers of artifacts are seen to occur below these levels, as do less than 10% of unretouched flakes, as well as infrequent bone and shell fragments. Nowhere is there evidence to suggest a sharp distinction between the amount of material in any single level, or combination of levels, versus any other combination. What these tables illustrate are patterns which are similar to those of the fire cracked rock and flake distributions, in that less cultural material is present in the first 10-15 cm of deposit, followed by the majority of materials from 15-40 cm, then by declining amounts.

Table 20 Formed Tools Per 5 cm Level: Assemblage A.

Type: Level:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
01				1						1						2		2								
02	2		1										1	1	1	1		4		1	2					
03	1		1							3		1			1			3								
04	3	3	1							5		1						5			2	1		2		
05	2	2								5		1						6			1					1
06		2	2							2			1			4		3			2	2	1	1	1	
07		1	3	1						1								1			1	2		2		
08			2														1					1		1		
09		1								1								2						1		
10										2								1								
11										1							1				1					
12																										
13		1																								
14																										

KEY:

01	Projectile point type 1	14	Preforms
02	" " type 2a	15	Drills
03	" " type 2b	16	Tabular Scraper-knives
04	" " type 2c	17	Awl-gravers
05	" " type 3	18	Scrapers
06	" " type 4	19	Perforators
07	" " type 5a	20	Tailed Scraper-gravers
08	" " type 5b	21	Bipolar Cores
09	" " type 6	22	Multi-directional Cores
10	Projectile Point Bases	23	Miscellaneous Stone Tools
11	Formed Bifaces	24	Bone Tools
12	Formed Biface Fragments	25	Antler Tools
13	Large Scrapers	26	Shell

Table 21 Formed Tools Par 5 cm Level: Assemblage B.

Type: / Level:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
01	1						2			1	1	3					2	2								
02			1		1		4			5		2	1		2	2	1	4		1			1			
03					3		3			3		2			1	2	1	4								
04		1	1	1	4	1	4	1	2	3		4		1		6	2	8	1		1	1	1	3		
05	1		3		1			1		5	4	3					1	8	1	2	2	1	3			
06	2	5	2		6	2			3	9	1	5	1		1	3	5	9	1	2		1	1	1	2	
07					1			1	1	5		3			1		1	5		1		1				
08	1	1	1		2	1				2							1	4	1	1	1					
09				1						1		1			1	1		4					1			
10	1																	2						1		
11		1								2							1	1						1		
12				1													1	1				1				
13				1	1							1					2	1		1				1		
14		1								1																

KEY:

01	Projectile point type 1	14	Preforms
02	" " type 2a	15	Drills
03	" " type 2b	16	Tabular Scraper-knives
04	" " type 2c	17	Awl-gravers
05	" " type 3	18	Scrapers
06	" " type 4	19	Perforators
07	" " type 5a	20	Tailed Scraper-gravers
08	" " type 5b	21	Bipolar Cores
09	" " type 6	22	Multi-directional Cores
10	Projectile Point Bases	23	Miscellaneous Stone Tools
11	Formed Bifaces	24	Bone Tools
12	Formed Biface Fragments	25	Antler Tools
13	Large Scrapers	26	Shell

In a pattern similar to the clustering of small side notched points in the upper 18 cm of deposit, some cultural materials cluster in the lower deposit at depths below surface greater than 40 cm. This is particularly noticeable in assemblage B where eight projectile points and 19 other formed tools occur at these depths. However, this does not provide concrete evidence of an earlier, deeper component as the overall pattern of flakes, fire cracked rock, and feature distributions do not extend to these depths. Rather, other factors such as rodent and occupational disturbance are probable vectors for their downward movement from the main cultural levels.

(6) Broken Artifacts.

Some idea of the scale of vertical artifact displacement , either as a result of occupational or rodent disturbances, can be achieved by analysis of the provenience of joined fragments of broken artifacts. Fitted pieces from both assemblages exhibited horizontal distributions ranging from a minimum of 0.5 m to a maximum dispersal of 2.0 m. These were comprised primarily of fitted core fragments. Horizontal displacements such as this are probably more the result of aboriginal cultural depositional acitivities.

Vertical displacements ranged from a minimum of 1.0 cm to a maximum of 20.0 cm in depth. In assemblage B, pieces from within the plow zone were found to fit pieces from 30-40 cm below surface (Figure 29). This indicates that some materials from the upper levels are associated with those of the lower, or main occupational levels as well. Such being the case, then it is another piece of evidence which suggests that the small side notched points cannot be readily dissociated from the majority of cultural materials in this assemblage.

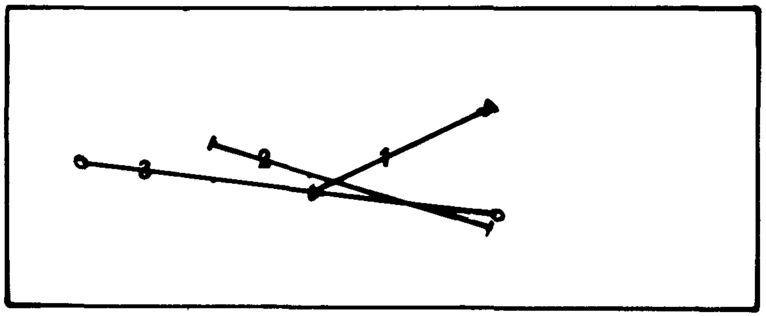
8.3. Summary.

With the exception of two shell features and the small side notched projectile point vertical distribution patterns in assemblage B, the occurence of fire cracked rock; features; as much as 90% of unretouched flakes; and almost all projectile points by 30-40 cm below surface is taken to be an indication that both assemblages represent single or discrete occupations. These separate occupations are seen to be temporally discrete and are separated by horizontal, not vertical, distances in the site. As such, an hypothesis that both areas were representative of single, but discrete, occupations is accepted. The third hypothesis, that assemblage B is represented by two or more occupations or components, is rejected on the basis of insufficient evidence.

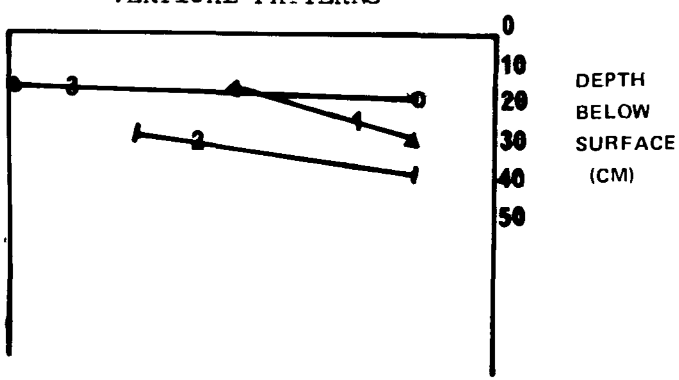
FIGURE 29 BROKEN ARTIFACT PATTERNS

ASSEMBLAGE A

HORIZONTAL PATTERNS

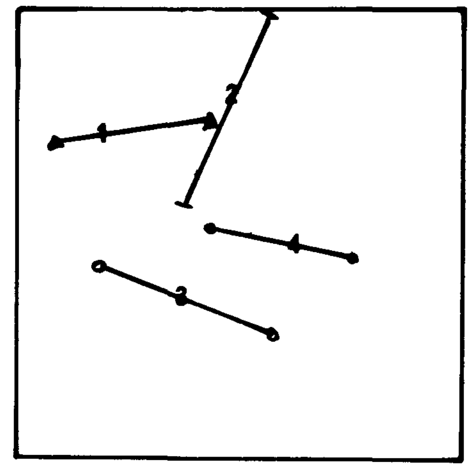


VERTICAL PATTERNS

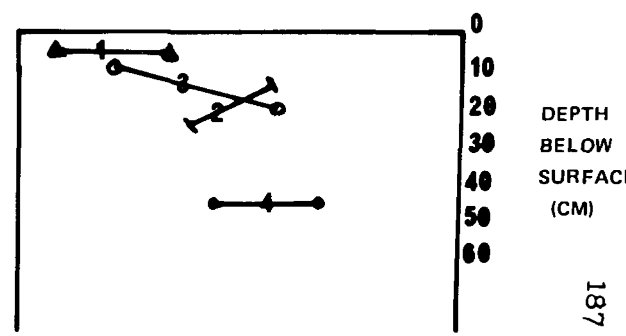


ASSEMBLAGE B

HORIZONTAL PATTERNS



VERTICAL PATTERNS



Contributing to the difficulty of analysis is the unknown vertical displacement effect on artifacts by disc plowing in the uppermost 18 cm of deposit. It is possible, but cannot be shown at this date, that disc plowing in sandy loam soils displaces cultural materials vertically. In addition, other factors such as the extent of vertical displacement by daily occupational activities and by post depositional rodent disturbance are factors which are poorly understood and cannot be controlled for at this time.

8.4. Archaeological Unit Concepts.

The preceding discussion established the two artifact assemblages to be separate occupations in the site. The two assemblages can therefore be defined as Chilliwist phase components, in that they represent temporally discrete occupations of the site. The temporal relationship of the McCall site assemblages to other assemblages in the Okanagan valley has already been established.

The phase concept has been applied in the Okanagan valley by Grabert (1968,1970,1974) to categorize variations observed in the archaeological material across time. Following Willey and Phillips (1958:22) a phase is here defined as ...

"an archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived ... spatially limited to the order of magnitude of a locality or region and chronologically limited to a relatively brief period of time."

The Chilliwist phase of the Okanagan valley (3000-1000 years B.P.) is one such unit. Comparison of the two McCall site components with other dated components in the Okanagan valley indicates that the Chilliwist phase can be divided into subphases. Subphases are defined when better temporal controls of culture historical data are obtained in any given region (Willey and Phillips 1958:24). The subphase concept is employed in this thesis to characterize temporal artifact differences observed in the McCall site materials. These artifact differences allow the subdivision of the Chilliwist phase into three subphases, each composed of diagnostic technological dissimilarities characteristic of culture change across time.

8.5. Chilliwist Subphase Definition.

Three subphases are defined, based on McCall site materials and other dated materials from the Okanagan valley. The other sites were described in the previous chapter.

Subphase I is based on evidence from three sites, the Indian Dan site, the open site area of the Marron valley site and assemblage A of the McCall site. They exhibit characteristic leaf shaped, contracting to rectangular stemmed projectile points and a microblade industry. In addition, the Indian Dan site contains wide necked, barbed, corner notched and basally notched point styles. These types do not occur in North Okanagan assemblages. The absence of barbed and notched point forms in this area of the valley may reflect regional variation as a result of sampling error, or some inherent Okanagan cultural factor favouring such styles. Regional variation in projectile point styles continue from this time through to the historic period as outlined below. Subphase I sites date ca 2400-3000 years B.P. A commencement date of ca 3000 years B.P. is based upon Grabert's (1968,1974) work in both the Wells Reservoir and Canadian Okanagan valley sites outlined previously. A terminal date of ca 2400 years is provisionally based upon an hypothesized discontinuation of microblade industries in the Okanagan valley and elsewhere in the Plateaus.

Subphase II is defined from evidence in three radiometrically dated assemblages; the Hymer site, the Marron valley housepit assemblage, and assemblage B at the McCall site. Diagnostic artifacts include leaf shaped and stemmed points similar in style to those of subphase I, but reduced in size.

Neck widths average 1.0 cm and more. Wide necked corner notched and basally notched points with expanding stems are present, but for the first time in the north Okanagan. Microblade industries are not present. Near the end of the subphase low frequencies of smaller, narrow necked side notched, corner notched and basally notched points occur, otherwise wide necked types dominate assemblages.

Comparison between north and south Okanagan sites indicates a continuation of a regional variation in point styles. Small side notched points are more frequent than small notched forms in the north Okanagan, whereas the reverse is true in the south Okanagan. Commencement of subphase II is provisionally set ca 2400 years B.P, based upon the hypothesized discontinuation of a microblade industry. A terminal date of ca 1800 years B.P. is suggested, based upon the presence of small notched points elsewhere in the Plateaus.

Subphase III is not defined on the basis of any known assemblages. It is based on an hypothesized trend of material culture change across time, providing a link between Subphase II assemblages and later Cassimer Bar phase assemblages. Earlier leaf shaped and stemmed projectile points continue to decrease in size, but become progressively less frequent. In addition, all notched point types continue, but diminish in size until narrow necked points become more frequent than wide necked forms. Small side notched points continue to represent north Okanagan areas, with small corner notched and basally notched forms representing south Okanagan areas. A commencement date of ca 1800 years B.P. follows the establishment of narrow necked points as indicated above. A terminal date of ca 900 years B.P. is based on Grabert's (1968,1970) analyses of sites which contain high frequencies of narrow necked points dating later than this time.

The following Cassimer Bar phase (900-150 years B.P.) is defined by Grabert (1968,1970,1974) and is based upon radiometrically dated assemblages from both the north and south Okanagan valley. Defining characterisitics include narrow necked projectile points among other criteria (Grabert 1974). Tailed scrapers, which Fladmark (1978) notes as no later than 1200 years B.P., do not occur.

8.6. Summary.

Three subphases (Table 22) for the Chilliwist phase of the Okanagan valley are defined. They are: Chilliwist subphase I (3000-2400 years B.P.), Chilliwist subphase II (2400-1800 years B.P.) and Chilliwist subphase III (1800-900 years B.P.). Subphase III is provisionally defined based upon reconstructed material culture trends between ca 2000-1000 years B.P. in the Okanagan valley.

Table 22. Chilliwist Phase Summary

Subphase I (3000 - 2400 years B.P.)

Deep, steep walled housepit depression features, open sites and rockshelters as habitation sites.
Various projectile point forms including stemmed and notched forms (Types 1 through 6). Neck widths average greater than 1.0 cm.
The atlatl is presumed as the major hunting weapon for which these points are arming tips.
Microblades and cores are present in some components, usually ocurring in non-housepit feature areas of sites.
A fishing industry is present, but artifacts are rare.
Woodworking tools including nephrite adze blades and ground stone hand mauls are present.
Grinding stones, indicative of food processing, are present in some components.
Small unifacially chipped stone tools, including a form of tailed scraper-graver, are present.

Subphase II (2400 - 1800 years B.P.)

Housepit depression features, open sites, and rockshelters are similar to those of Subphase I. Other types of sites dating to this period probably include pictographs and pictograph/rock-shelter complexes based on the portable pictograph from the McCall site.
Projectile point types 1 through 6 are present, but are reduced in size. Wide necked points dominate assemblages until the later part of this subphase, when narrow necked points (Types 3, 4 and 5) appear. The atlatl is the predominate hunting weapon throughout, with a bow and arrow technology introduced near the terminal date.
Microblades and cores are not found.
A fishing industry is represented by faunal remains as well as bone points and rare sinker stones.
Woodworking tools are present in some components.
Grinding stones are present.
Small formed chipped stone unifaces including tailed scraper-gravers continue.
Assemblages indicate an increasing preference for cryptocrystalline silicates over basalts as a preferred lithic raw material, particularly for the manufacture of chipped stone projectile points and small formed unifaces.

Subphase III (1800 - 900 years B.P.)

This subphase is not represented by any current archaeological assemblage, rather it is based upon a hypothesized trend in material culture evolution observed between the preceeding subphase and the later Cassimer Bar phase.

Habitation features and sites similar to those preceeding occur along with a possible development of the mat lodge structure.
Projectile point types 1 through 6 continue, but are reduced in size. Narrow neck-widths begin to dominate point assemblages until wide necked points become rare by the terminal date.
The bow and arrow is perceived as the dominant weapon system.
The fishing industry continues and expands.
Woodworking continues and intensifies as does the ground stone industry.
Small unifacial, formed unifaces continue to include the tailed scraper-graver form.
Cryptocrystalline silicates become the preferred lithic raw material.

Chapter 9: Summary and Conclusions.

9.1. Introduction.

The purpose of this chapter is threefold: (1) to provide a discussion and evaluation of research hypotheses outlined in Chapter 1, (2) to summarize the Chilliwist phase prehistoric adaptive processes in the Okanagan valley in relation to a generalized Plateau pattern, and (3) to provide suggestions for future research in the Okanagan valley.

9.2. Research Orientation.

Chapter 1 outlines a number of presumably testable hyptheses concerning prehistoric Okanagan culture from which cultural material in the McCall site can be analyzed. These hypotheses are concerned with matters ranging from the nature of deposition of artifacts, features and faunal remains in a site, to the identification of traded goods from neighbouring areas.

Chapter 6 presents an attempt to answer hypothesis No.1, that subsurface clustering of cultural materials is indicative of past behavioural patterns. Attempts are made visually and statistically to isolate patterned artifact distributions which can be interpreted in a meaningful way. It is suggested that most cultural deposits, inasmuch as they reflect a daily round of activities, show a general clustering around hearth features. Some activities, such as hide preparation and some core reduction exhibit patterning around or away from hearth and refuse areas, presumably as a function of the space or social requirements to perform the requisite tasks.

Other activities with small space requirements employing small formed tools are distributed close to hearths. This supports the suggestion that hearths or similar areas in an open site tend to serve as foci for activities around which tasks can be carried out in a socially conducive atmosphere.

The second hypothesis involved determination of seasonality of site occupation. A lack of structural remains from either assemblage points to a possible non-winter occupation when the ethnographic pattern of winter pithouse dwellings is considered. Other than lack of structures, evidence for assessing the seasonality of occupation is not conclusive. Sample sizes are too small to facilitate direct comparisons with known seasonal occurences of fauna in in the valley system. Large ungulates and smaller mammals can be hunted or trapped during any time of year, depending upon how much energy is expended to procure them. Some animals are more readily available in specific seasons than others. Mountain sheep and goat, for example, are seen on lower slopes in early spring and late fall. They retreat to higher elevations during the summer, and winter in various hollows where browse is available. Chapter 5.2 suggests that such summer and winter ranges are not beyond a daily travel capability from the McCall site. Therefore, no single season for ungulate hunting can be suggested.

Various freshwater fish species could have been taken any time during the year including winter, depending on technology used. Anadromous salmon however, are available only during the fall. Fish vertebrae in assemblage B are identified as Pacific salmon (R. Casteel: pers. comm.), indicating fall as a likely season of occupation. This assumes that fish were caught, prepared and consumed at that time, and not dried and preserved with spinal column intact to be eaten months later as recorded for ethnographic Okanagan populations (Cline et al. 1938, Bouchard and Kennedy 1975).

The location of the McCall site close to the marshy headwaters of Vaseaux lake would have provided an ideal camp from which to hunt waterfowl. Numerous species of migratory and nonmigratory waterfowl frequent this area (Chapter 3.6) and would have made valuable contributions to the daily larder anytime from early spring to late fall, with fresh eggs available in the spring.

River and lake beds also provide freshwater mussels which are still present in the Okanagan river and Vaseaux lake. Available on a year round basis, and limited only by ice cover in the winter, mussels could provide a dietary supplement, as shown by numbers of <u>Gonidea angulata</u> valves in both assemblages. Assessing the seasonality of these mussels was attempted by examination of seasonal ring growth, but lack of a seasonally controlled modern collection negated definitive statements about the archaeological sample.

A final, albeit indirect and inferential, indicator of seasonality can be seen in the milling stone recovered in assemblage B. If its purpose is seed grinding or a similar activity, it indicates a non-winter occupation, especially since it appears to have been used in the open.

In summary, the most probable seasonal occupation of assemblage A is spring, summer or fall, due to lack of structural features, and the presence of freshwater fish, mountain goat or mountain sheep. Assemblage B could have been a fall occupation, based on the small sample of salmon vertebrae. At present, the small faunal sample cannot be used to present conclusive statements of seasonality.

The problem of trade and trade-related practices as indicated in hypotheses No.3 and 4 cannot be specifically answered. Two indications of goods exotic to the Okanagan valley were recovered, a single Olivella shell bead and a number of obsidian flakes. The Olivella shell bead recovered from assemblage B has a coastal origin. Available only on the West Coast from California to Alaska, this artifact could have been traded up the Columbia river from the Dalles; across the Coast Range along the Methow or Similkameen river valleys; up the Fraser river to Lillooet and south along the Nicola and Similkameen valleys; or up the Fraser river to the Shuswap area and thence south.

Obsidian, on the other hand, can be traced. The small sample of flakes derived from both components was traced through the X-ray flucrescence method to several different source areas in central Oregon (E. Nelson: pers. comm.). This indicates that at least some trade relationships were to the south. The red ochre, which is found in large natural deposits in the Tulameen valley near the town of Princeton indicates some trade or procurement from the west.

Hypothesis No.5, that the major surface component was late prehistoric in age is examined in Chapter 8. Problems of post-depositional disturbance and the physical nature of the deposits do not justify separation of two components in assemblage B, particularly since features and patterns of fire cracked rock found just below the surface are in alignment with those ca 20-40 cm below the surface.

Hypothesis No.6 involved the statement that prehistoric north Okanagan culture was oriented more towards procurement of terrestrial than riverine resources. The faunal remains recovered indicate that both types of fauna were exploited, although statements regarding their relative significance require more research. The faunal remains from both McCall site components indicate that not only were anadromous salmon taken, but also that a number of freshwater fish were as well. These species included trout, suckers and burbot; indicating both river and lake fishing.

The fact that both freshwater and anadromous fish were taken cannot support Hypothesis No.7 which stated that a terrestrial orientation was the result of poor quality and general lack of piscean resources in te valley. In the case of anadromous salmon it can be argued that runs were probably light in comparison to main Columbia and Fraser river runs. In addition, the length of the trip from the ocean would have depleted much of the flesh and detracted from the overall protein in spawning fish. Even so, salmon which travelled as far as Kettle Falls in Washington still provided a base for a developed fishing industry (Chance et al. 1977). Beyond this however, since fish and other faunal remains are poorly represented in the McCall site, no statements can be made about the quantity of salmon taken. Rather, it can only be stated that some salmon were being exploited.

Hypothesis No.8, that excavated sites in the Okanagan indicate an increasing preference for silicates over basalts through time, is hindered by the fact that material from earlier sites is not abundant. The McCall sample does not reflect the total range of the past 3000 years of culture history, nor do known excavated sites. As far as the McCall site is concerned, basalts are favoured over silicate unmodified flakes by 1.61/1 in assemblage A and 2.74/1 in assemblage B. However, silicates were generally favoured in the manufacture of formed unifaces. One observable difference is in raw material used for biface production. Projectile points in assemblage A (N = 30) are all basalt except for a single chert specimen, whereas assemblage B has 26% silicate material points (8 of 69). Characteristically, the small arrow points are manufactured primarily of silicates.

The reasons for a gradual trend to formed biface silicate use through time are obscure, but it is noted that almost all leaf shaped and stemmed points are basalt, whereas most notched forms tend to be cherts and chalcedonies. Whether this is a functional characteristic indicating a particular mode of use for these artifacts or is related to some other factor is unknown.

9.3. The Generalized Plateau Cultural Pattern.

The general trends observed in the three Chilliwist subphases defined in this thesis are in agreement with Grabert's (1970) analysis of prehistoric Okanagan culture. Grabert hypothesized that environmental stability since the Altithermal is reflected in a continuous and progressive cultural evolution in the Okanagan, characterized by successive and gradual changes in the artifact inventory. Nowhere in the sequence, save for the disappearance of the microblade technology, is there evidence of rapid technological change. Whether microblade technology can be linked to a specific season of use cannot, at present, be answered. The co-occurence of non-microblade housepit assemblages dated between 2700-2100 years B.P. with microblade assemblages from open sites dated ca 3000-2500 years B.P. suggests there may be a seasonal bias in the sample, assuming that open sites repesent non-winter occupations.

The archaeological record indicates that Okanagan cultural adaptive processes were part of a generalized Plateau pattern similar to trends occuring elswhere (Chapter 7.1 and Appendix

1). The two Plateau cultural subareas north and south of the Okanagan valley, the Fraser and Columbia Plateaus, are both semi-arid regions characterized by diverse ecozonal variation in major valleys. Both drainage systems are characterized by large seasonal runs of anadromous salmon, species which are not as well represented in the Okanagan river system. However, the Okanagan valley shares similar biological resources and ecozonal variation in hilly uplands and forested areas as do regions north and south, including large and small game species.

The presence of seasonal runs of anadromous salmon has been linked to the elaboration and diversification of Plateau cultures over the past 2000 years (Browman and Munsell 1969, Stryd 1973a, Wilson 1977, and Chance et al. 1977). Evidence for the exploitation of anadromous salmon occurs as early as 9000 years B.P. at the Dalles on the Columbia river (Cressman 1977), equally early at Kettle Falls (Chance et al. 1977), by ca 7000 years B.P. in the mid-Fraser region (Sanger 1970), and by ca 6000 years B.P. in north-central Washington at the Ryegrass Coulee site (Munsell 1968). Despite this, the Okanagan valley has been conceived as being relatively lacking in this resource.

If this view is adhered to, then the Okanagan valley populations probably operated at a disadvantage to richer fish resource areas to the north and south. As "poor cousins" situated midway between more stable economic resource areas, residents of the Okanagan valley were susceptible to cultural traits from the northern and southern Plateaus. Evidence for this has been presented by Grabert (1974:71) who argues that projectile points characteristic of the Cassimer Bar phase (900-150 years B.P.) show greater frequencies of small side notched points in the north Okanagan. Sites from the south Okanagan, notably the Wells Reservoir area, display reduced frequencies of side notched forms, having instead higher frequencies of small barbed, corner notched and basally notched points.

It is not certain that the Okanagan valley can be described as a true transitional area, as most archaeological areas and sequences can be described as "transitional" or "intermediate" between other neighbouring areas. Rather, it is hoped that the discussion presented in Chapter 6 on external areal comparisons between the Okanagan valley and sequences established for the Fraser and Columbia Plateaus have served to illustrate that which Browman and Munsell (1968) refer to as a "generalized Plateau pattern" of resource exploitation and elaboration of culture by ca 2000 years B.P. was also characteristic of the Okanagan Chilliwist phase. To what degree such a generalized pattern corresponds to the ethnographic pattern (Chapter 3) cannot be quantified. It is noted, however, that with the exception of social structure determination and certain subsistence technologies, the McCall site artifact and feature inventory are not at odds with the ethnographic descriptions.

9.4. Recommendations for future research.

In order to recover more data which can help increase knowledge of Okanagan prehistory, the following recommendations are made:

(1) That a greater emphasis be placed on the collection and analysis of ancillary samples ranging from soil samples for chemical and micro-stratigraphic analysis, to soils analysis to obtain microfaunal remains such as fish scales, otoliths, and other such data.

(2) That open sites, in the future, be block excavated over larger areas as opposed to test pitting or trenching in order to insure recovery of more representative samples of cultural material.

(3) That dry rockshelter deposits be examined in order to obtain representative samples of otherwise perishable organic remains, as well as to provide chronological controls when compared to open or housepit feature sites.

(4) That the full ecozonal range of Okanagan valley areas be critically examined in order to locate sites characteristic of other seasonal or economically based occupations other than those characterized by valley bottomland sites.

(5) That open and housepit sites situated across the known range of ecozonal variation in the Okanagan valley be excavated in an attempt to:

(a) further strengthen and evaluate the present culture history sequence,

(b) examine the question of microblade technology in the Okanagan with regard to its first appearance and decline, as well as a possible seasonal factor for use and function of these tools,

(c) locate and excavate sites dating from ca 2000 to 1000 years B.P. in order to evaluate the effect of an hypothesized change from spear thrower to bow and arrow hunting systems on Okanagan cultural and subsistence strategy patterns.

(6) That experiments be conducted to determine the effect that various plowing practices exert upon surface and subsurface artifact distributions. As well, controlled experimentation to determine the effects of occupational disturbances such as trampling on both surface and subsurface artifact distributions should be conducted.

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Appendix 1: Plateau Culture Sequences.

The purpose of the following section is to provide a more detailed outline of existing Plateau culture history sequences than is presented in Chapter 7.1. Figures 30 and 31 are chronological charts of the established sequences.

The Lower Fraser Canyon.

The Baldwin phase (3000-2350 years B.P.) is defined by Borden (1968) and shares a number of material traits with the early part of the Okanagan Chilliwist phase. Both phases are typified by contracting stemmed, rectangular stemmed, asymmetrically shouldered and leaf shaped projectile points. Personal examination of Baldwin phase points at the University of British Columbia Museum of Anthropology indicates that point neck-widths fall within the range of variation of Chilliwist phase types, that is, they are usually larger than ca 1.0 cm on average. A microblade industry is present in both phases.

The following Skamel phase (2350-1750 years B.P.) witnesses the introduction of corner and basally notched projectile points with expanding stems. These points dominate assemblages, taking precedence over earlier leaf and stemmed forms (Hanson 1973). These notched point types continue into the Emery phase (1550-750

FIGURE 30 PLATEAU SEQUENCES I

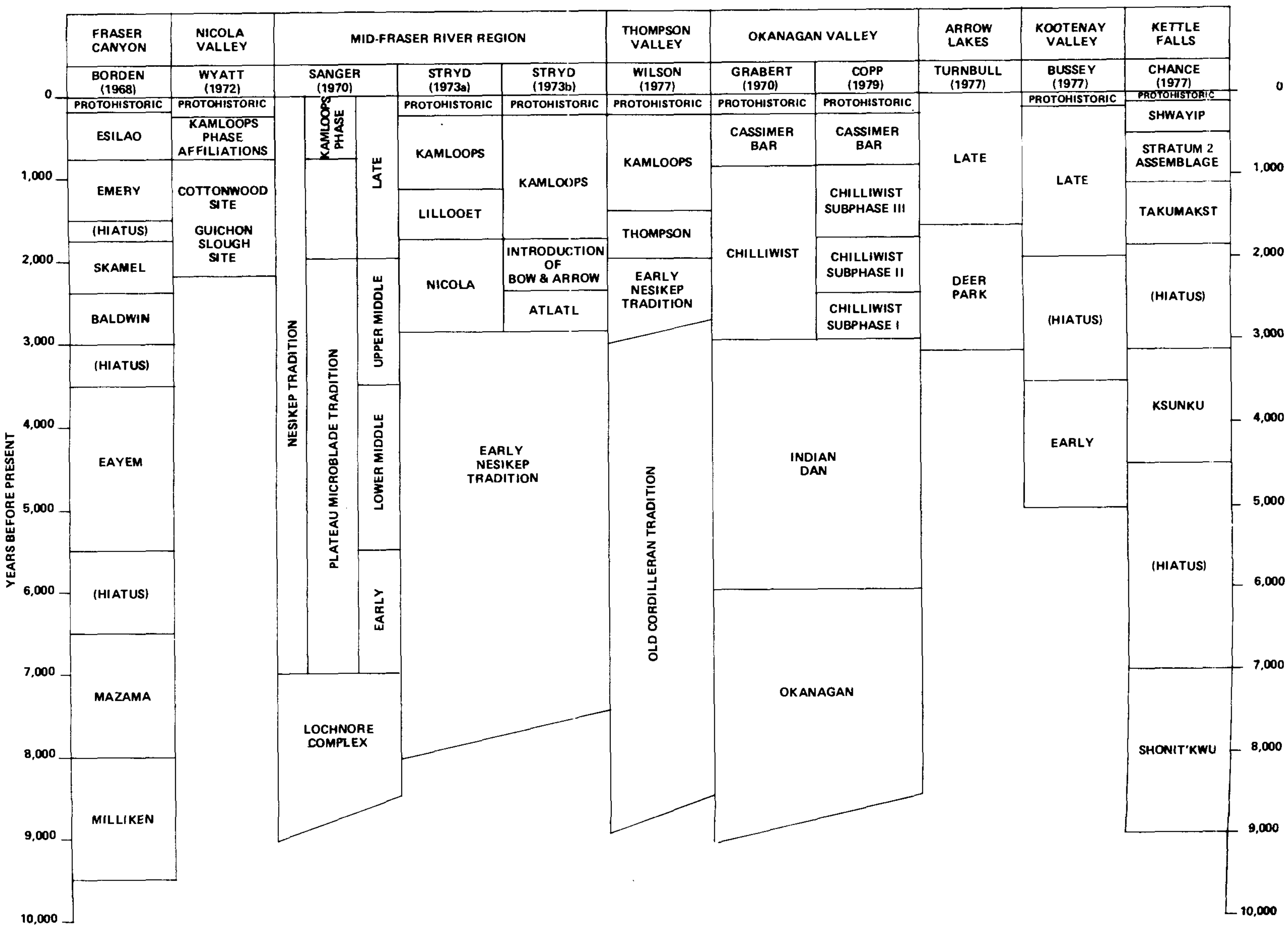
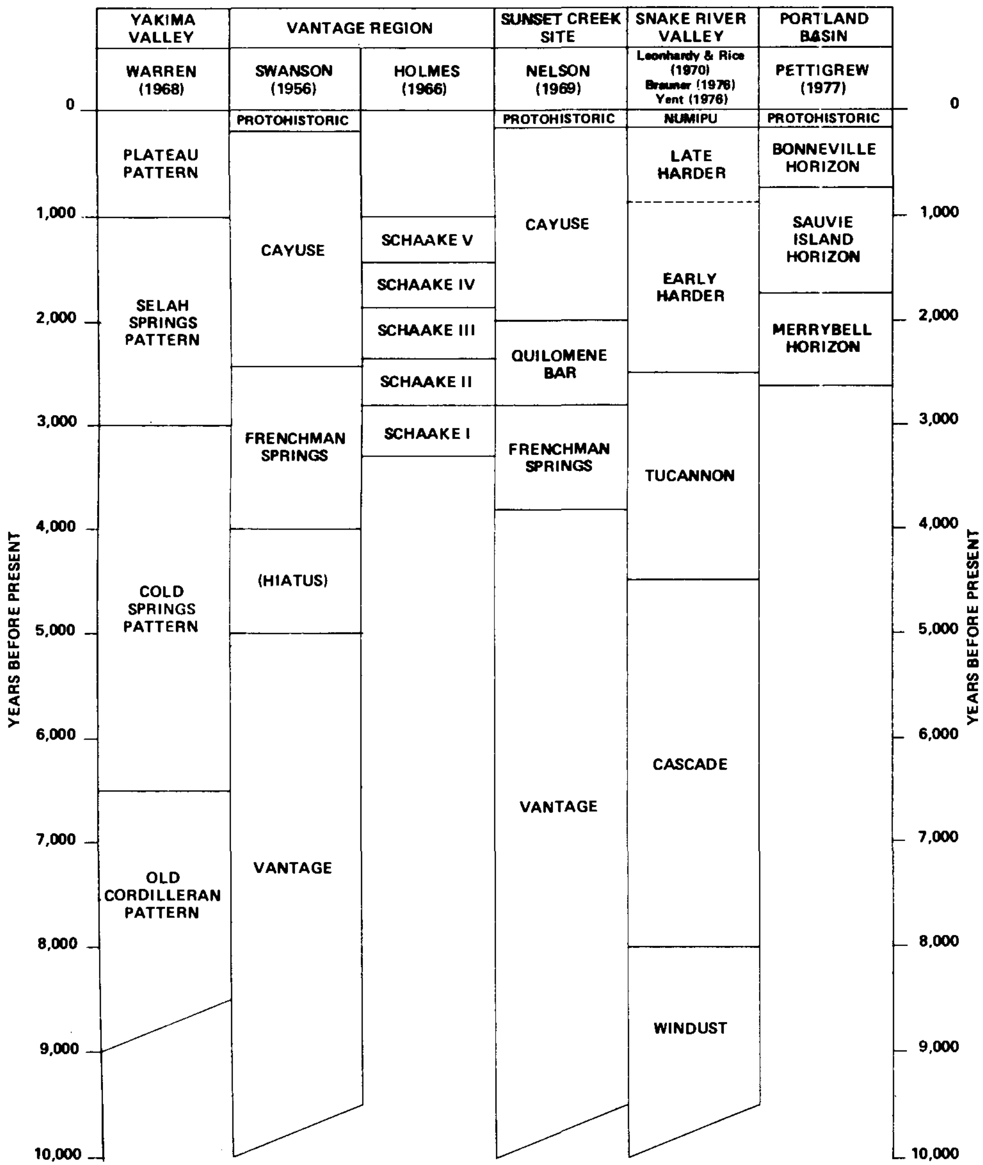
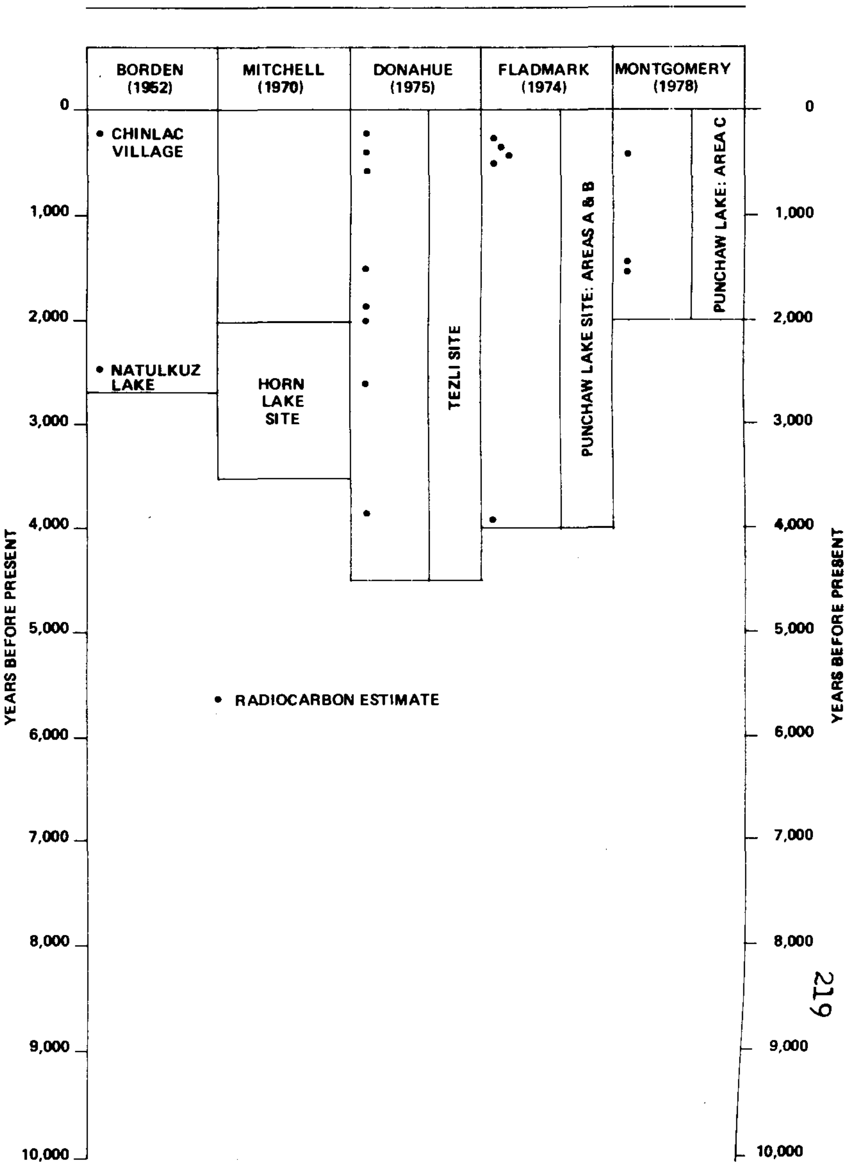


FIGURE 31 PLATEAU SEQUENCES II



CARIBOU-CHILCOTIN SEQUENCES



years B.P.), becoming progressively smaller with narrower stems. By the Esilao phase (750-140 years B.P.) the dominant point form is a small side notched type. Microblades do not occur later than Baldwin phase assemblages.

The Mid-Fraser and Thompson River Drainages.

Sanger's Nesikep Tradition (1970) of the Lochnore-Nesikep locality is comparable in time to the Okanagan Chilliwist phase, particularly his Upper Middle Period (3500-2000 years B.P.). This period is characterized by a microblade industry. Projectile point forms are primarily barbed and unbarbed corner notched forms. Unbarbed notched points are more frequent in assemblages (Sanger 1970:108). In addition, leaf shaped points are present, but are smaller than earlier forms. Unbarbed contracting stemmed points are present as well as barbed, basally notched points with parallel to expanding bases.

All projectile points characteristic of this period exhibit average neck-width measurements larger than 1.3 cm (Sanger 1970:38-42). Microblades, present from ca 6000 years B.P. in this locality, occur in greatest frequencies in components of the Lower Middle period (5000-3500 years B.P.) and decline in frequency in assemblages dated to ca 3000 years B.P. The Lochnore Creek site, zone I, dated ca 2600-2700 years B.P.

contains an assemblage frequency of microblades of only 5%. Sanger (1970:109) hypothesizes from this data that microblades do not continue in use beyond ca 2000 years B.P.

The Late period (2000-200 years B.P.) is characterized by a further reduction in size and neck-widths of all projectile points. Neck-widths average less than 1.0 cm, with the introduction of a small side notched point dominating assemblages by 800-1000 years B.P. (Sanger 1970:122). No microblades are associated with the Late period.

The Lillooet Vicinity.

Stryd (1973a,b) excavated near the town of Lillooet, British Columbia. On the basis of his data, he defines a Later Nesikep Tradition. Stryd (1973a) views technological evolution in this vicinity as sharing in the Nesikep Tradition defined by Sanger (1970), with an early period characterized by a microblade industry. The demise of this industry is considered to occur by ca 2800 years B.P.

Stryd (1973a) defines the Nicola phase (2750-1750 years B.P.) wherein wide-necked points continue from earlier times as the most frequent point style. They are characterized by expanding stems, barbed and unbarbed corner notched and basally notched forms. Low frequencies of leaf shaped and stemmed forms are also present. By ca 2200 years B.P. smaller barbed and unbarbed, corner notched and basally notched points with narrow stems occur. These points are thought by Stryd (1973a:30) to indicate the introduction of the bow and arrow.

The following Lillooet phase (1750-1150 years B.P.) exhibits mixed frequencies of wide and narrow necked points of all forms, which decrease in size until ca 1150 years B.P. when settlement patterns change and other diagnostic tools such as bilaterally barbed harpoons, spall tools, steatite carving, and other traits initially define the Kamloops phase.

The Kamloops phase is characterized and partially defined on the basis of a small side notched projecile point form dubbed the Kamloops side notched type (Sanger 1970). Small side notched points are also characteristic of late prehistoric components in other Plateau areas.

Stryd (1973b) later revised his chronological sequence, dividing the early part of the Late Nesikep Tradition into two chronological periods representative of an adjustment to a cooler, wetter climate. The earlier period (2800-2400 years B.P.) is characterized by the absence of two material traits; a microblade technology and narrow necked or "arrow" point forms.

The second period (2400-1800 years B.P.) is characterized by the introduction of the bow and arrow as well as by the presence of other, wide necked point forms. Stryd (1973b) retains the Kamloops phase concept with its diagnostic trait of the Kamloops small side notched point restricted to the period ca 1800-200 years B.P.

The Kamloops Vicinity.

Wilson (1977), excavating in the Kamloops area, has defined a two phase cultural sequence from ca 2000-200 years B.P. from settlements on the Thompson river floodplain. These are termed the Thompson phase (2000-1400 years B.P.) and the Kamloops phase (1400-200 years B.P.) respectively. Elements characteristic of the Thompson phase include small round housepit depressions, a possible microblade industry, numerous spall tools, and projectile points with neck width measurements larger than 1.0 cm. Point forms range from barbed and unbarbed corner notched and basally notched types with expanding stems, to low frequencies of leaf shaped and stemmed forms. Narrow necked, notched points occur only towards the end of this phase (Wilson 1977:18). By establishment of Kamloops phase occupations (1400-200 years B.P.), small side notched or Kamloops points are the single most frequent point form in assemblages (Wilson 1977: 19). Small leaf shaped and stemmed points continue until the

Protohistoric period but are rare.

The Nicola Valley.

Wyatt's (1972) analysis of a number of housepit excavations in the Nicola valley of British Columbia typologically dated to 2200 years B.P., led him to believe that the Nicola valley served as a transitional zone between the Columbia and Fraser Plateaus. Artifact assemblages indicate an evolving sequence of projectile point forms from wide necked to increasingly narrow necked notched forms. Stemmed points occur and exhibit a trend toward progressive decrease in size. Small side notched projectile points are seen to predominate after ca 1000 years B.P. Wyatt's samples are small however, and assemblages are dated on typological grounds alone. More work needs to be done in this area, especially with regard to obtaining absolute dates from other assemblages, before causal relationships can be worked out or redefined.

The Arrow Lakes.

As a result of excavations in both open and housepit sites in the Arrow lakes region, Turnbull (1977) has defined the Deer Park phase (3200-1650 years B.P.). Deer Park phase assemblages include wide necked projectile points of leaf shape, contracting stem, rectangular stem, barbed corner notched and basally notched points with expanding or parallel stems (Turnbull 1977:264-266). Microblades and cores are also present. Turnbull's (1977) two late prehistoric components from open and burial sites have narrow necked points identified as variants of the Columbia Valley corner notched type, as well as small side notched forms.

The Kootenay Valley.

The most recently reported work in the Kootenay river valley of eastern British Columbia is that of Bussey (1977). As a result of lithic analysis of three sites on or near the banks of the Kootenay river, Bussey is able to determine relative influences of Plateau and Plains material culture attributes. Two periods are defined; and early period represented by small numbers of Lusk, McKean-Hanna affiliations, and a second or late period.

Bussey's late period is comprised of a number of components exhibiting a mixture of Plains and Plateau traits with a heavier influence from the Plateau (Bussey 1977). Diagnostic attributes include a number of corner notched point forms typologically similar to forms from both sides of the Rockies, as well as from the Columbia river. Similarly, side notched points include types defined as Avonlea, Prairie and Plains types. Both Plains and

Prairie types can be identified in Plateau assemblages as they approximate the ubiquitous Kamloops type from the Thompson-Fraser river drainages and a similar form in the Okanagan valley. Other lithic classes characterized as Plateau are pecked and ground stone pestles, grinding stones, adzes and slab tools (Bussey 1977:79).

The Kettle Falls Locale.

Chance *et al*. (1977) define the Ksunku period (4400-3200 years B.P.) at Kettle Falls in Washington as characterized by leaf shaped, stemmed, unbarbed and barbed corner notched, basally notched and large side notched points. As well, numerous small uniface forms are present. Microblades, which are present in earlier assemblages, are not present.

Following a hiatus of ca 1400 years, the Takumakst period (1850-1100 years B.P.) is characterized by small contracting stemmed and side notched points. Takumakst assemblages are followed by an assemblage referred to only as Stratum 2a which dates from ca 1100-550 years B.P. Chance sees this as directly preceding development of the ethnographic Colville pattern, which is defined by a general reduction in point size. Projectile points are invariably smaller barbed, corner notched and side notched forms.

The following Shwayip period (550-150 years B.P.) is characterized by an overwhelming preference for small side notched points as well as high frequencies of quartzite knives. The Shwayip period is further characterized by a large fishing industry, with highest frequencies of sites and assemblages in the Kettle Falls locality dating from this last period.

The Yakima Valley.

In 1968, Warren excavated an upland open site in the Yakima river valley, a tributary system of the Columbia river. Situated on Wenas Creek, the site is located near the foothills of the Cascade range but is still within an upper Sonoran biotic community. Analysis of the excavated material indicates occupation from ca 3000-1000 years B.P., characterized by diagnostic traits such as contracting and rectangular stemmed projectile points, as well as low frequencies of shouldered and slightly barbed corner notched points. Macroblades and cores, a limited microblade industry, and woodworking tools (small unifaces) are also present. Warren has termed this pattern of diagnostic traits and upland game hunting as the Selah Springs pattern.

The Vantage Locale.

The middle Columbia culture history sequence is best developed and reported by two researchers, Holmes (1966) in a reevaluation of the Schaake site and Nelson's (1969) analysis of the Sunset Creek site. Both analyses are attempts to refine the first culture sequence outlined for the Vantage region by Swanson (1956), for which a 9000 year sequence was developed.

Swanson's (1956) sequence includes three major periods, including: (1) the Vantage phase (9000-5000 years B.P.), (2) the Frenchman Springs phase (4000-2400 years B.P.) and (3) the Cayuse phase (ca 2400-200 years B.P.). A great deal of uncertainty accompanied this sequence due to lack of diagnostic materials and small sample sizes.

Holmes (1966) reexamined the Schaake site in which housepit and interhouse areas revealed occupations dated to 3300 years B.P. Analysis of radiometrically dated assemblages yielded the following sequence:

Schaake I-III is characterized by leaf shaped, contracting and rectangular stemmed points. Radiocarbon dates include two estimates of 3210$\pm$150 years B.P. and 2780$\pm$190 years B.P. Schaake IV is defined by stemmed projectile points and the introduction of wide necked, expanding stem, barbed corner notched and barbed basally notched forms. Smaller narrow necked points with straight to parallel stems also occur. Schaake V assemblages illustrate a reduction in point size, reduced frequencies of wide necked forms, and the introduction of narrow necked, barbed corner notched and barbed basally notched points with infrequent small side notched forms. A single radiocarbon date of 1520±110 years B.P. represents this component.

Nelson (1969) derived a similar sequence from the Sunset Creek site, also situated near Vantage. In his evaluation, which is not radiometrically supported, diagnostic artifacts of the past 3000 years are: (1) the Frenchman Springs phase (3800-2800 years B.P.) containing low frequencies of leaf shaped and large side notched points, as well as barbed corner notched and barbed basally notched forms with wide neck widths. Wide necked rectangular and contracting stemmed points also occur.
(2) The Quilomene Bar phase (2800-2000 years B.P.) contains barbed corner and barbed basally notched points with reduced neck width ranges. Earlier stemmed points occur in low frequencies.
(3) After 2000 years B.P. and continuing into the historic period, the succeeding Cayuse phase is characterized by increasing percentages of small barbed, corner and barbed basally notched, narrow necked points until ca 400 years B.P. when small side notched points dominate assemblages.

The Snake River Sequence.

This culture history sequence is based upon work by Leonhardy and Rice (1970), with later modifications by Brauner (1976) and Yent (1976). The 10,000 year sequence consists of six phases: Windust, Cascade, Tucannon, Harder, Piqunin, and Numipu.

The Tucannon phase (4500-2500 years B.P.) is characterized by semipermanent winter pithouse villages (Brauner 1976:293). Artifacts include large side notched points, as well as large contracting and rectangular stemmed forms. A number of expanding stem, barbed corner notched and side notched points also occur. No microblade industry is indicated.

Following the establishment of modern climatic conditions, with established river systems and salmon runs, settlement patterns alongside rivers become manifest and characterize the Harder phase (2500-200 years B.P.) (Leonhardy and Rice 1970: 14). Among the defining criteria are large, randomly flaked, barbed, corner notched, and barbed, basally notched points with expanding stems. Low frequencies of smaller notched forms with parallel stems also occur (Leonhardy and Rice 1970: Figure 9 a-j). Brauner (1976:317) notes almost equal frequencies of both wide necked and narrow necked points in assemblages dating ca 2000 years B.P.

The late Harder phase (950-200 years B.P.) is defined by Yent's (1976) analysis of site 45WT39, resulting in the deletion of the Piqunin phase from the sequence. Barbed, corner and barbed, basally notched points with parallel stems predominate and are much reduced in size from earlier forms. Neck width sizes are not given, but appear to be less than 1.0 cm. Small point forms dominate after ca 1000 years B.P. (Yent 1976:74) indicating adoption of the bow and arrow as in the Fraser Plateau (Stryd 1973a, Wilson 1977).

The Portland Basin Sequence.

Pettigrew (1977) reports a 2600 year sequence from the Portland Basin in the Willamette valley of Oregon with evidence based on combined surface collections and test excavations from 10 sites. The Merrybell Horizon (2600-1750 years B.P.) is characterized by wide necked, stemmed points accounting for 35% of point types (Pettigrew 1977:366). Projectile points are primarily expanding stemmed, barbed, corner notched and barbed, basally notched types. Contracting and rectangular stemmed forms also occur.

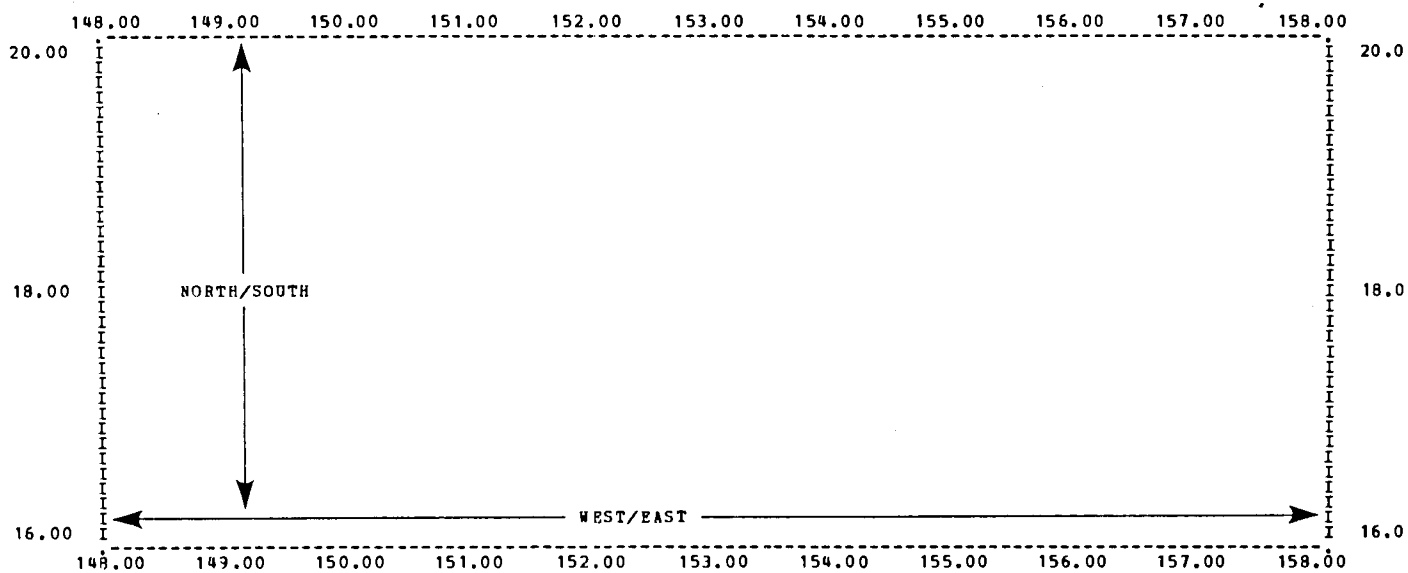
The Sauvie Island Horizon (1750-700 years B.P.) is defined by a predominance of narrow necked, barbed, corner notched and barbed, basally notched points. Stemmed forms similar in size to earlier points form less than 35% of points. The Bonneville Horizon (700-200 years B.P.) is characterized by the appearance of small, concave base triangular points as well as small side notched types. In general, Pettigrew's sequence indicates a progressive diminution in projectile point sizes and form which is generally congruent with other established regional and local Plateau chronologies.

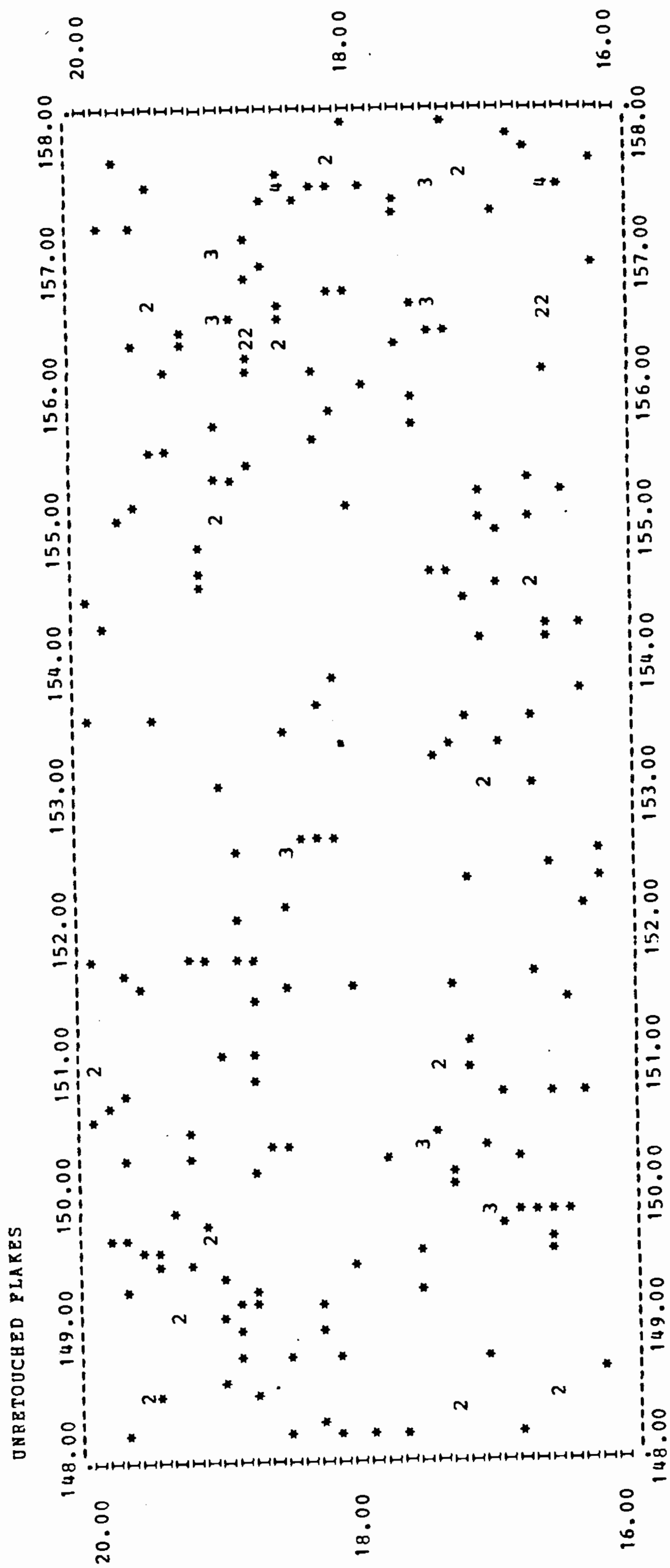
APPENDIX 2.

ARTIFACT AND FAUNAL REMAINS SPATIAL DISTRIBUTIONS.

ASSEMBLAGE A.

THIS DIAGRAM ILLUSTRATES THE COORDINATE SYSTEM OF EXCAVATION AREA A IN WHICH ARTIFACT AND FAUNAL SPATIAL DISTRIBUTIONS ARE DISPLAYED IN THE FOLLOWING PAGES.

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157.00
158.00
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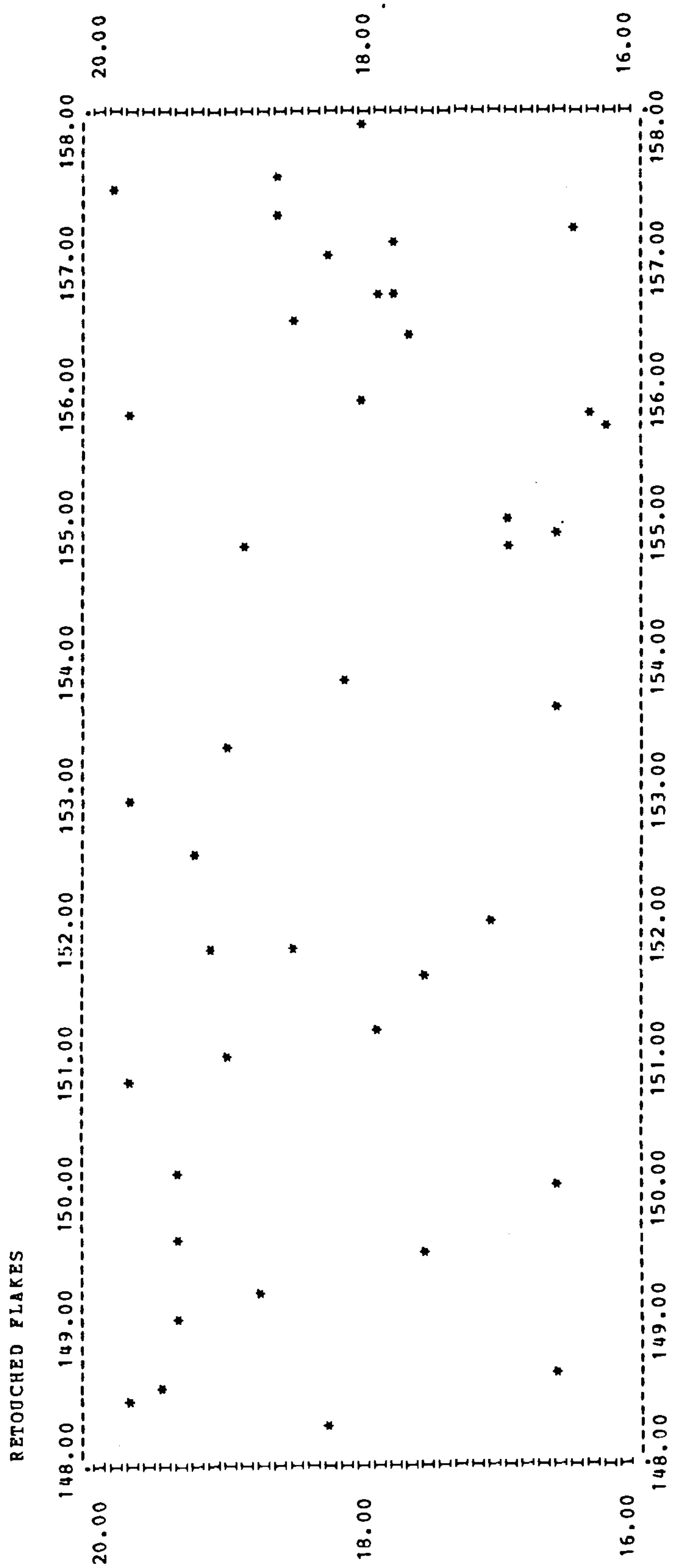
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20.00
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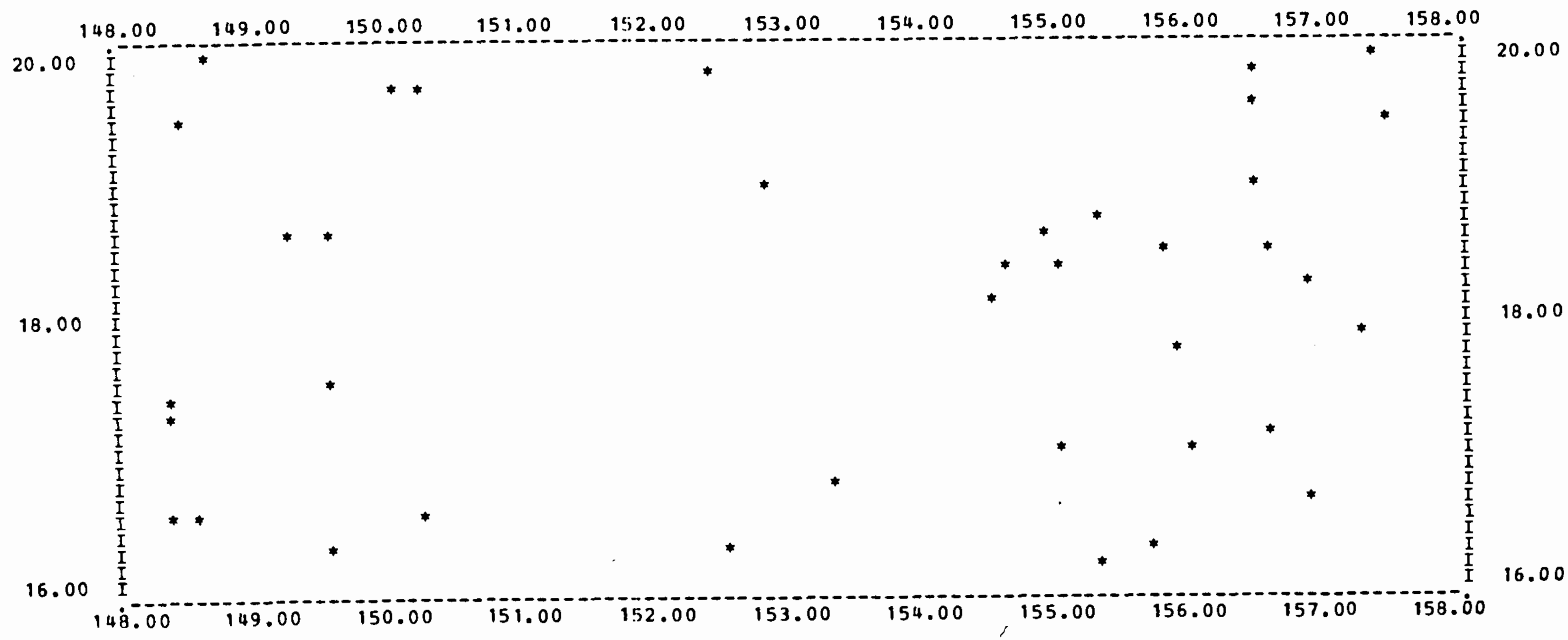
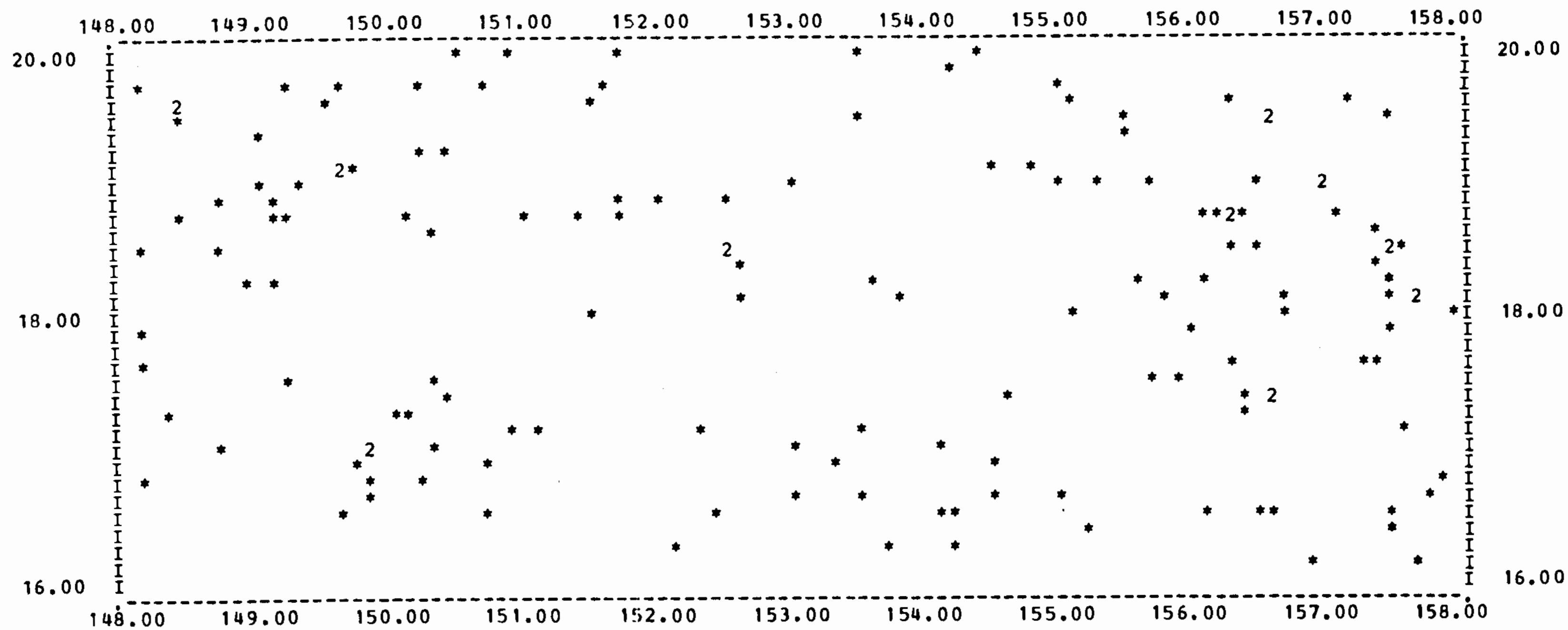
16.00

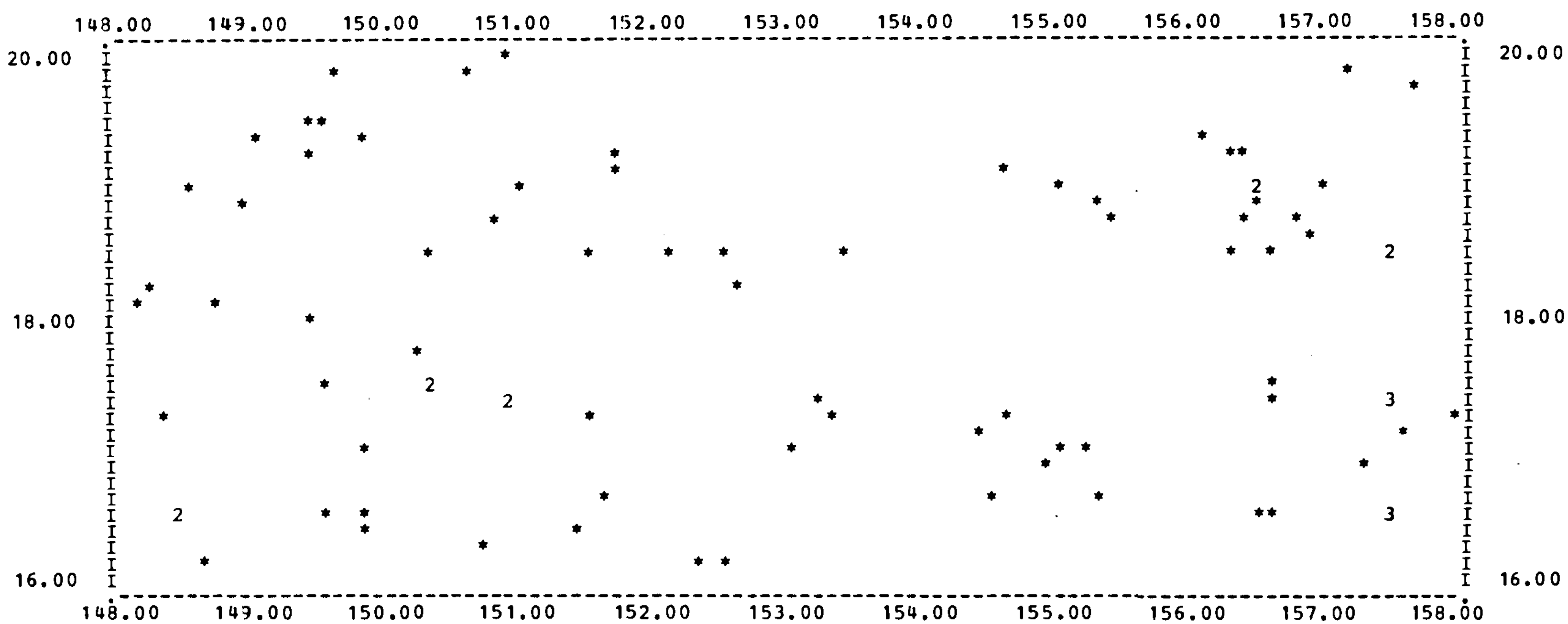
UTILIZED FLAKES



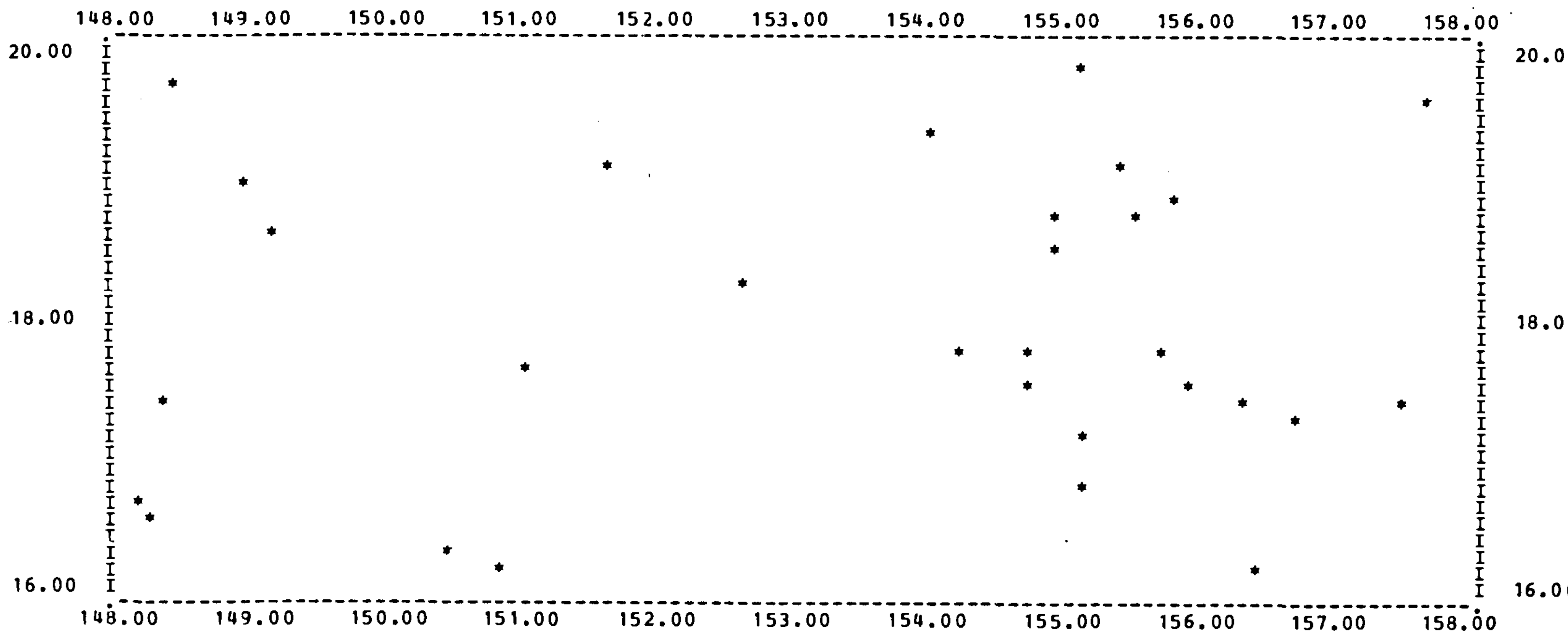
UNRETOUCHED BASALT FLAKES



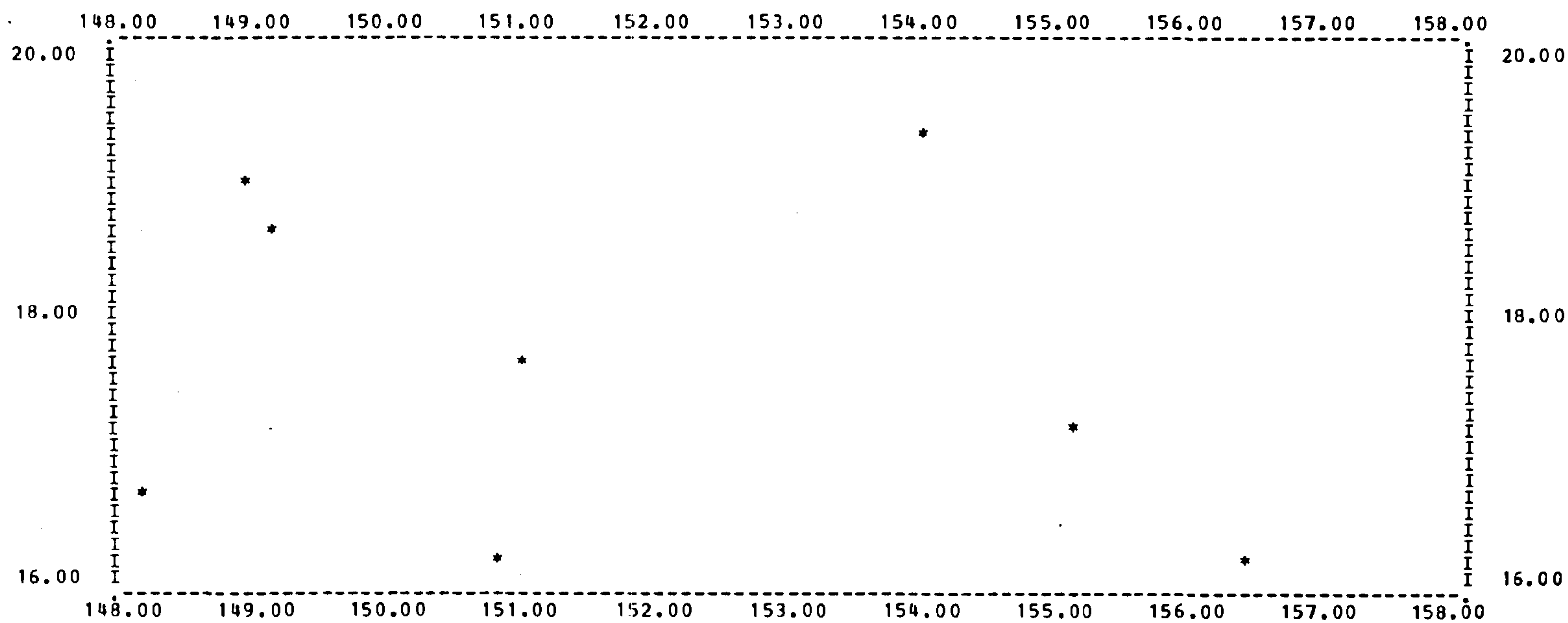
UNRETOUCHED SILICATE FLAKES



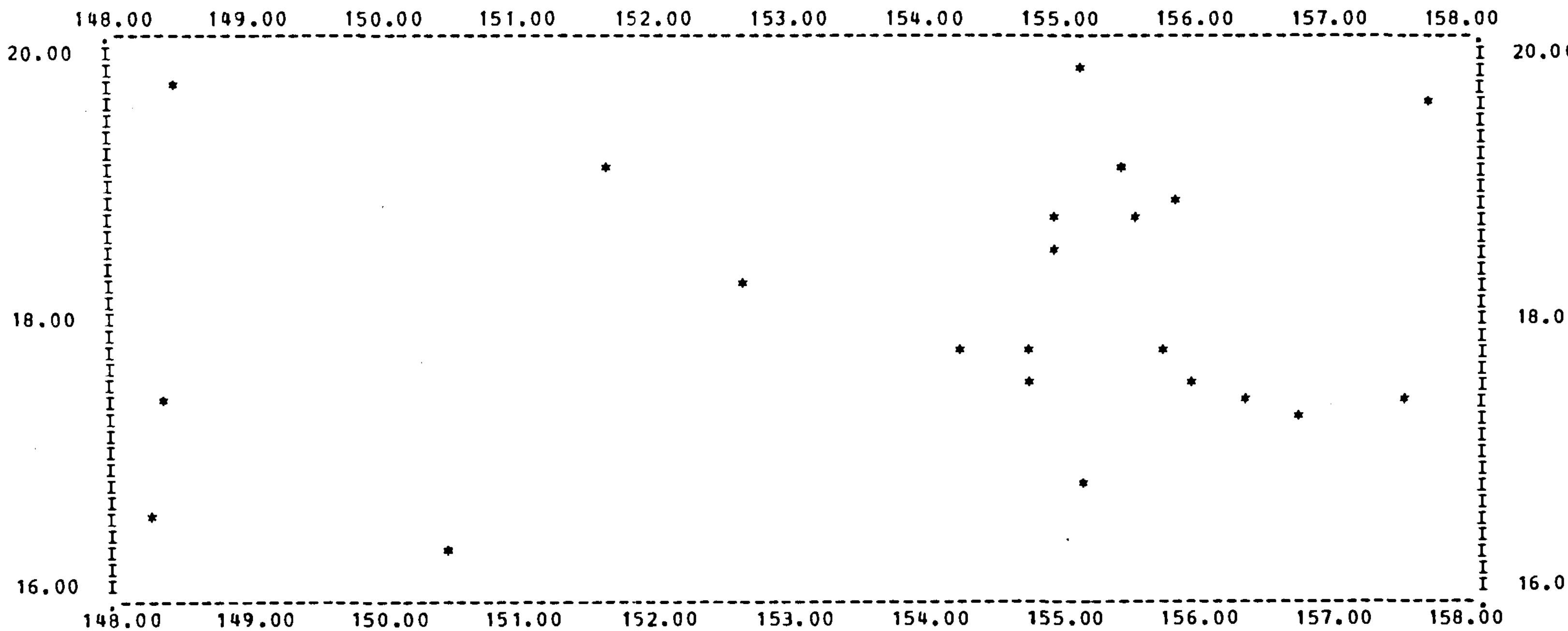
PROJECTILE POINTS: GROUPS 1 TO 2C
ALL TYPES



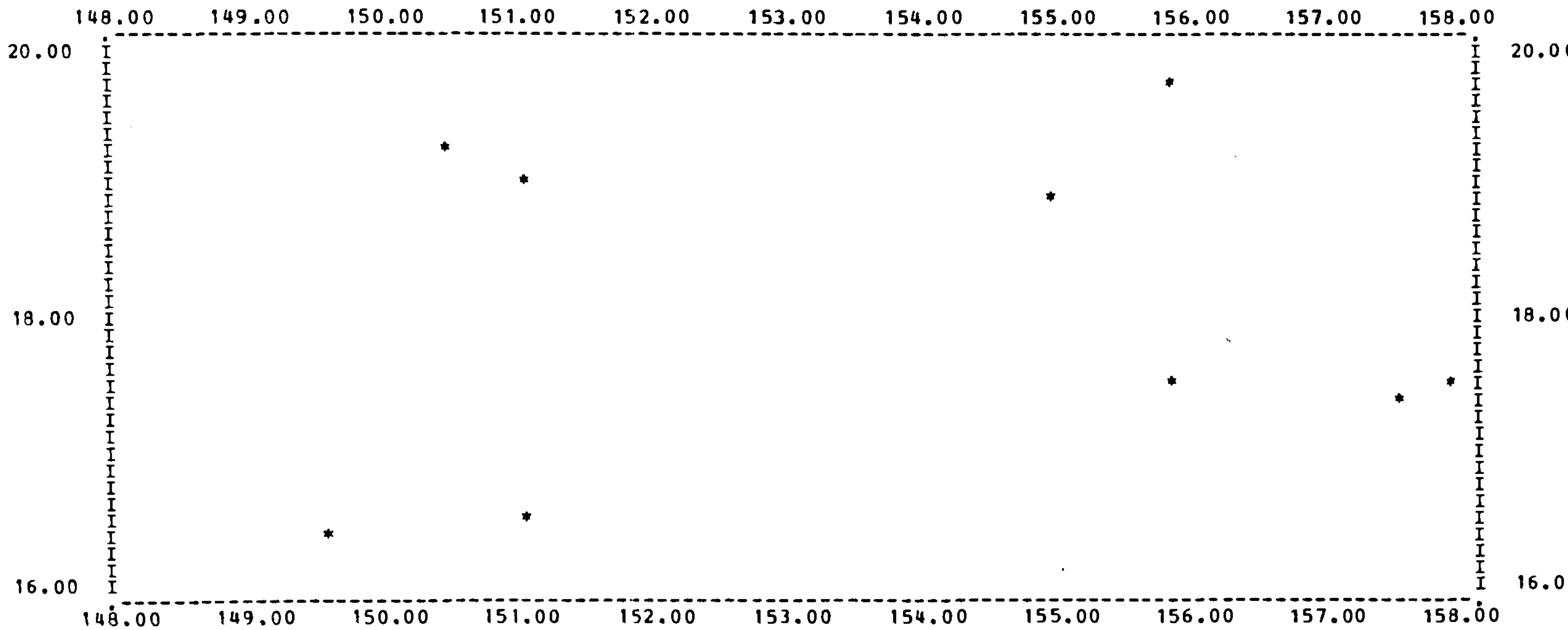
PROJECTILE POINTS: GROUP 1
LEAF SHAPED POINTS

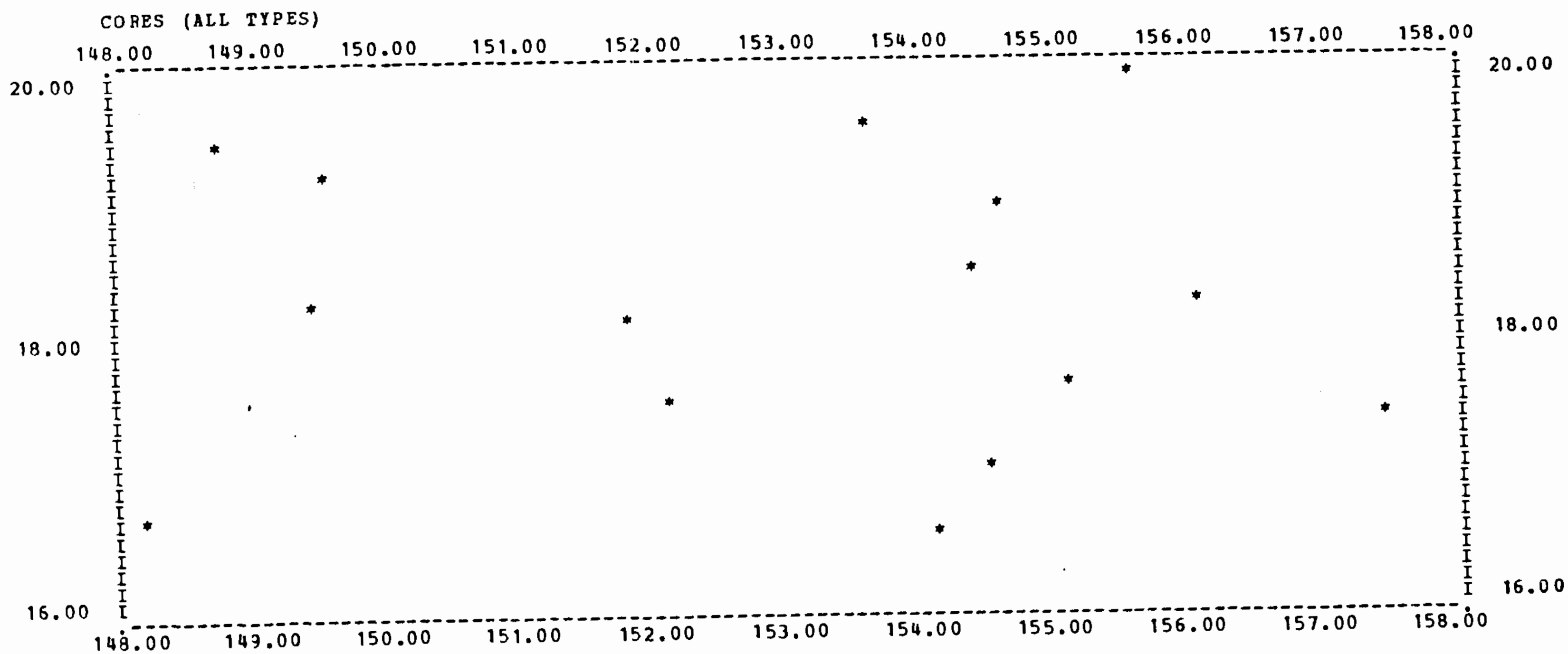


PROJECTILE POINTS: GROUP 2
STEMMED POINTS



PROJECTILE POINT TIPS

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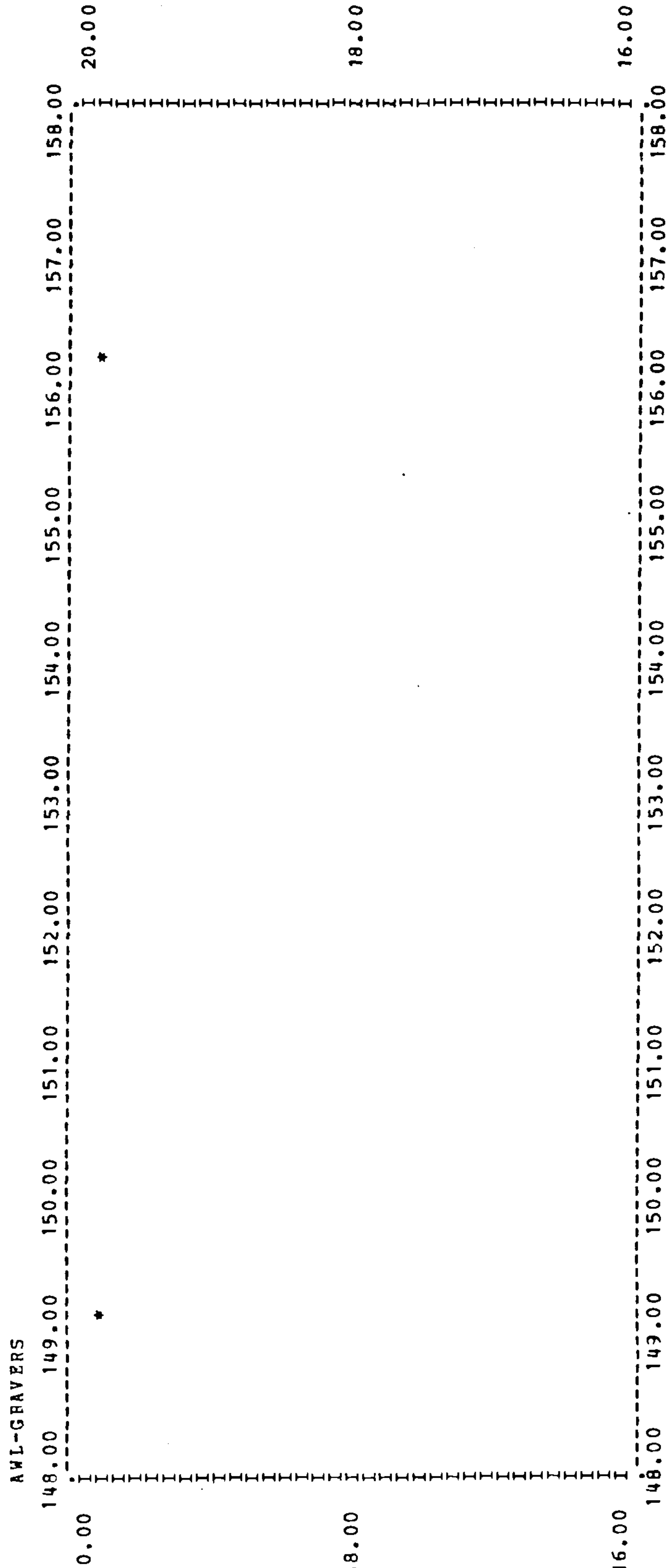
AWL-GRAVERS
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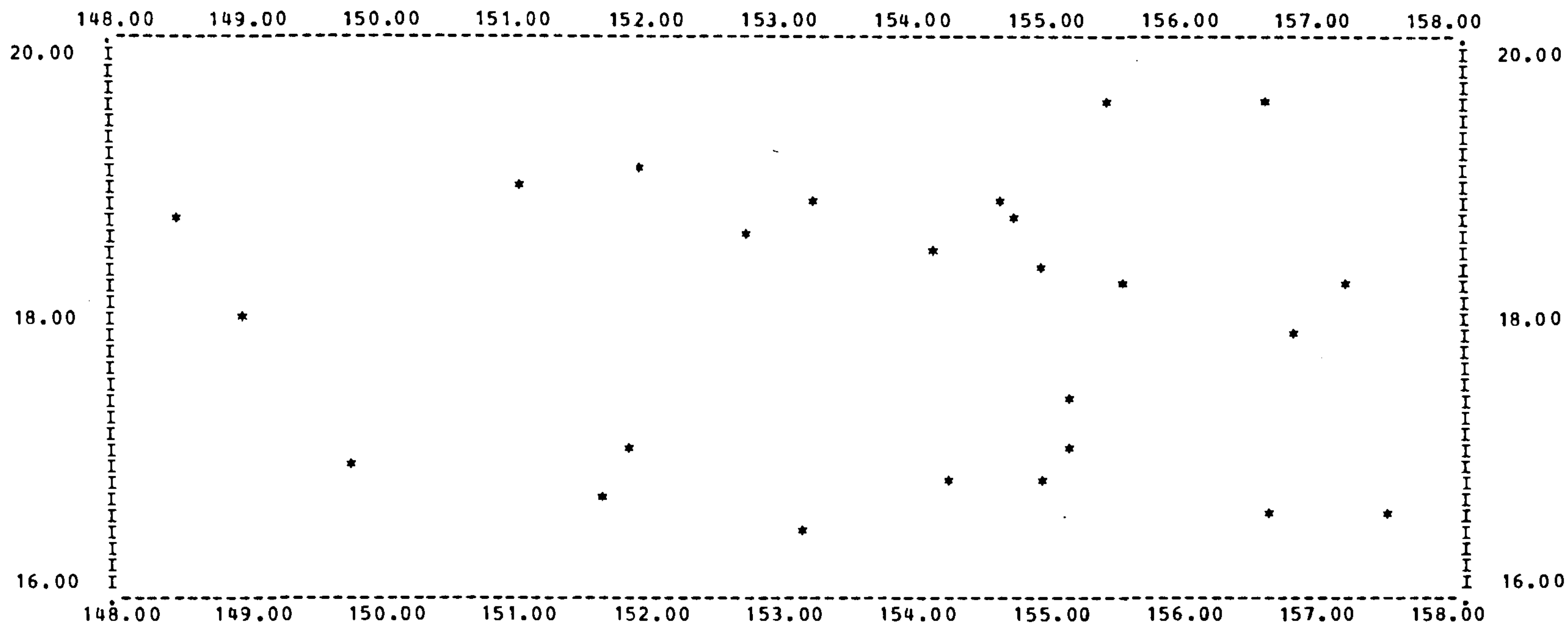
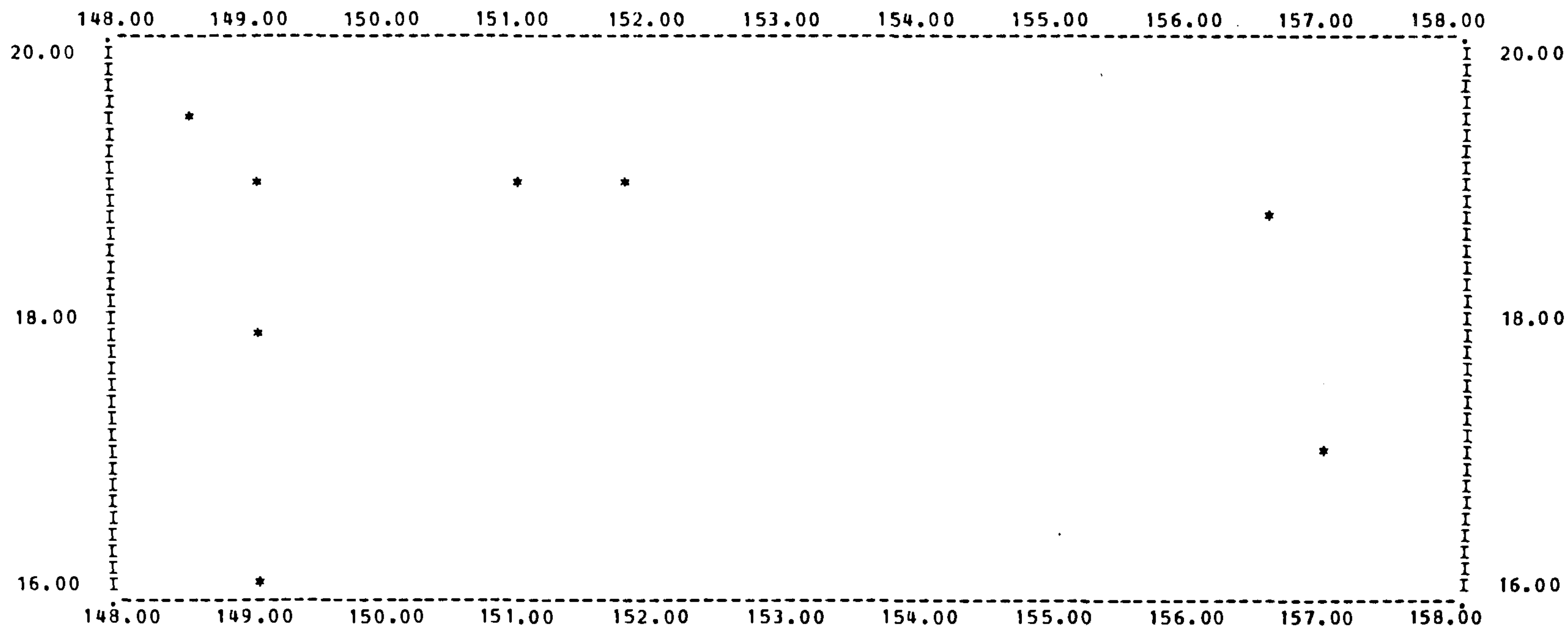
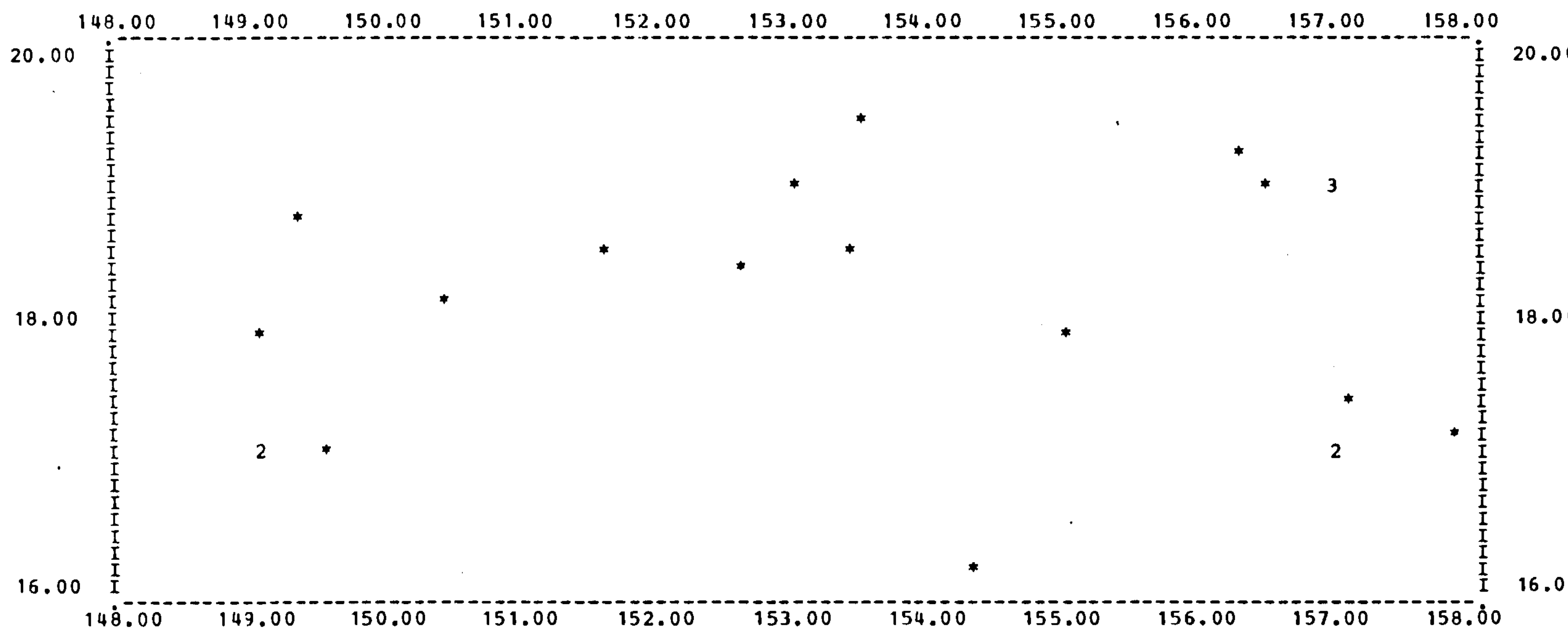
UNIFACIAL SCRAPERS

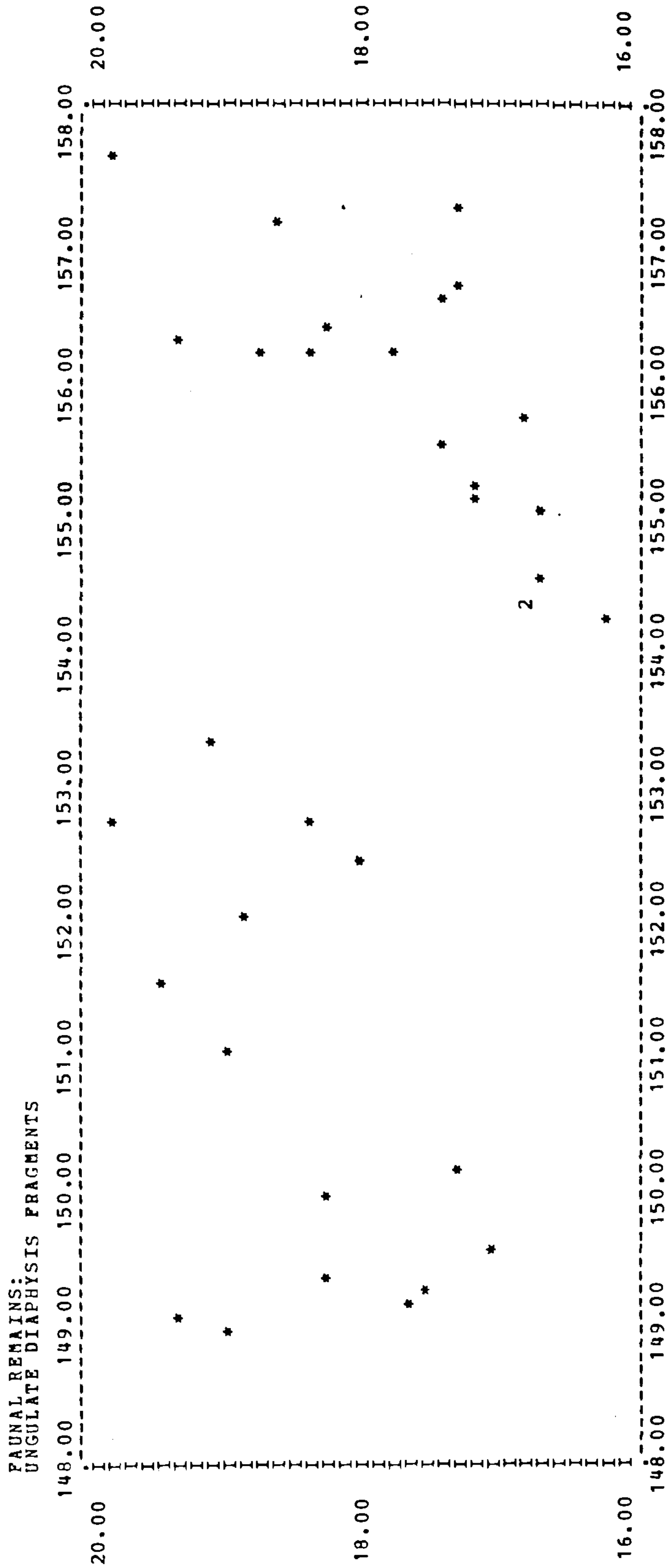


TABULAR SCRAPER-KNIVES



FAUNAL REMAINS:
METAPODIAL BONES

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UNGULATE DIAPHYSIS FRAGMENTS
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157.00
158.00
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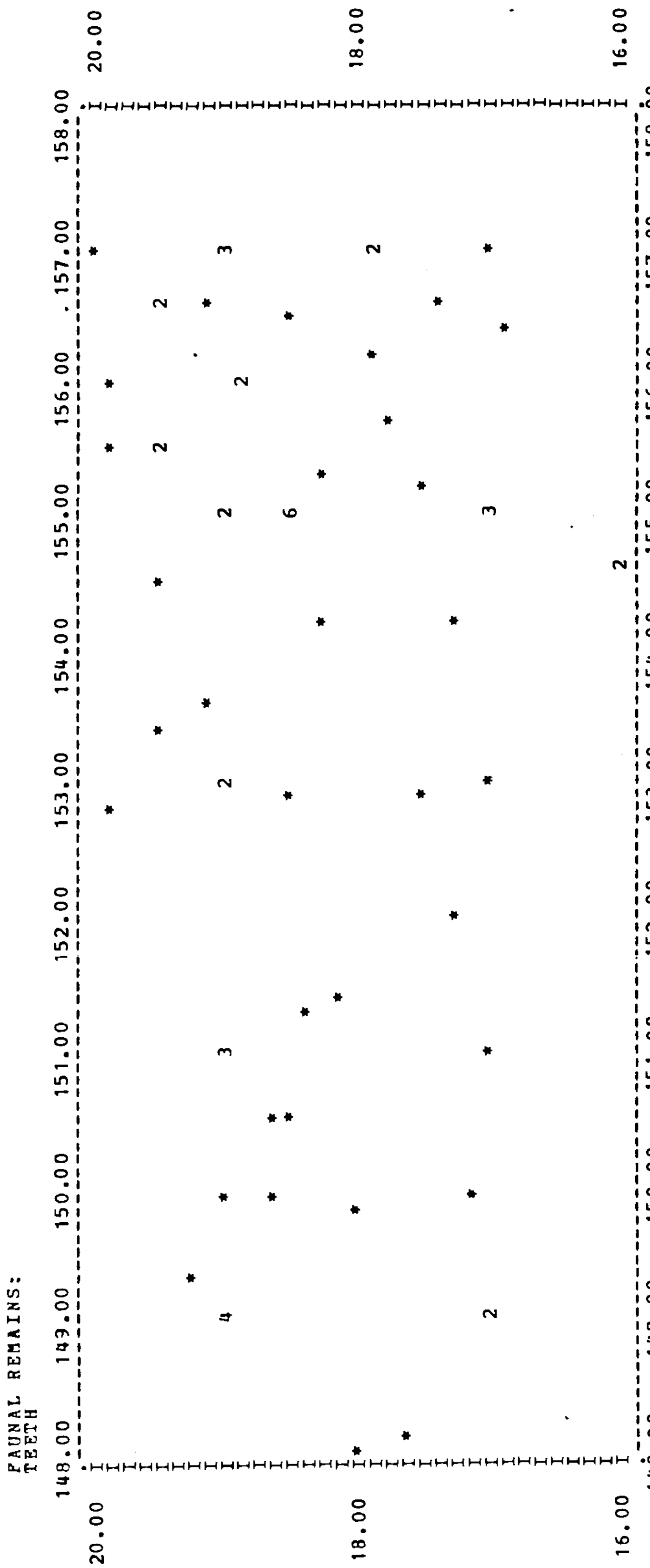
18.00
16.00
2


FAUNAL REMAINS:
TEETH
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152.00
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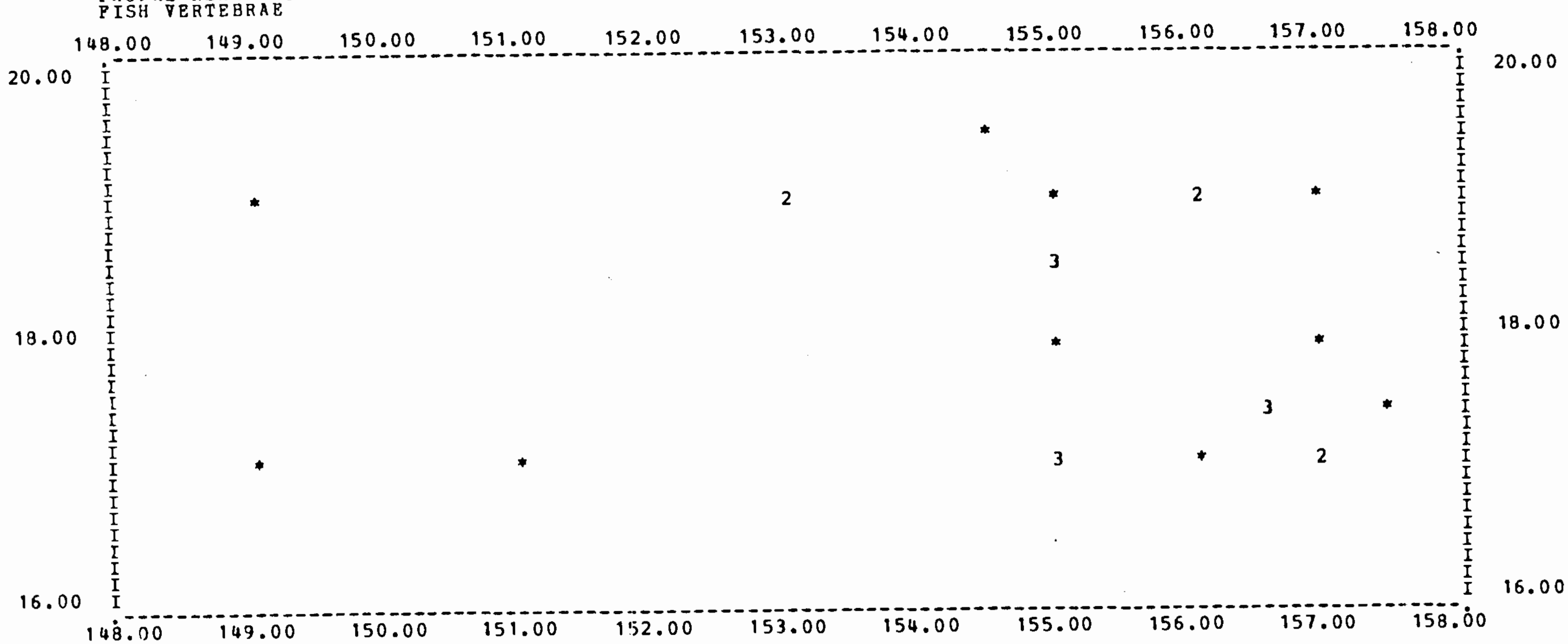
158.00
20.00
18.00
16.00

FAUNAL REMAINS:
FISH VERTEBRAE



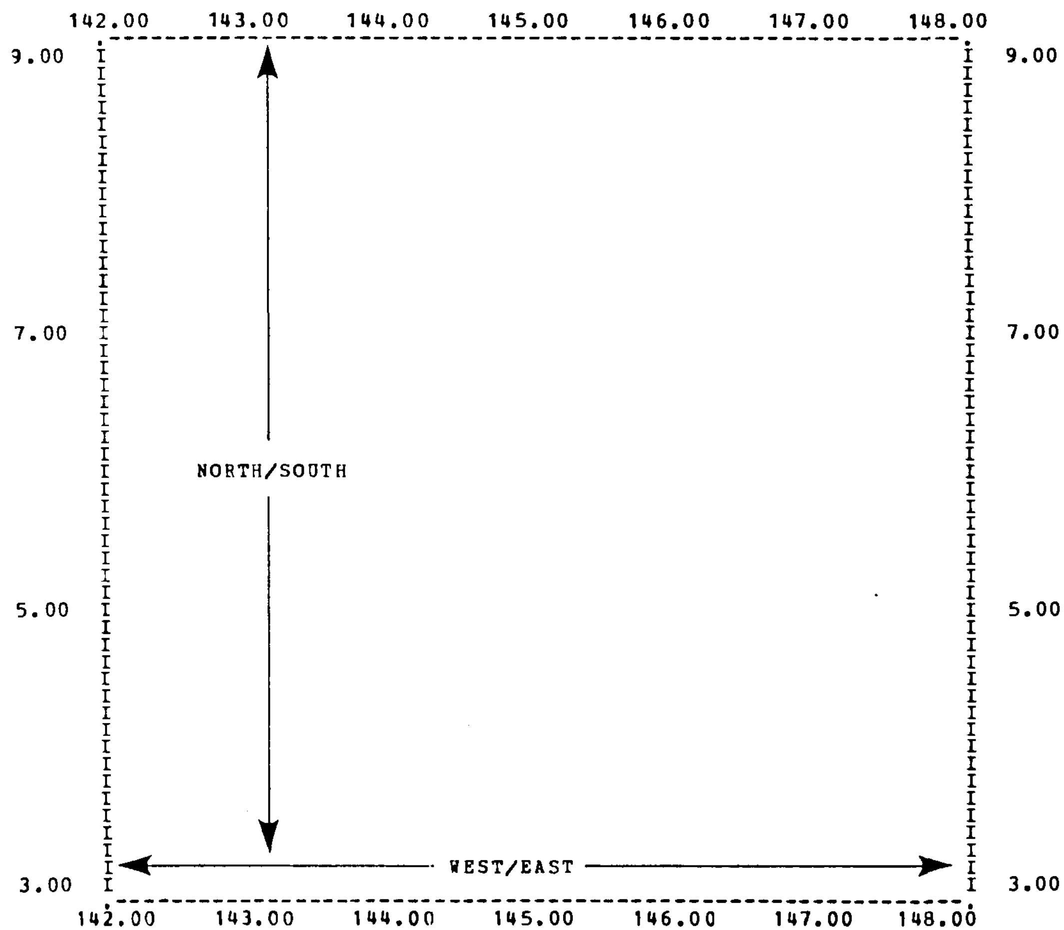
APPENDIX 3.

ARTIFACT AND FAUNAL REMAINS

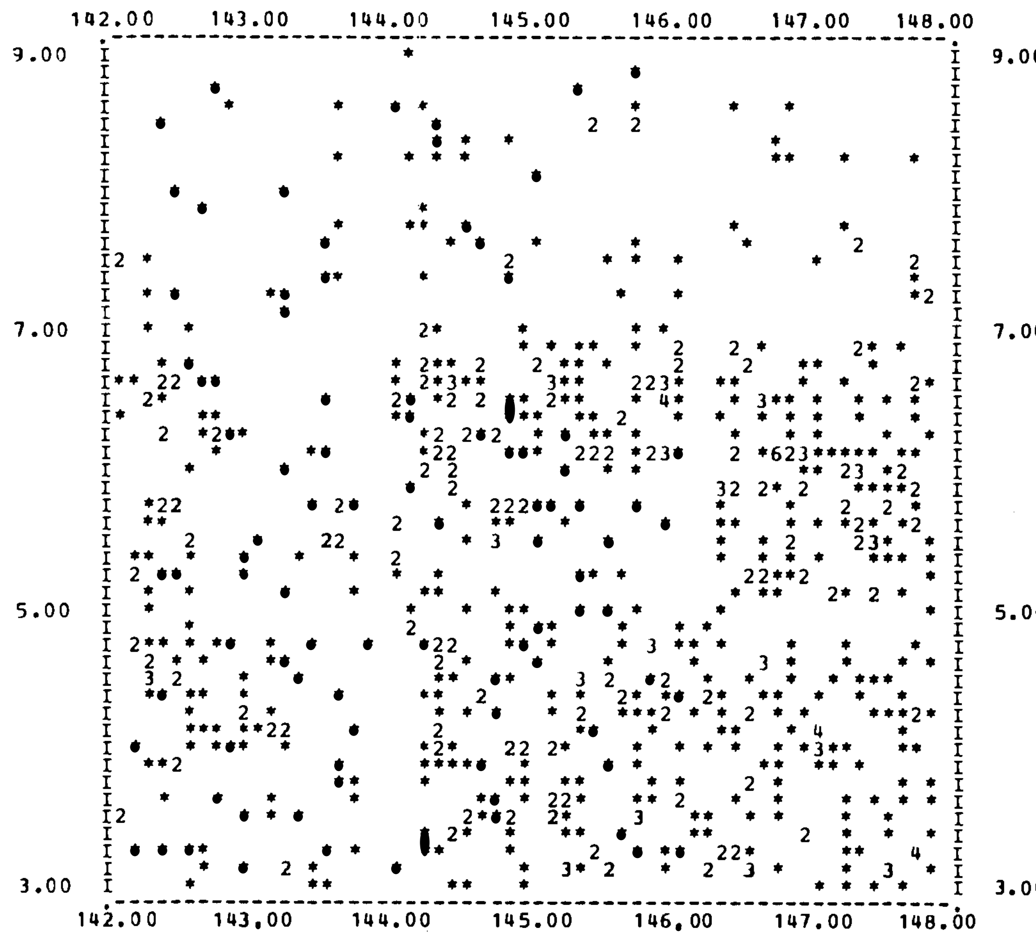
SPATIAL DISTRIBUTIONS.

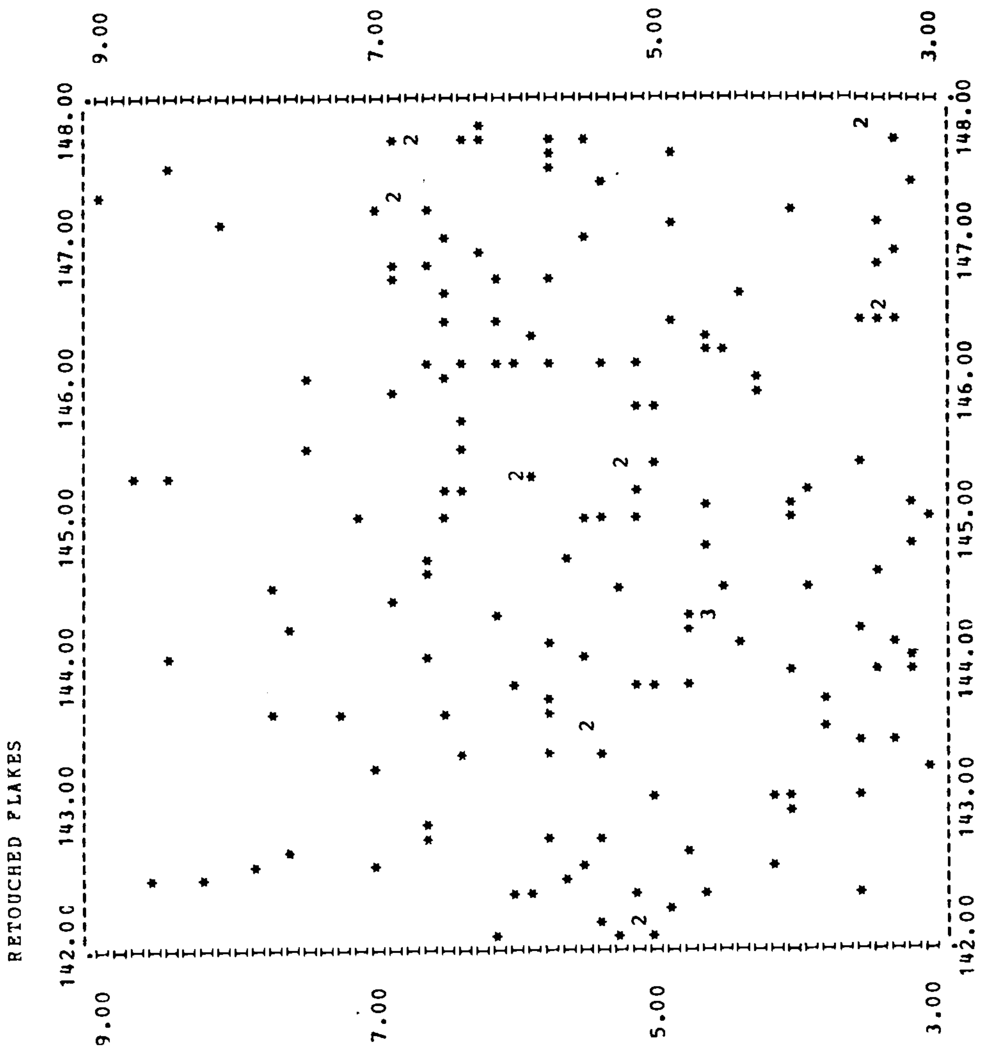
ASSEMBLAGE B.

THIS DIAGRAM ILLUSTRATES THE COORDINATE SYSTEM OF EXCAVATION AREA B.



UNRETOUCHED FLAKES




RETOUCHED FLAKES
142.0C
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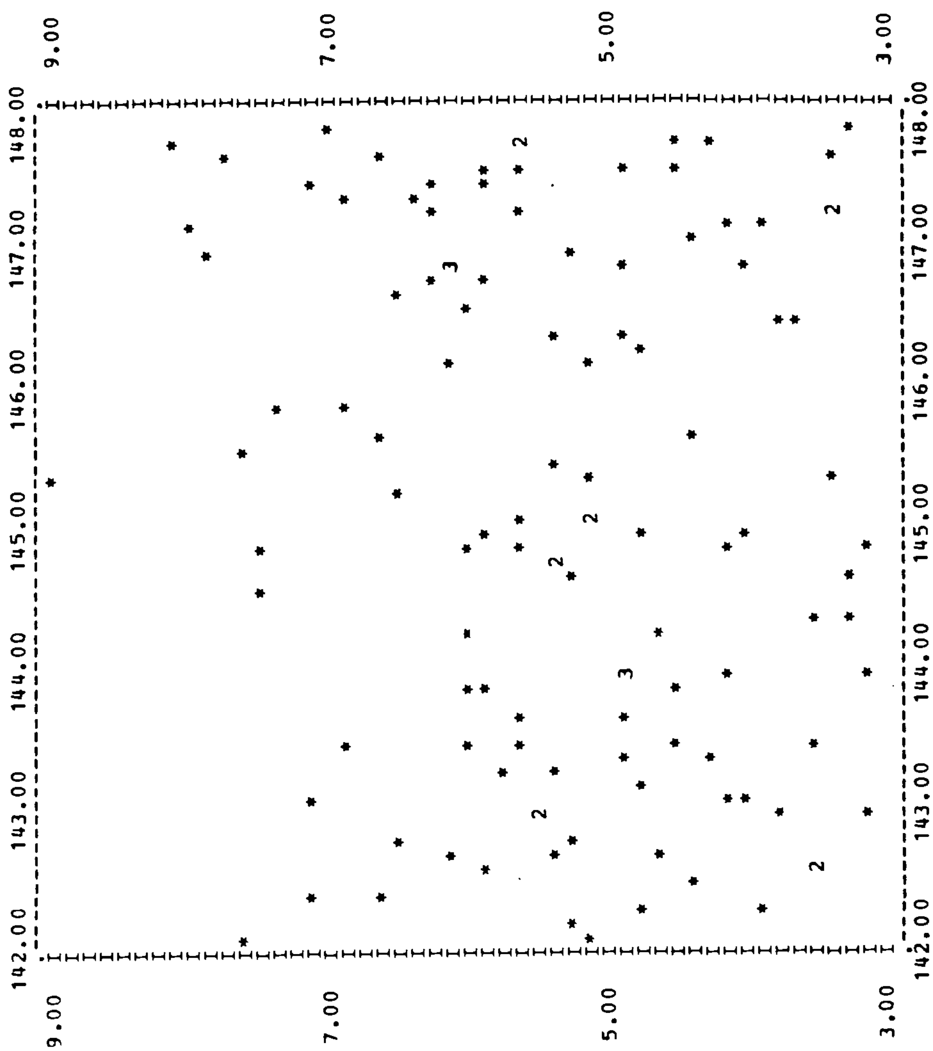
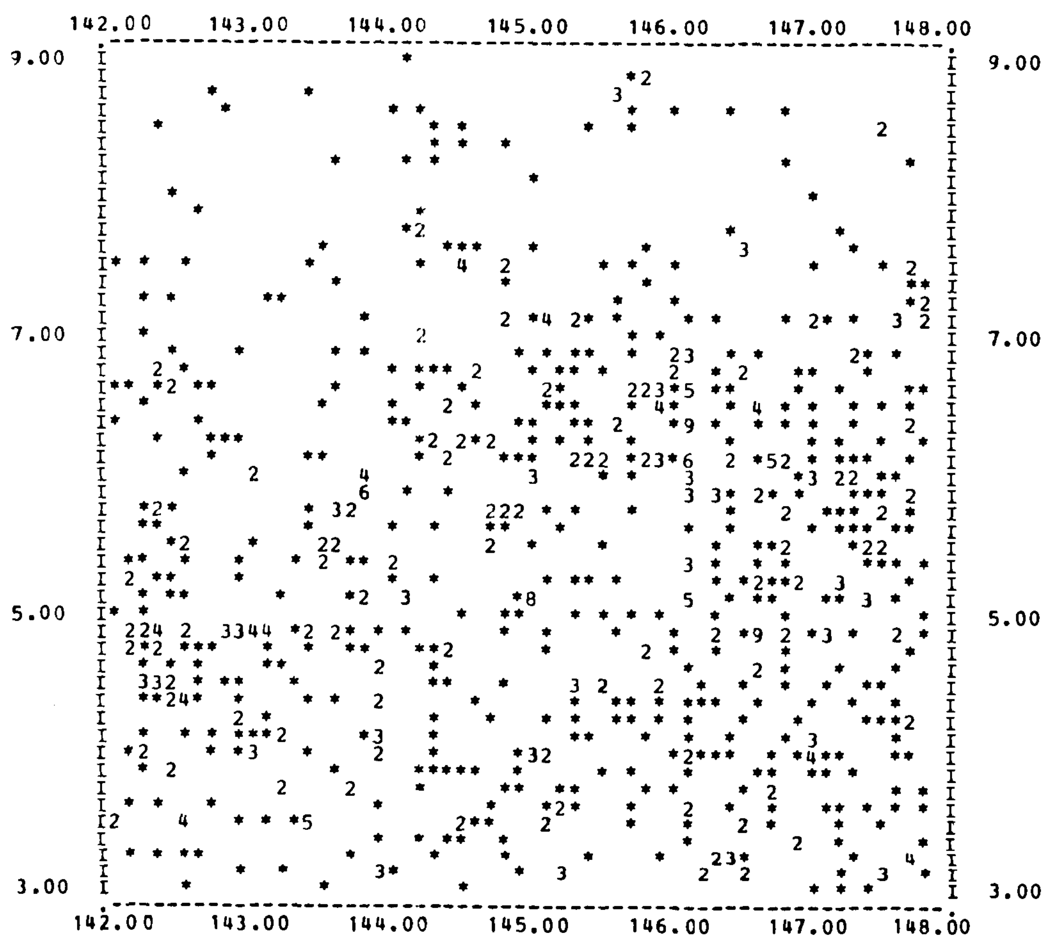
146.00
147.00
148.00
9.00
7.00
5.00
3.00

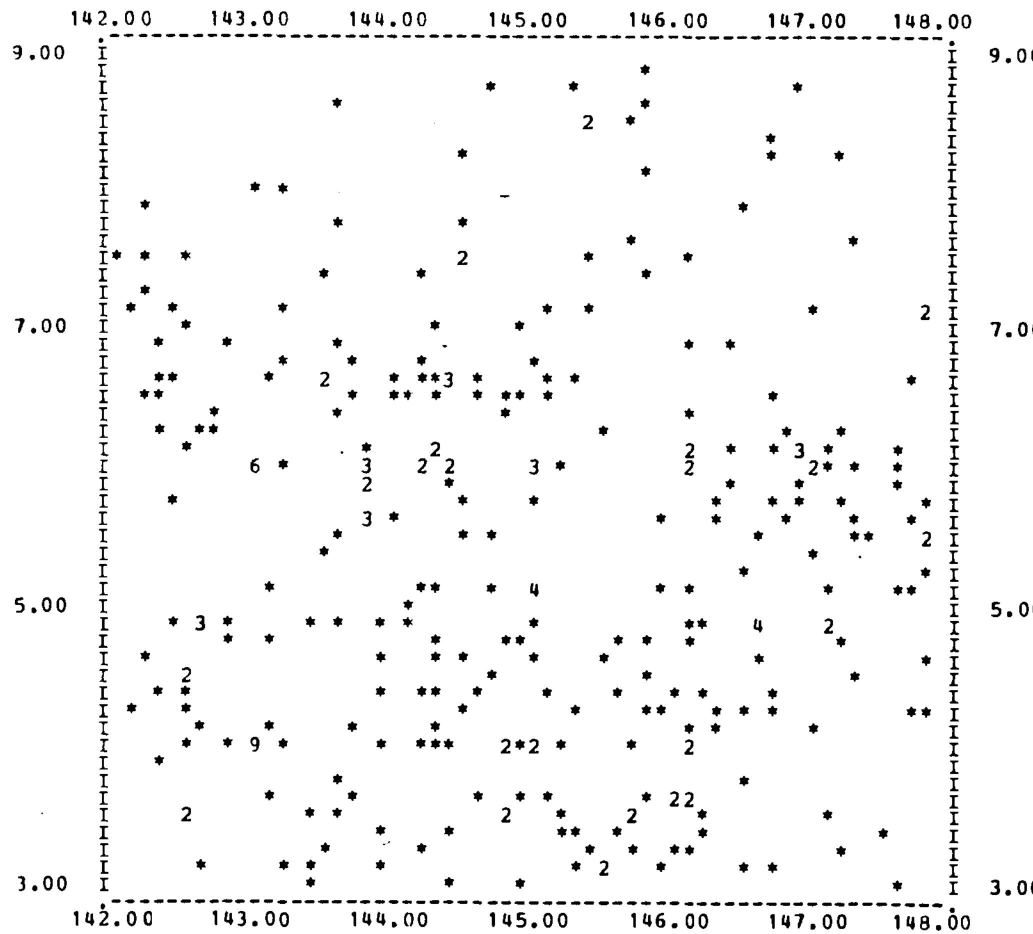
UTILIZED FLAKES



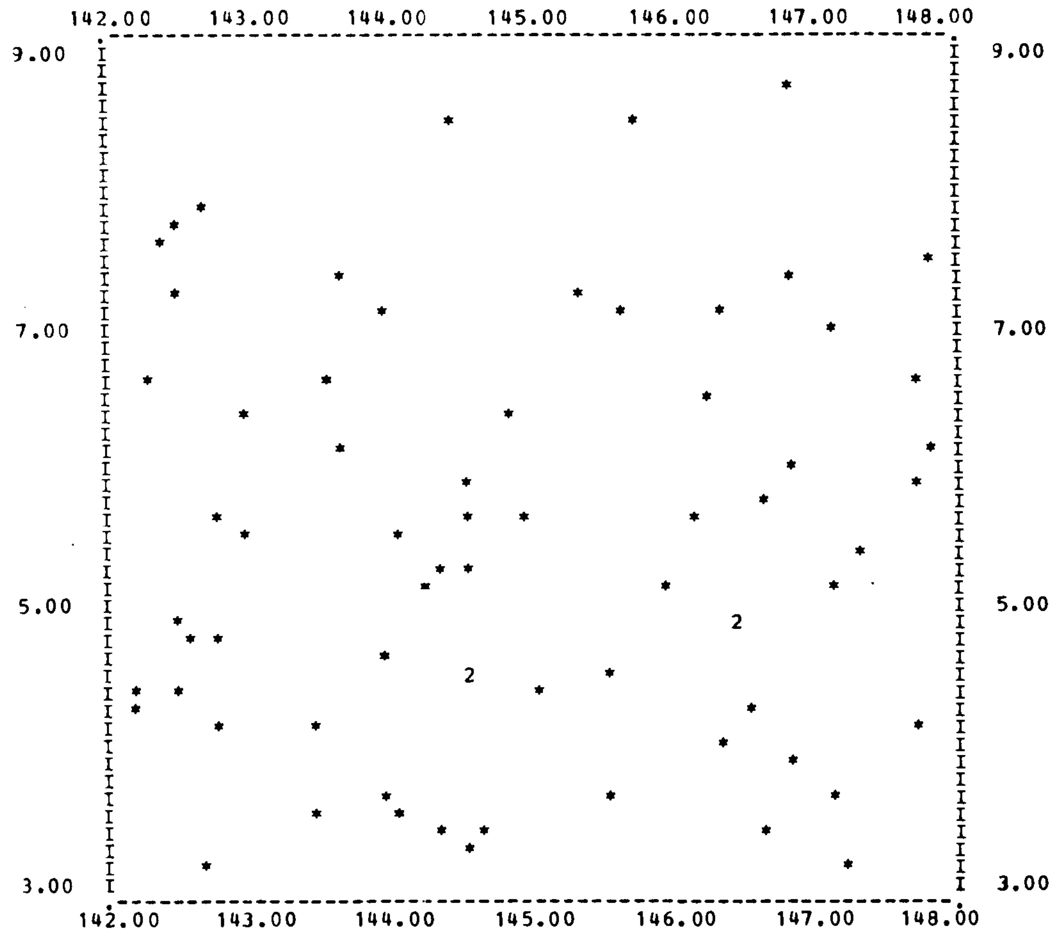
UNRETOUCHED BASALT FLAKES



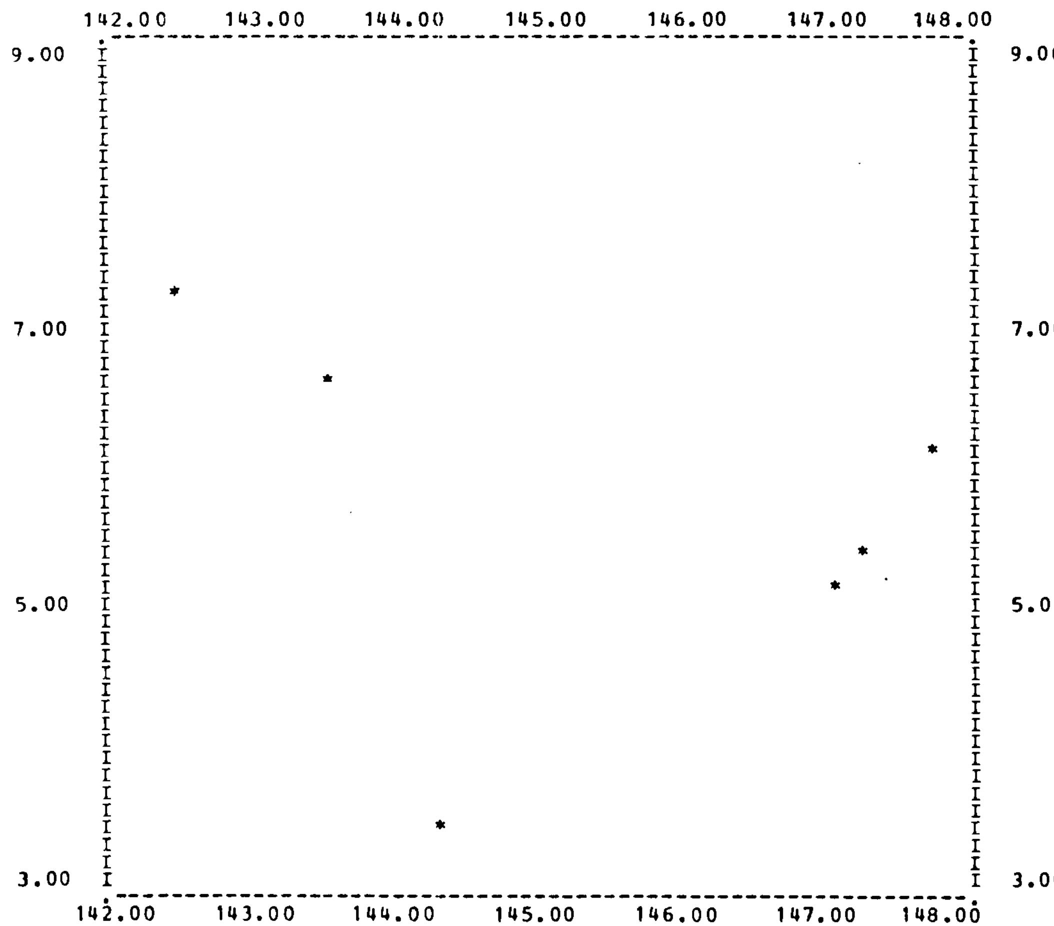
UNRETOUCHED SILICATE FLAKES



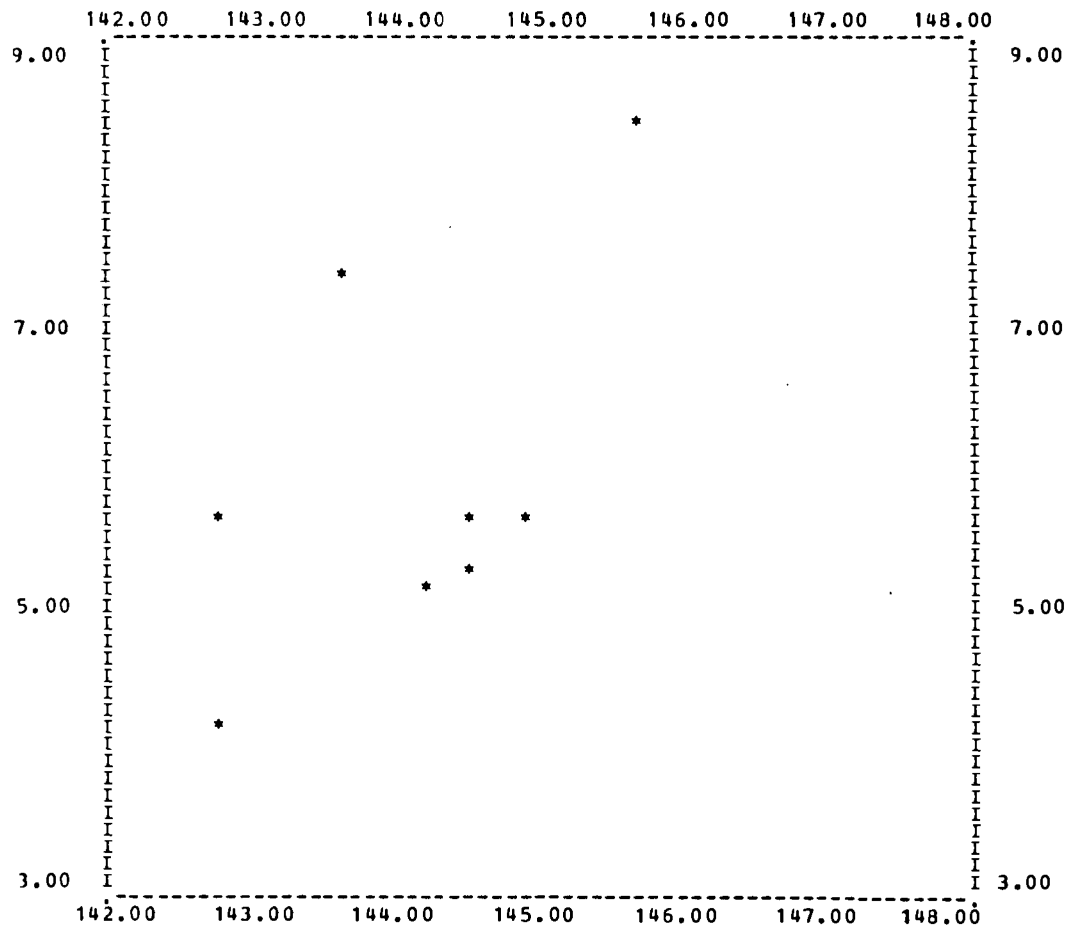
PROJECTILE POINTS: GROUPS 1 TO 6
ALL TYPES



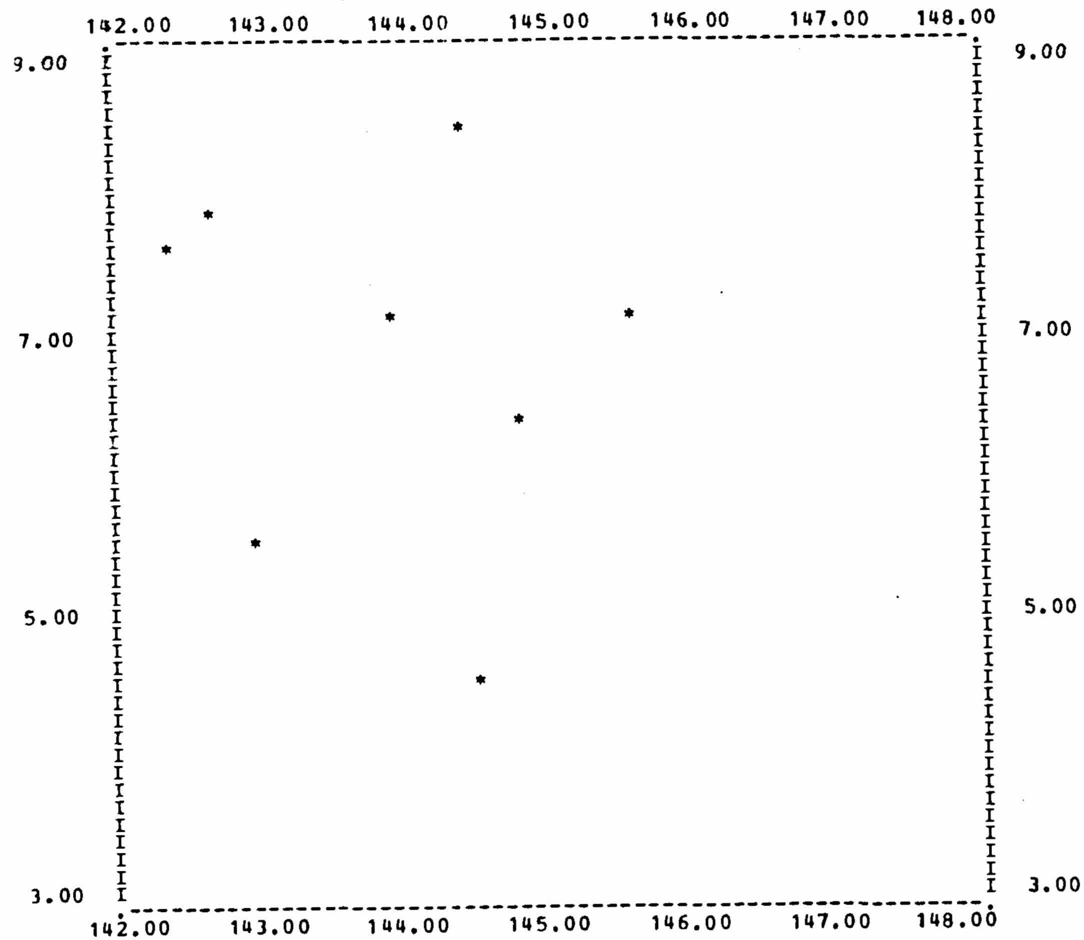
PROJECTILE POINTS: GROUP 1
LEAF SHAPED POINTS



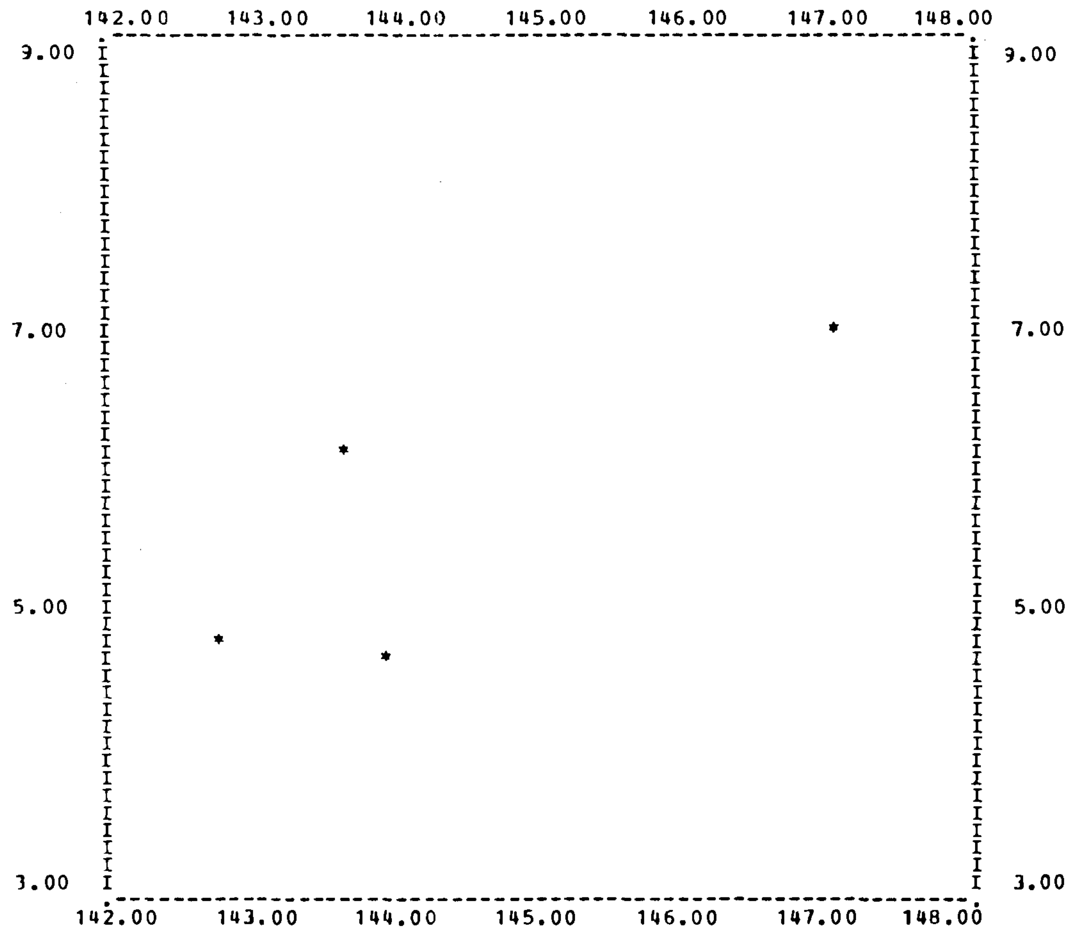
PROJECTILE POINTS: GROUP 2A
CONTRACTING STEM POINTS



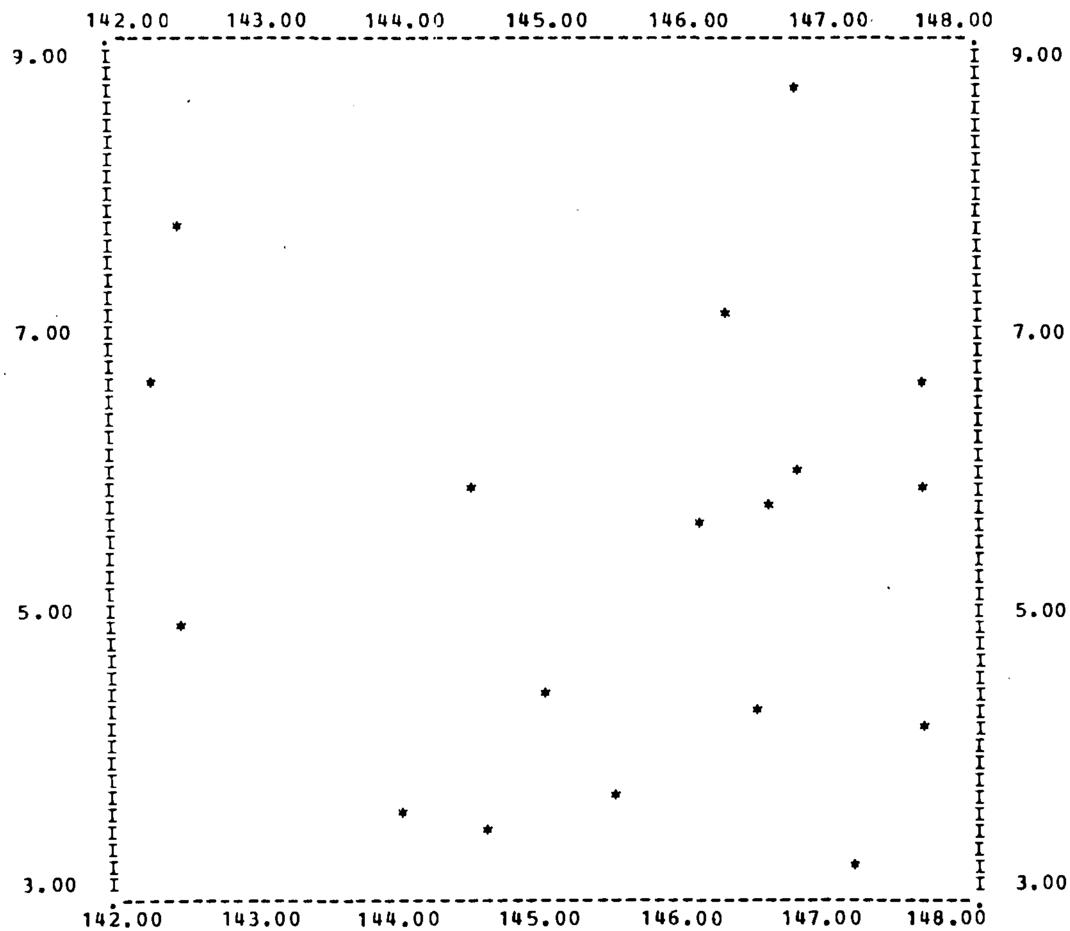
PROJECTILE POINTS: GROUP 2B
CONTRACTING STEM, SHOULDERED POINTS

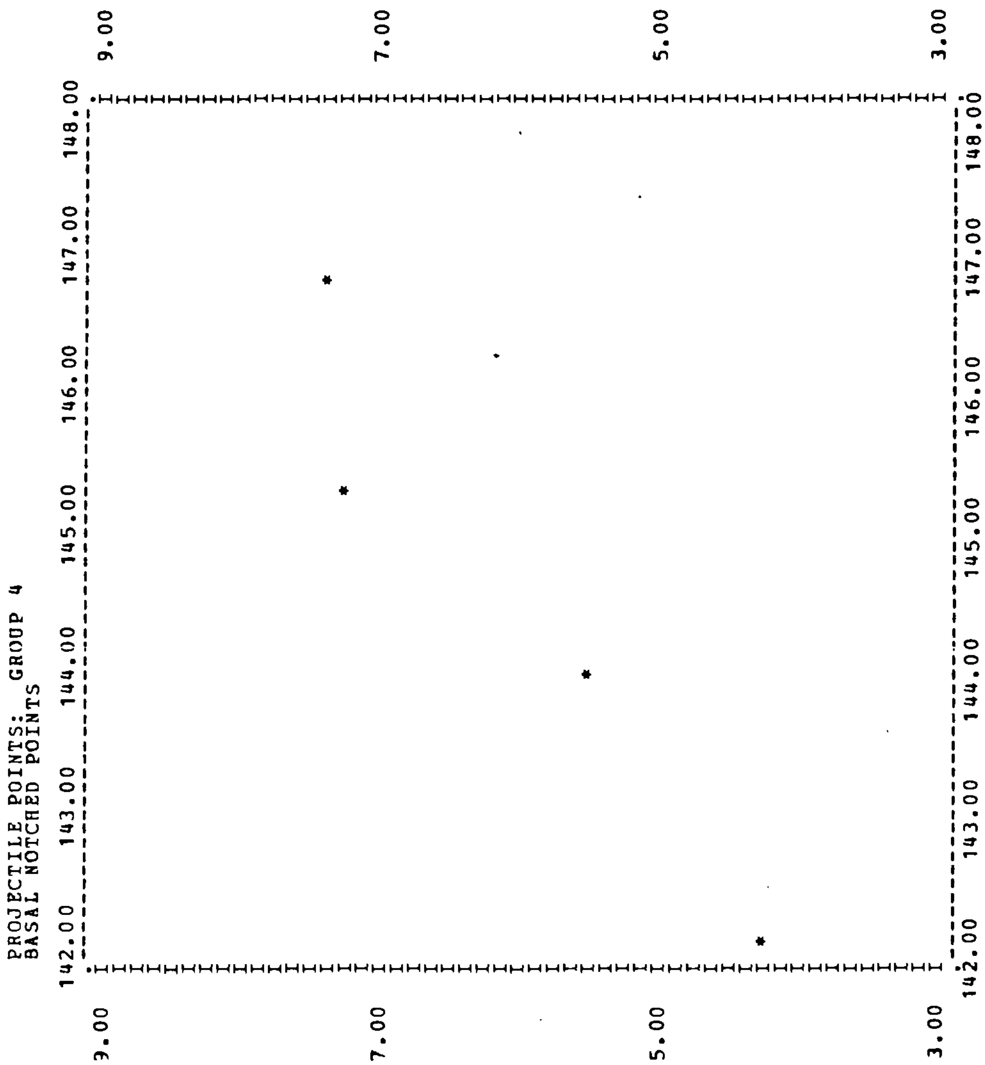


PROJECTILE POINTS: GROUP 2C
RECTANGULAR STEM, SHOULDERED POINTS



PROJECTILE POINTS: GROUP 3
CORNER NOTCHED POINTS




PROJECTILE POINTS: GROUP 4
BASAL NOTCHED POINTS
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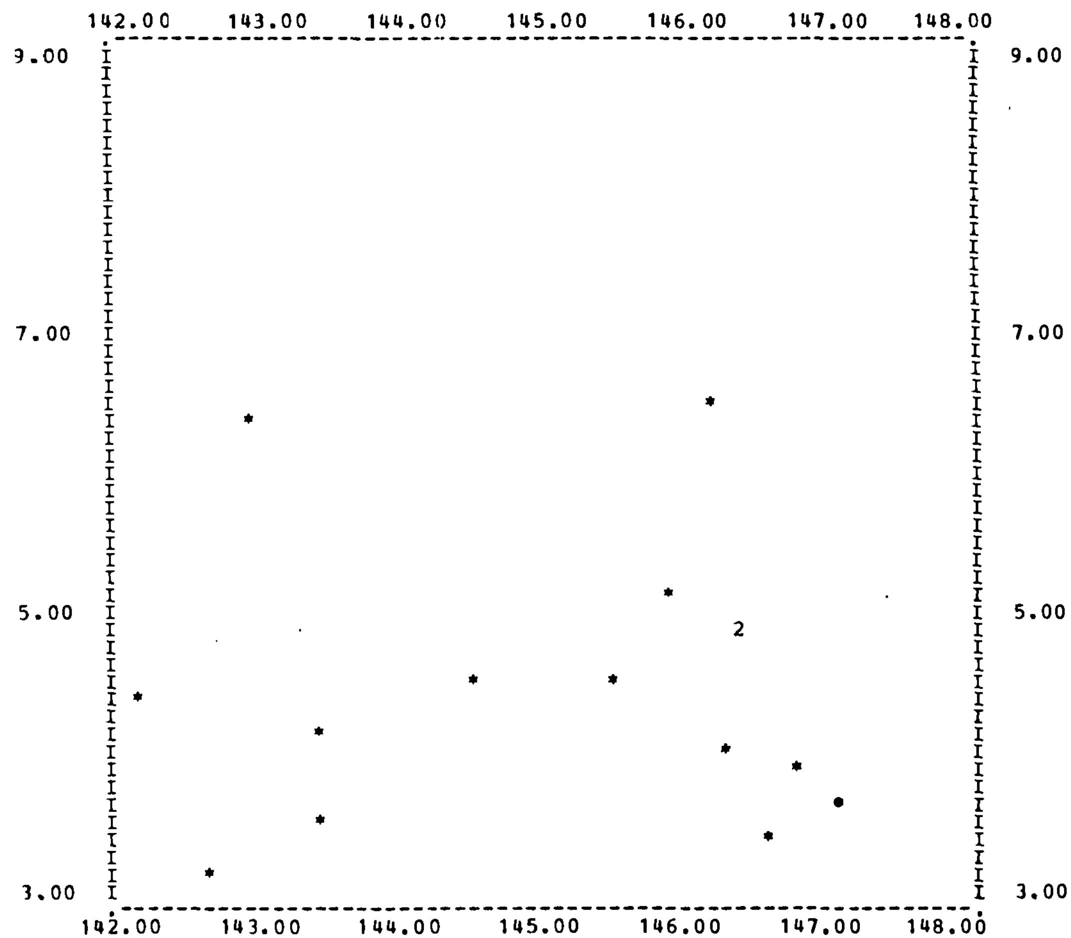
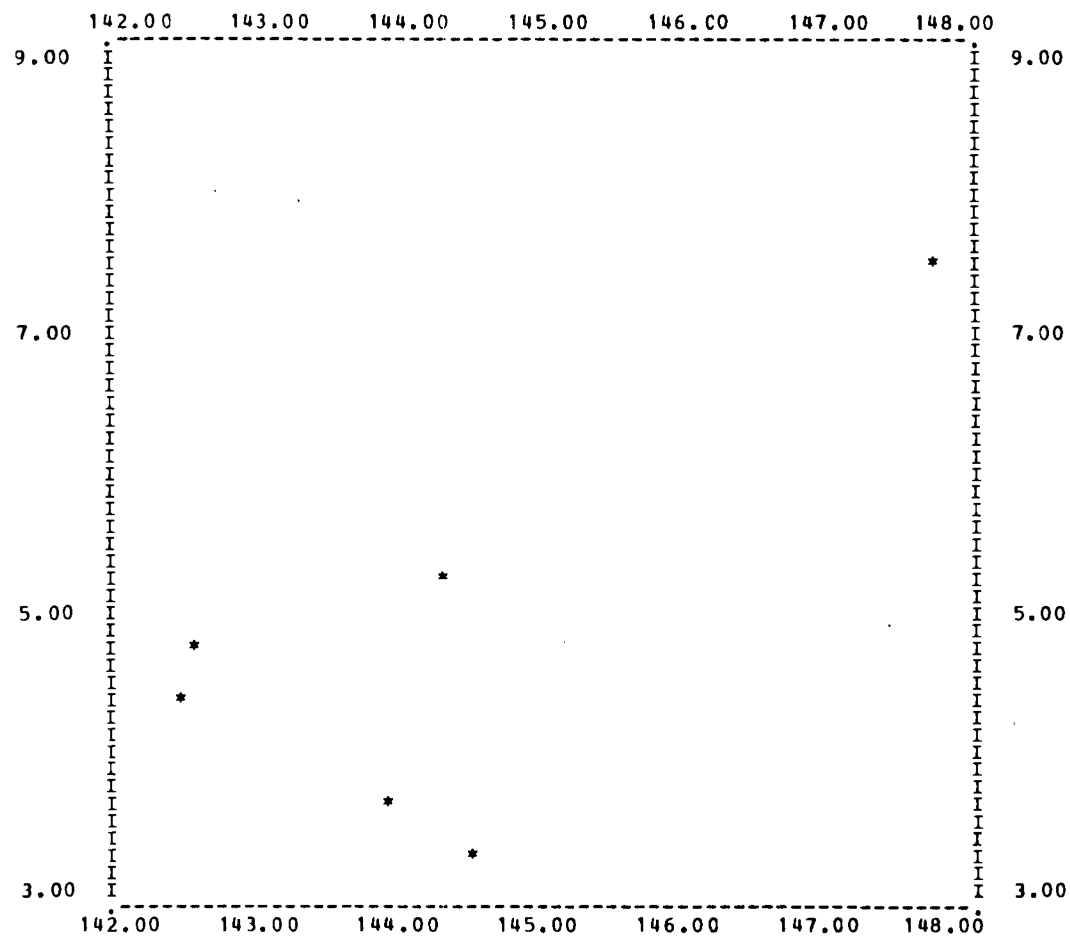
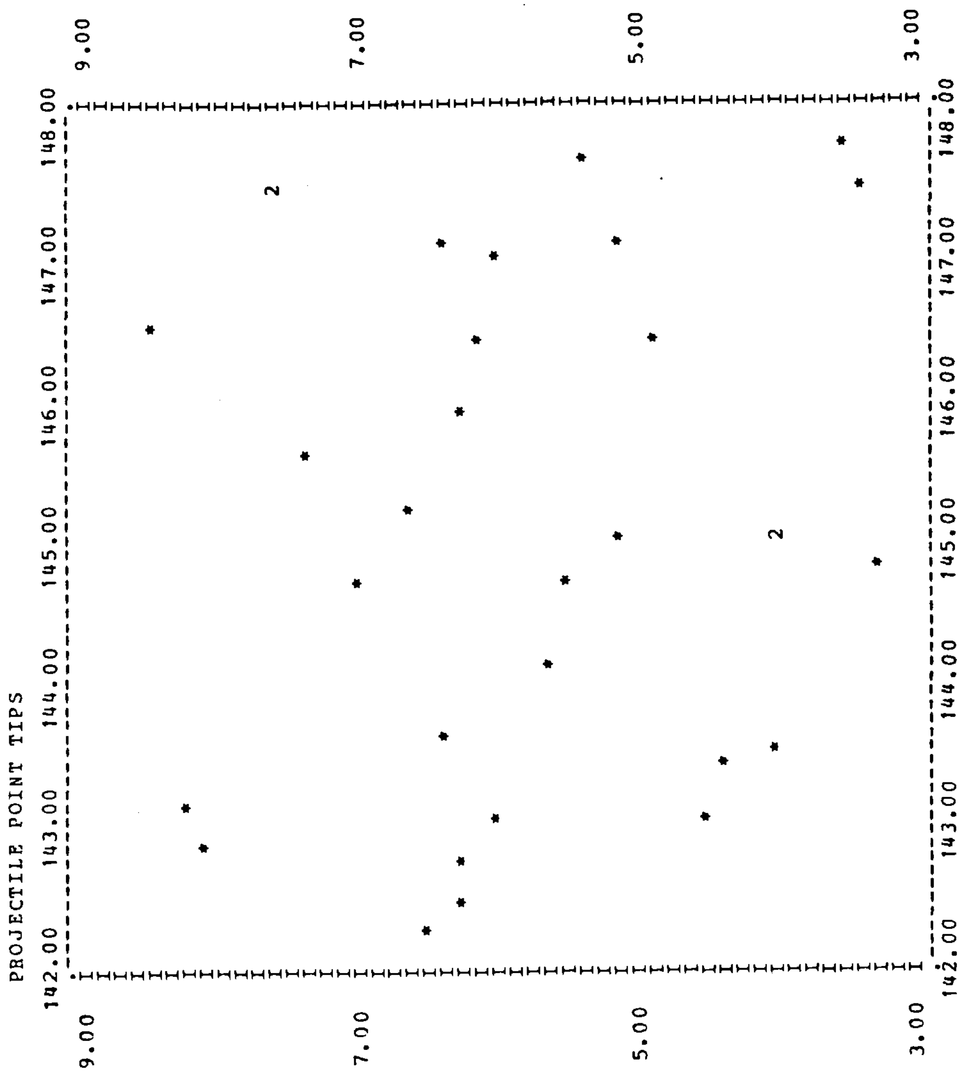
3.00
5.00
7.00
9.00

PROJECTILE POINTS: GROUP 5
SIDE NOTCHED POINTS



PROJECTILE POINTS: GROUP 6
TRIANGULAR POINTS




PROJECTILE POINT TIPS
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9.00
7.00
5.00
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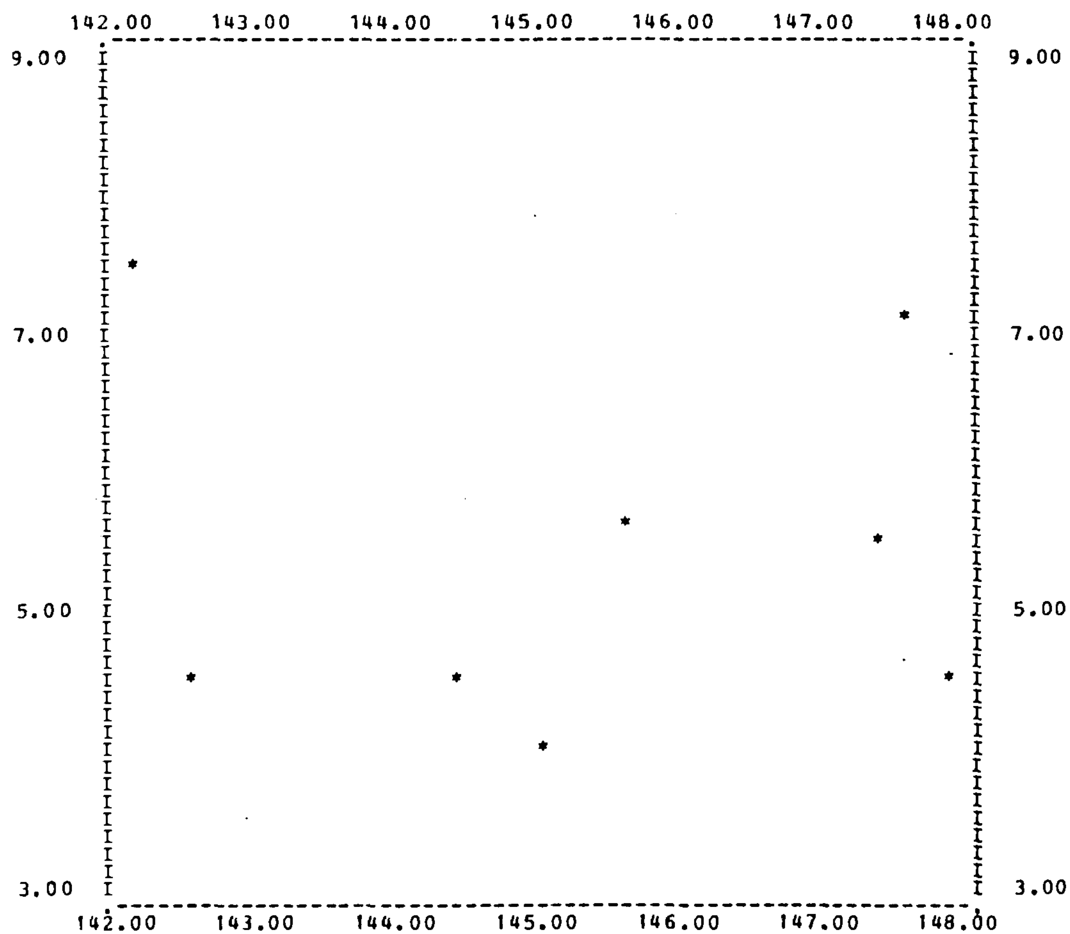
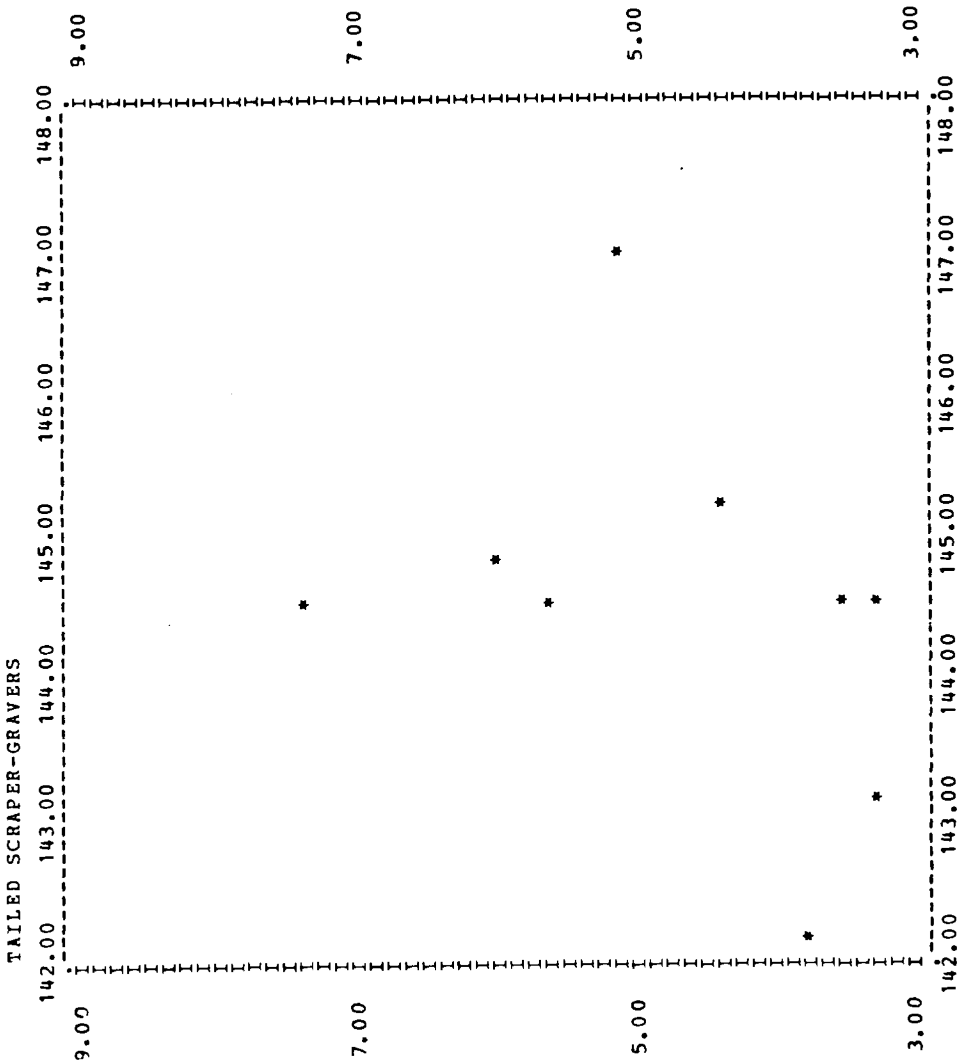
2
2

CORES (ALL TYPES)

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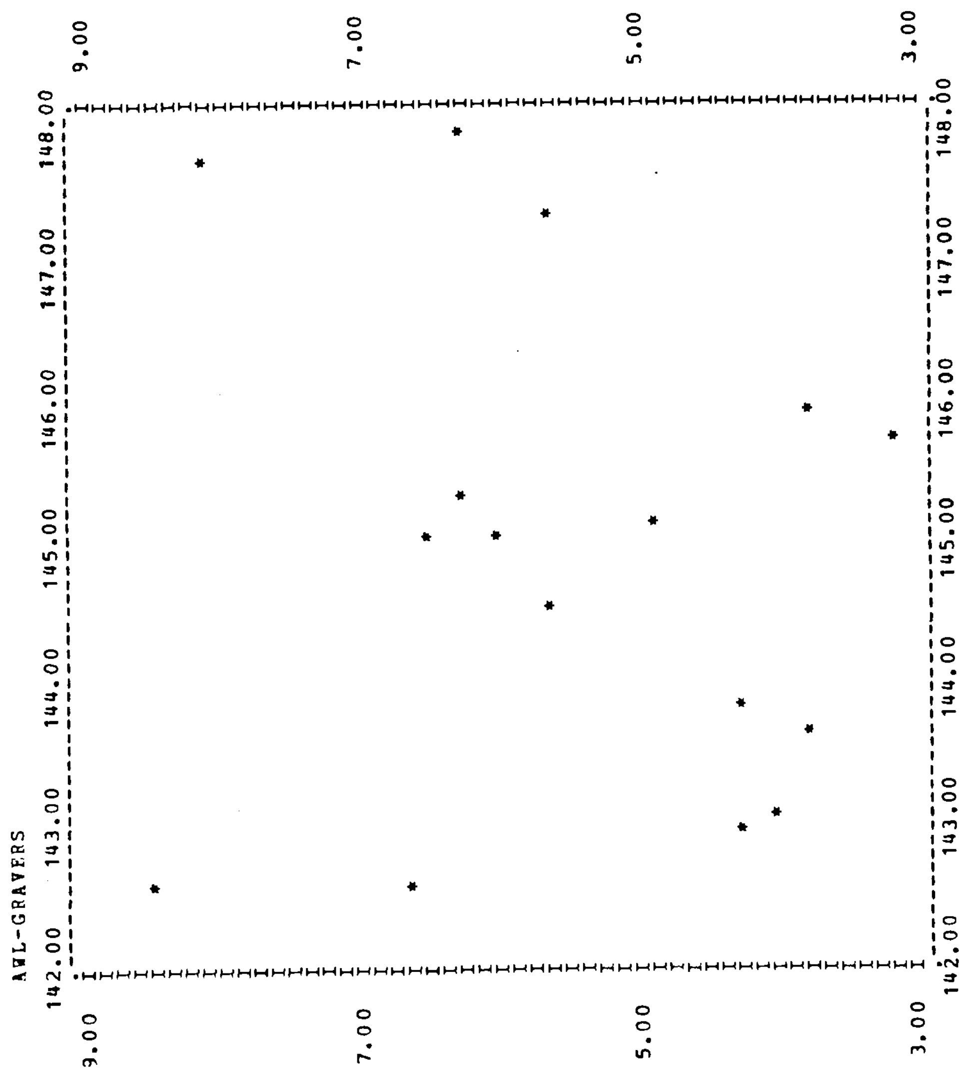
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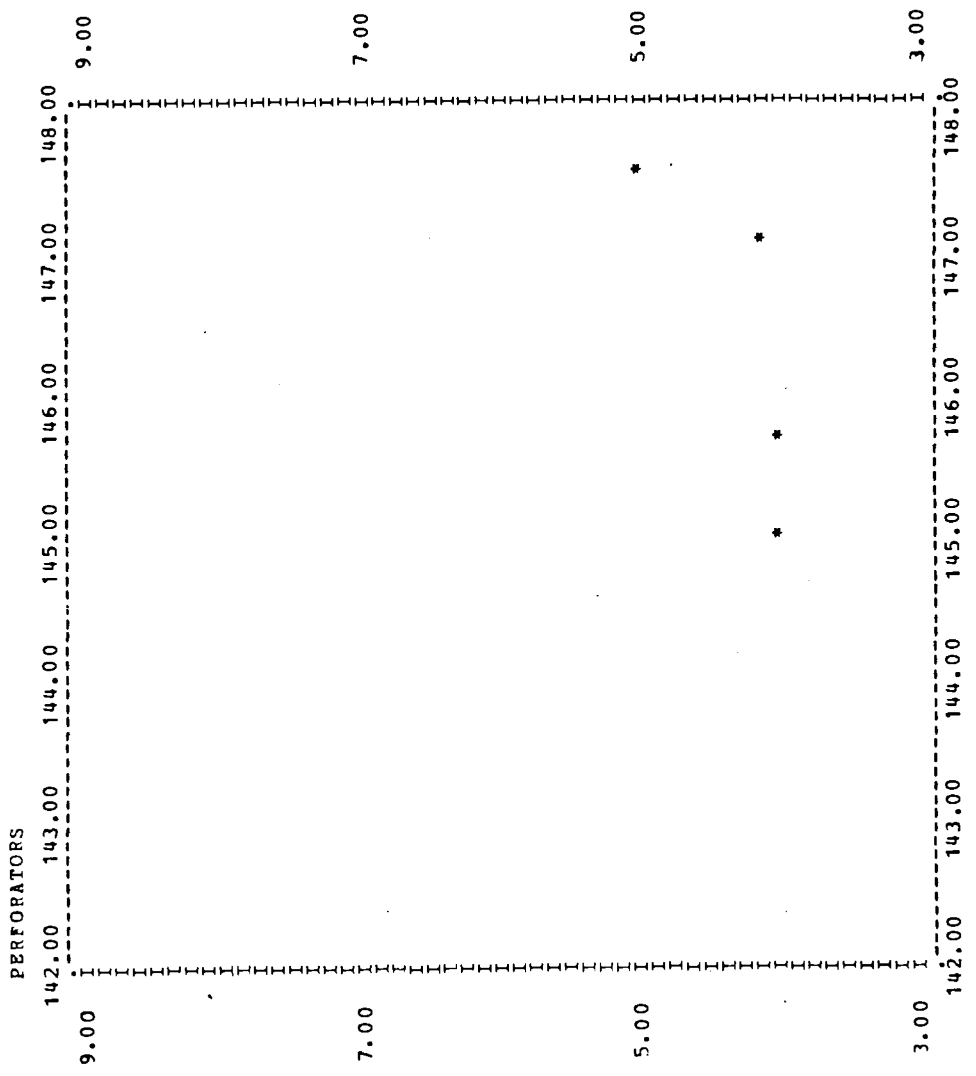
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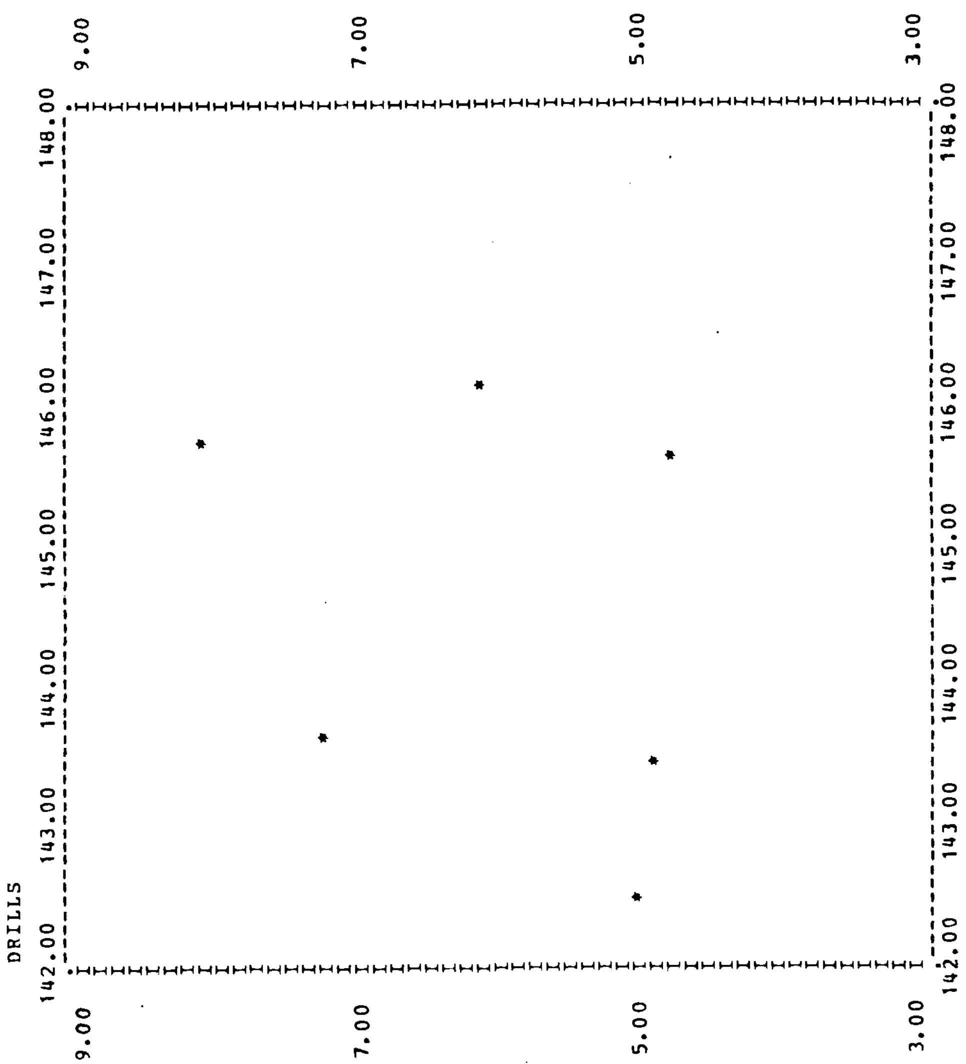
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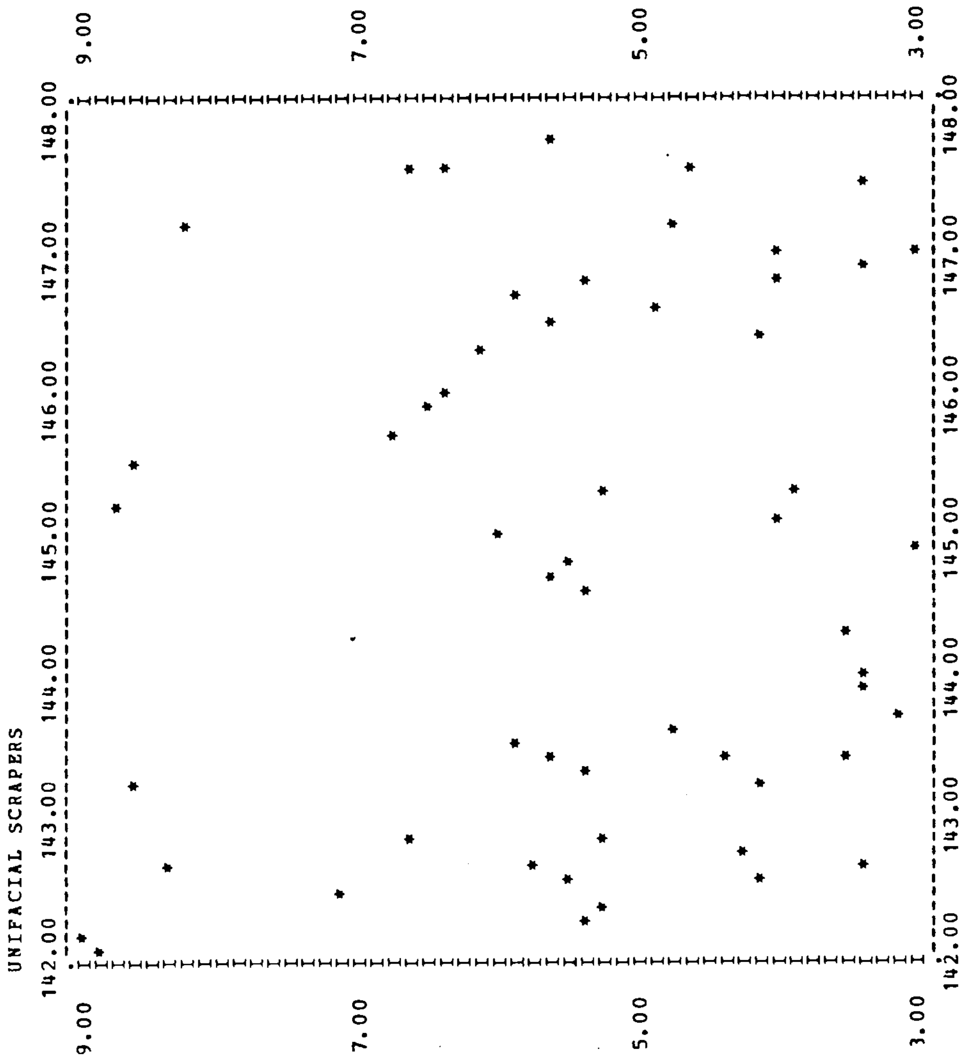
UNIFACIAL SCRAPERS
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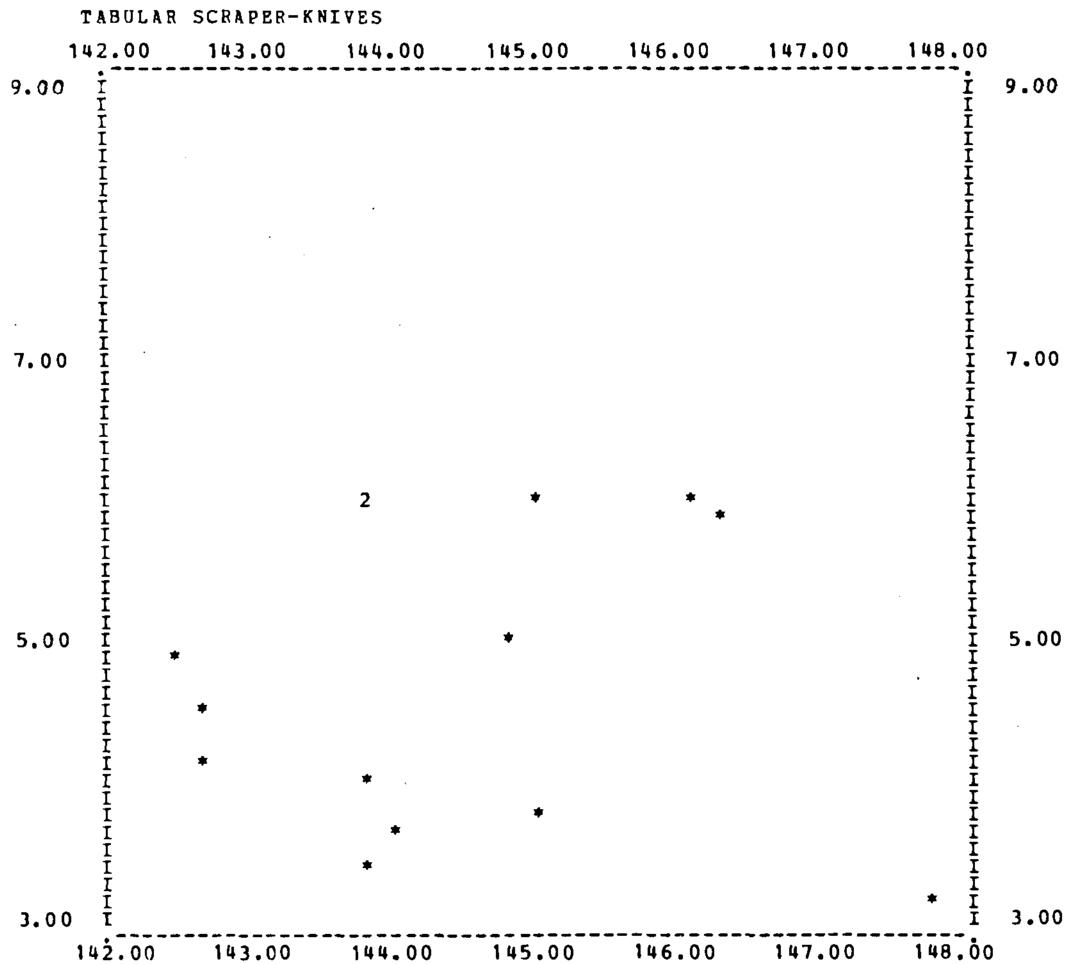
TABULAR SCRAPER-KNIVES
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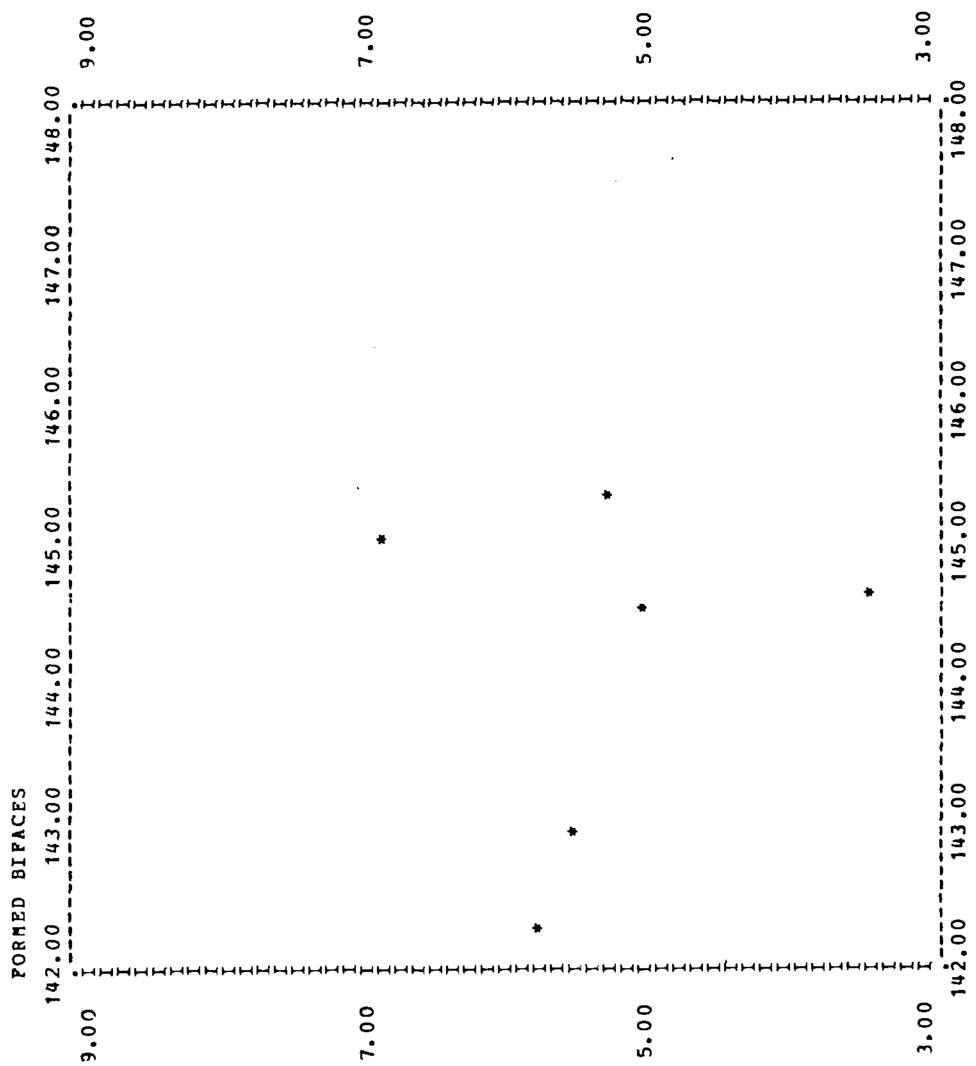
3.00
2



FORMED BIFACES
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9.00
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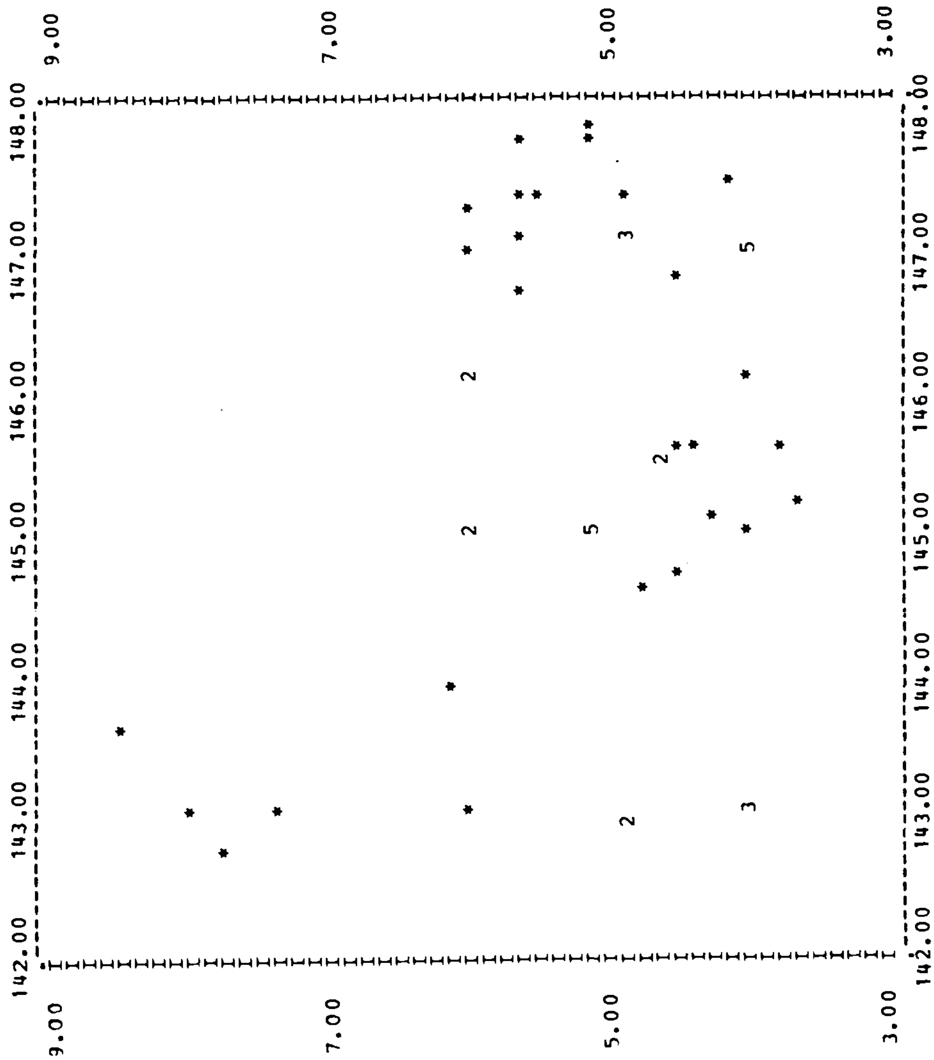
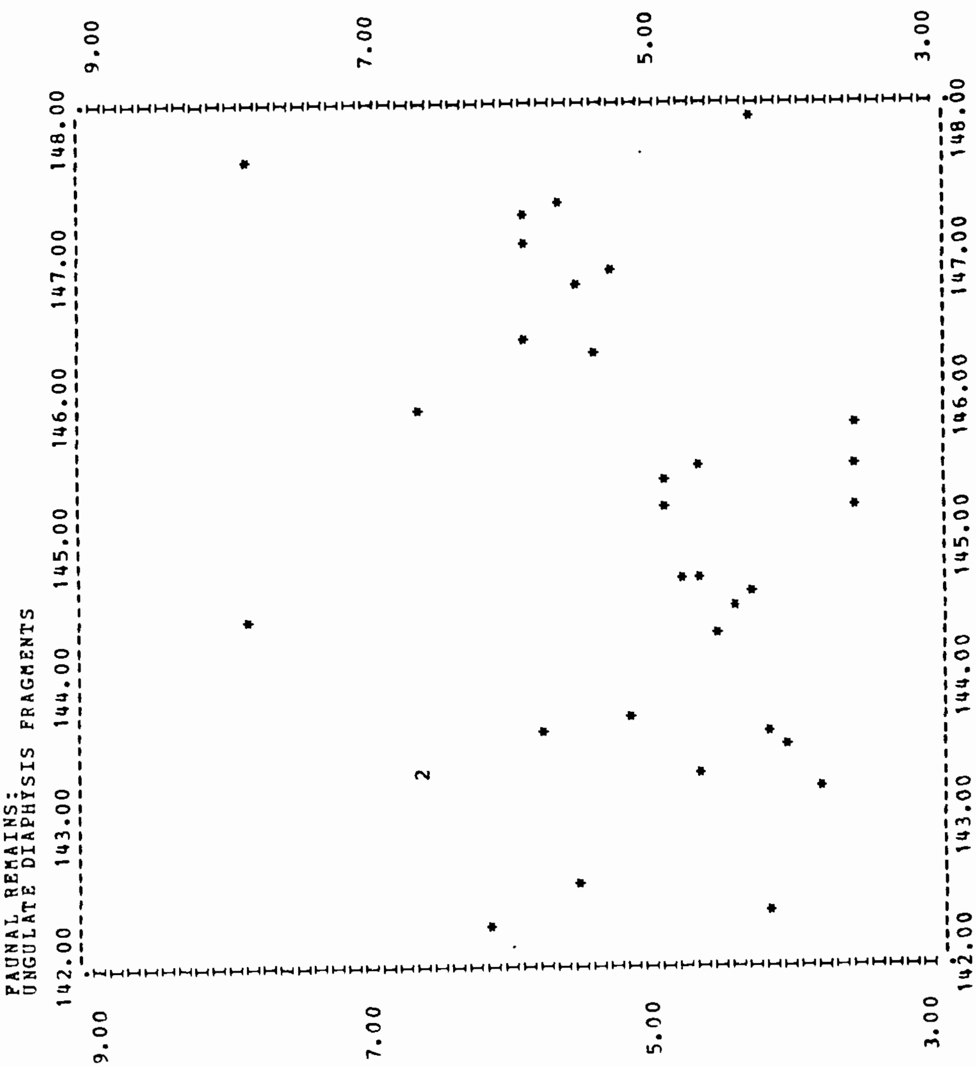
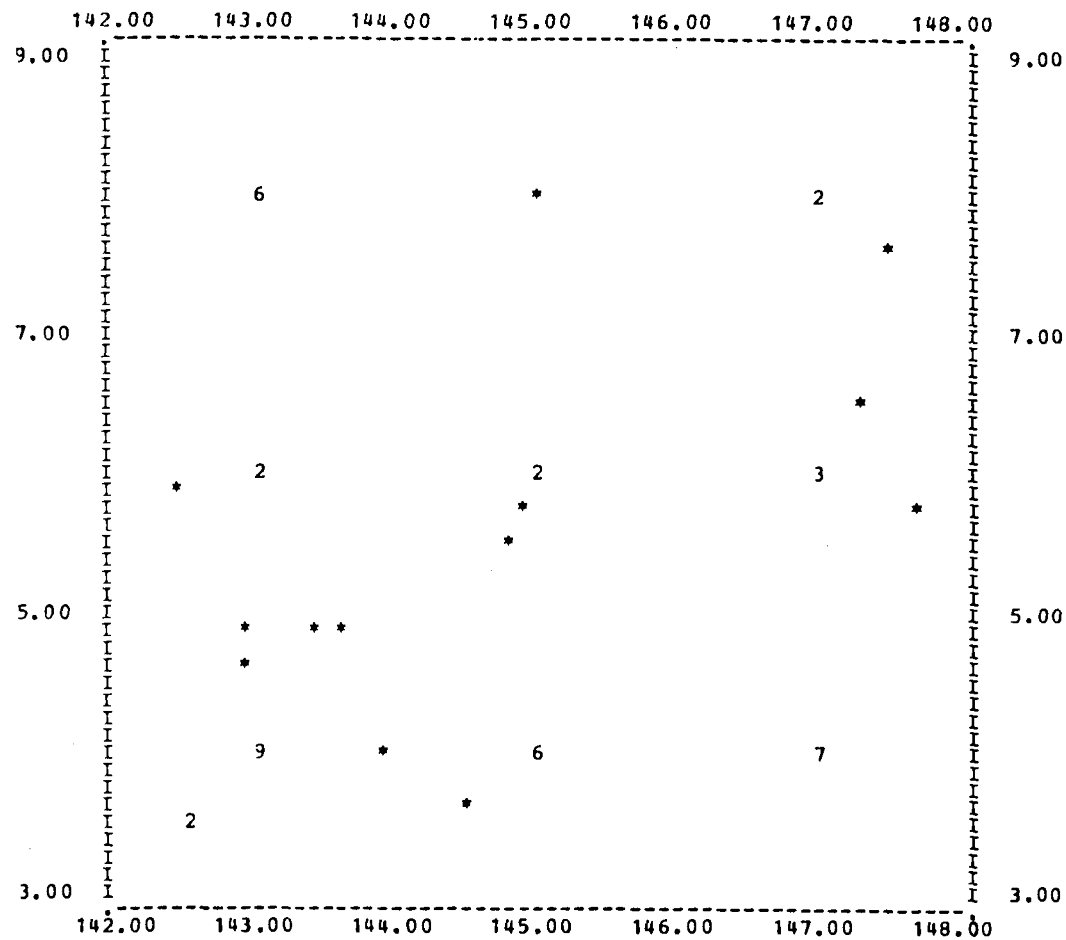
3.00

FAUNAL REMAINS:
METAPODIAL BONES




FAUNAL REMAINS:
UNGULATE DIAPHYSIS FRAGMENTS
142.00
143.00
144.00
145.00
146.00
147.00
148.00
9.00
7.00
5.00
3.00
2

FAUNAL REMAINS:
TEETH



FAUNAL REMAINS:
FISH VERTEBRAE