ARCHAEOLOGICAL INVESTIGATIONS AT THE FLOOD AND PIPELINE SITES , NEAR HOPE , BRITISH COLUMBIA

by

GEORG HENNING VON KROGH

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Name: Georg Henning von Krogh

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Examining Committee:

Chairman: Knut R. Fladmark

Roy L. Carlson
Senior Supervisor

Jack D. Nance

Donald H. Mitchell
External Examiner
Associate Professor
Department of Anthropology
University of Victoria

Date Approved: March 15th, 1976

ABSTRACT

This thesis is an archaeological study of two prehistoric housepit sites which lie in the ethnographic territory of the Upper Stalo Tait group, near Hope, British Columbia. The excavations, conducted under my direction in 1974, although salvage oriented, provide new data on both housepit form and the prehistory of the Hope-Yale locality.

The investigations undertaken have a number of specific and related objectives. A major concern is the description of the structural form of the housepits investigated. A detailed ethnographic account is given to aid in the understanding and interpretation of these features. To facilitate comparative work with the materials recovered, a major portion of this thesis is devoted to the analysis and description of both cultural features and artifacts. Linked to this is the identification and definition of discrete occupation components as they exist within the assemblages from the two sites. Intra- and inter-site relationships of the sites in the Hope-Yale locality are examined, with specific attention being given to the outlined Fraser Canyon sequence. Wider comparisons are made, dealing with the Hope-Yale locality and its coastal and interior neighbours.

Although the data base is sparse, the Hope-Yale locality appears to be clearly transitional to both the coast and interior regions. The cultural sequence as outlined for the southern Fraser Canyon locality appears to be supported by these findings, with components being tentatively assigned to the Skamel and Emery Phases. The sequence must, however, be more clearly and concisely defined before this can be confirmed.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FIGURE PAGE

CHAPTER I

INTRODUCTION

This thesis deals with excavations conducted during 1974 at the Pipeline and Flood sites. These excavations, though salvage oriented, were designed to examine specific housepit features. To accomplish this, various questions concerning housepite construction, function, related cultural features and the material cultural assemblages were formulated.

More specifically, this thesis is concerned with the detailed description and comparison of cultural assemblages, cultural features and discrete occupation components recovered as a result of these excavations. The data presented contribute to the small body of quantitative data already available for study from the Hope-Yale locality. Intra- and inter-site comparisons are made with other sites in the Hope-Yale locality as well as the neighbouring localities. The temporal arrangement of the discrete occupation components is discussed with specific reference to the cultural sequence already outlined for the southern Fraser Canyon.

The outline of this thesis was designed to acquaint the reader with the area, to present the data, to discuss the data in relation to the Hope-Yale and neighbouring localities, and finally, to give a brief summary of the work undertaken. An outline of the chapters follows. Chapter II, outlining the setting, has been broken into three sections. The first deals with the locality today, reviewing the physiographic outline, the climate and the potential floral and faunal resources. The second section presents the pertinent ethnographic data, dealing particularly with the ethnographic inhabitants of the Hope-Yale locality, the relations of these people with their neighbours, settlement pattern, the use of pithouse structures, the seasonal round and methods of food preparation. This presentation of ethnographic data is not meant as a complete review of the subject, but rather to discuss aspects of the ethnographic record that would be of most use in the interpretation of the archaeological record. The final section in this chapter briefly outlines the previous archaeological work conducted in the Hope-Yale locality.

Chapter III describes the excavations conducted and outlines the stratigraphy. This includes a brief prelude to the excavations, outlining background data prior to excavations, the excavation procedure, a description of the two sites involved, problems in interpreting housepit stratigraphy and the definition of discrete occupation components. Chapter IV, on cultural features, and Chapter V, on the artifact assemblage, deal with the cultural materials exposed or recovered during the course of excavation work.

Chapter VI discusses the data with respect to intra- and inter-site comparisons. The dating of the various occupation components is also dealt with. Finally, Chapter VII gives a brief summary outlining the results of this work, as well as posing some questions and problems for future research in the Hope-Yale locality.

CHAPTER II

THE SETTING

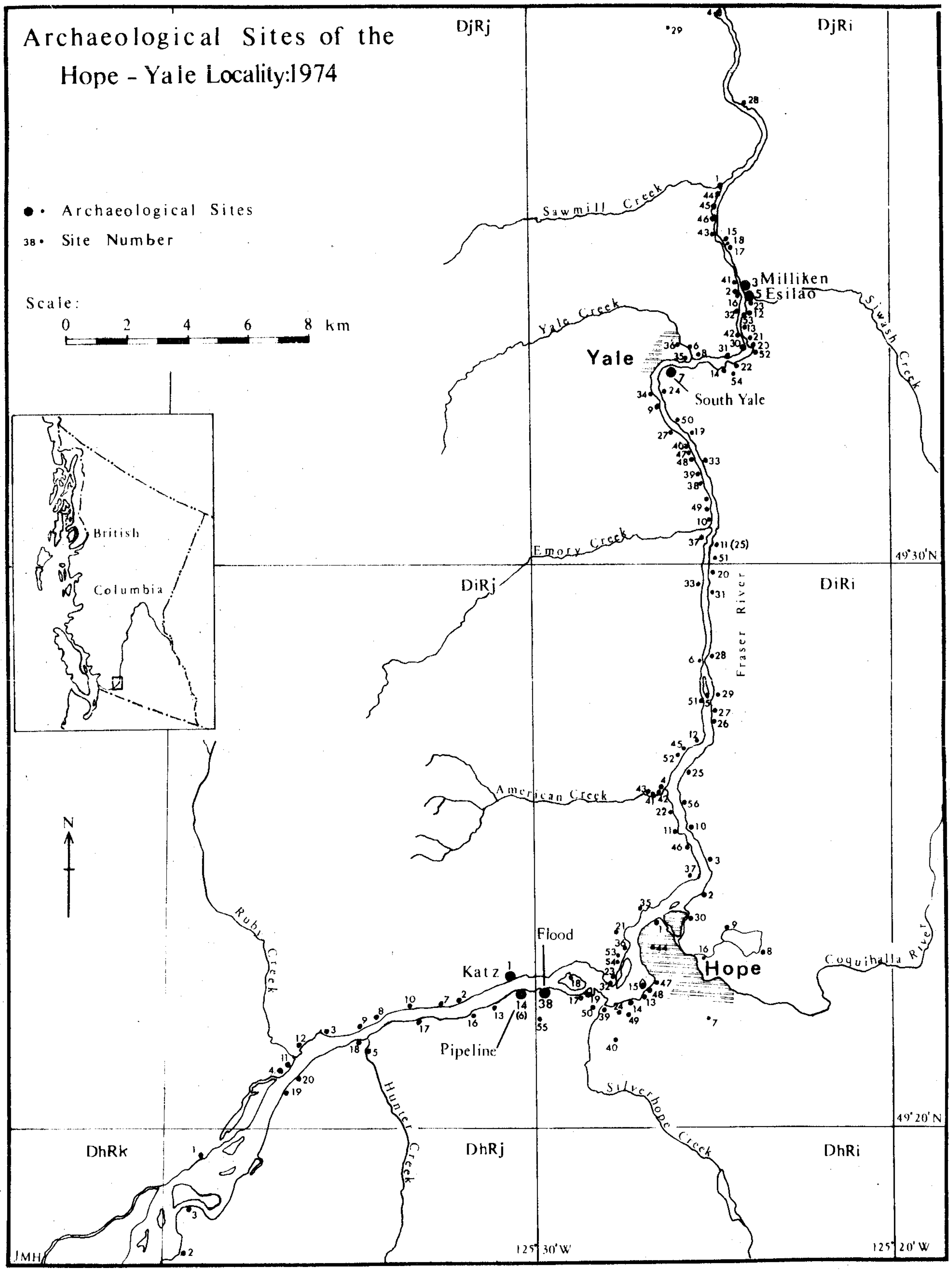
The Locality Today

(1) Physiographic Outline

The Hope-Yale locality, see Figure 1, lies within the Coast Mountain subdivision of the mountainous mainland coast of British Columbia (Holland 1964:28). The locality is bounded on the north and northwest by the Pacific Ranges and on the south and east by the Cascade Mountains (Holland 1964:42-44). The mountains of both of these ranges rise steeply for 5,000 to 8,000 feet above sea level.

The major physiographic feature which influenced past human habitation is the Fraser River. The Fraser River system comprises one of the major drainage systems of British Columbia, with a total mainstream length of 850 miles and a drainage basin of 89,310 square miles (Holland 1964:109). For almost its entire length, the Fraser River flows to the east of the Coast Mountains. Downstream from Big Bar, the Fraser River is confined to a canyon, which, between North Bend and Yale, is narrow, steepsided and gorge-like in profile. Rocky slopes rise from water level to summits of up to 7,000 feet and the river is very constricted, with grade of eight feet in a mile. The canyon begins to open at Yale and the flow of the river begins to slow. This becomes more pronounced at Hope, and, further west, at Laidlaw, the valley opens into the broad Fraser Low-land, including the delta of the Fraser River (Holland 1964:36;109-110). The importance of the Fraser River cannot be over emphasized with regards to life along its shores. It was the Fraser River that provided a route of communication between native groups, but,more importantly, it was the Fraser River that provided the inhabitants with seasonal runs

Figure 1


Archaeological Sites of the Hope - Yale Locality:1974
Archaeological Sites
Site Number
Scale:
0 2 4 6 8 km
N
British Columbia
DjRj
DjRi
DiRj
DiRi
DhRk
DhRj
DhRi
Sawmill Creek
Yale Creek
Siwash Creek
Emory Creek
American Creek
Ruby Creek
Hunter Creek
Silverhope Creek
Coquihalla River
Fraser River
Milliken
Esilao
Yale
South Yale
Hope
Katz
Flood
Pipeline
49°30'N
49°20'N
125°30'W
125°20'W
JMH

of salmon, chinook and eulachons, as well as a constant supply of numerous other varieties of fish. From archaeological excavations at the Milliken site, Borden (1968a:14) has recovered evidence which suggests man was attracted to this locality by these seasonal fish runs as much as 9,000 years ago. The general limitation of suitable land for habitation, resulting from the narrow canyon has had a pronounced effect on the inhabitants of the Hope-Yale locality, an effect which is clearly evident in the archaeological record. Duff (1952:85) noted that "...nearly all favourable sites have been occupied at one time or another." This was also found to be very much the case during the 1974 Hope-Yale site survey (von Krogh 1974b;1975).

Holland (1964:37) sums up the physiography of the Fraser Lowland in general, with the same factors also being applicable to the Hope-Yale locality immediately to the east:

> "The area has had a very complex Pleistocene Recent history involving marine and non-marine, glacial and non-glacial deposition. During several glacial advances, ice accumulated to depths of as much as 7,500 feet, and during each major glaciation the land was depressed relative to the sea. The submergence of the land surface based on the occurrence of marine fossils amounted to 575 feet and is interpreted to have been as much as 1,000 feet during the Vashon glaciation.
>
> Recent deposits, still in the process of formation, consist of deltaic, channel and flood-plain deposits of the Fraser River as it builds its delta seaward at a rate of about 28 feet a year."

As both the Flood site and the Pipeline site were occupied within the last 3,000 years, as determined from radiocarbon estimates, it is the recent deposition that is of most concern to us. This will be discussed in greater detail in the next chapter.

(2) Climate

The climate of the Stalo area is typical of the Coast in general, being both moist and mild. However, as one proceeds eastward, to the vicinity of Hope, and then northward, up the Fraser Canyon and further away from the moderating effect of the Pacific Ocean, there is a tendency towards greater extremes.

Duff (1952:17) has already remarked on the possible link between increased snowfall and the use of housepits,

> "What is more important is the fact that between Agassiz and Hope the annual snowfall doubles. This is important in the consideration of cultural factors such as, for example, winter house-types, which changed a short distance below Agassiz from plank houses to semisubterranean pithouses."

In looking at a number of climatic indices, we see that the Hope weather station has the most number of days of precipitation, the highest snowfall, almost the highest rainfall and is on a midway point with respect to mean temperature, when compared to Vancouver, Abbotsford, Agassiz, Hells Gate and Lytton, (Figure 2). All of these factors, and more, may have played an important role in the preferential use of housepits over plank houses in the Upper Stalo territory.

On the average, Hope has a relatively narrow seasonal range in temperature, about 35°F (Figure 2b). This is not the case with precipitation, where the major amount falls during the autumn and winter months. The summer months are normally quite dry (Figure 2e).

An additional weather feature that does not show up in the normal meteorological statistics, is mentioned by Duff (1952:18). This is the steady breeze which blows almost continuously in the Fraser Canyon above Yale. The breeze is caused by the funnel effect of the valleys at either end of the Canyon. As Duff (1952:18) writes:

> "Depending on the pressure systems on the two sides of the Cascades, air flows either north or south through the Canyon. Below Hope and Yale the valley is too wide to provide much of a funnel effect, but at Yale the funnel narrows and the wind velocity increases. Hence, only at Yale is the wind strong enough to dry the summer catch of salmon without supplementary smoking."

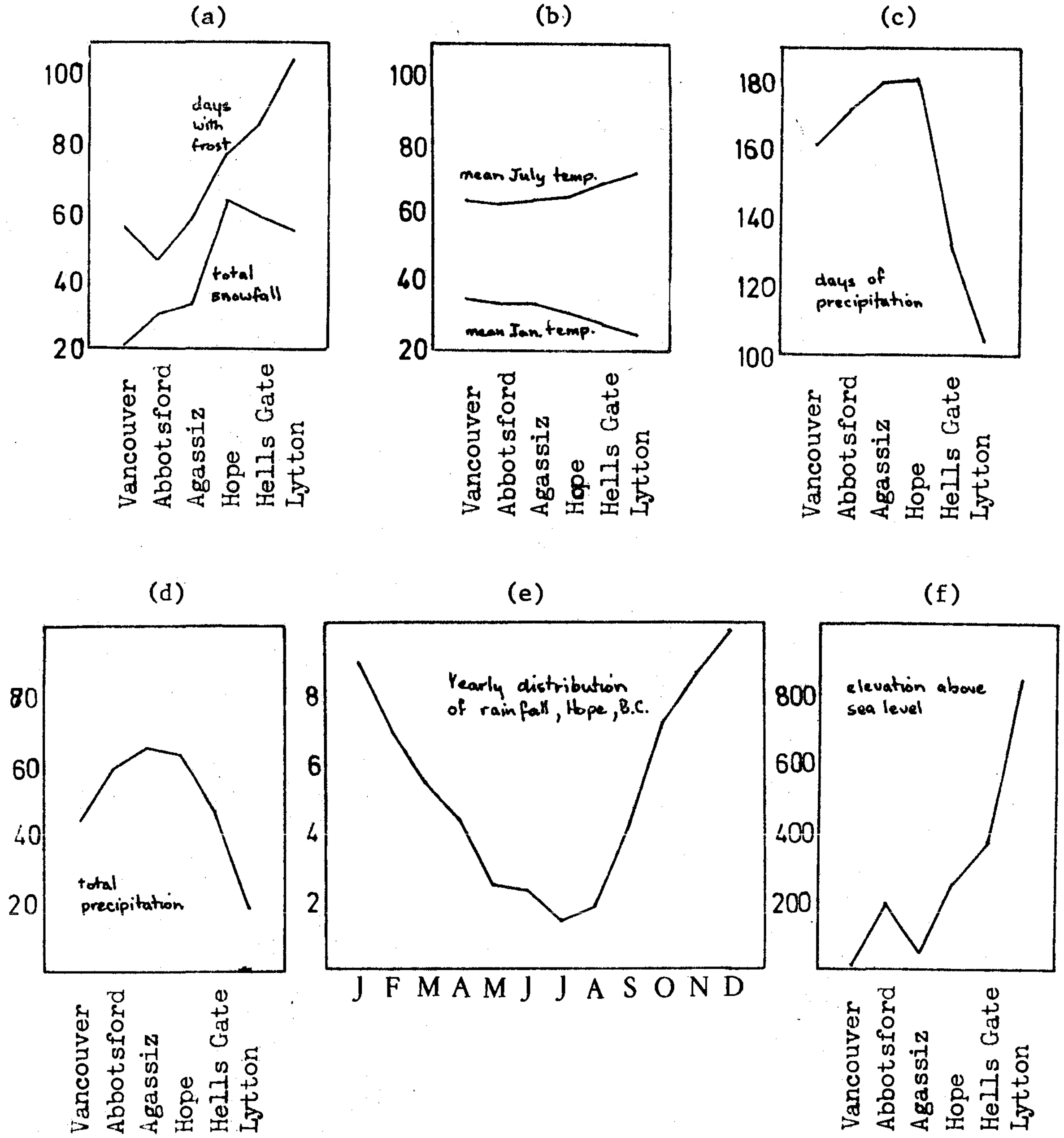


Figure 2: Environmental statistics. The charts compiled here illustrate a) mean days with frost and mean total snowfall; b) mean yearly January and July temperatures; c) mean days of precipitation; d) mean total precipitation; e) yearly distribution of rainfall for Hope,B.C.; and f) elevation above sealevel of the various stations. These statistics are as compiled over the last 30 years by the Department of the Environment (1971).

As stressed by Duff, this steady breeze played a key role in the preservation of salmon for the winter months.

(3) Potential Floral and Faunal Resources

As Duff (1952:62-74) and, more recently, Hanson (1973:24-46), have already examined the terrestrial and riverine resources of the ethnographic Tait territory in some detail, they need not be repeated here in their entirety. Rather, a brief summary of the resources available for potential exploitation will be presented.

Hanson (1973:24-46), with specific reference to the Katz site, compiled an extensive list of the present day resource potential for the Tait territory. The very close proximity of the Katz site to the Flood and Pipeline sites (Figure 1), makes this data equally applicable to all three of these sites. As a result of his work, Hanson (1973:36) identified a total of 55 potential fish, plant and animal resources which he separated into 42 variables (a variable being any resource which could be bracketed within a time unit of less than a full year). These are listed in Table I, and are ordered in time (seasonally) in Figure 3.

Not all of the resource variables are available directly on or from the particular site locations. Some, such as eulachons (Duff 1952:70), wild potatoes (Duff 1952:73) and Birkenhead River Chinook (Hanson 1973:43), were only available further downstream. Others, such as the end of June steelhead run (Hanson 1973:43), were upstream, in the Coquihalla River. It does not necessarily follow that because a potential resource, i.e. salmon, passed the site location that it would necessarily be harvested exclusively there, a more favourable spot may have been sought out and used. This is also indicated by Duff (1952:14;19) in his stressing of the

Table I: Ecological resource variables, (Hanson 1973:37).

1.	Harrison system	Birkenhead River	Aug. 6-Sept. 1
2.	sockeye	Weaver Creek	Sept.11-Oct. 9
3.		Harrison rapids	Oct. 6-Nov. 3
4.	Main Canyon	Early Stuart	July 1-July 28
5.	sockeye	Bowron, Early Nadina	July 14-Aug. 11
6.		Late Stuart, Stellako Chilko,Seymour	July 29-Aug. 25
8.		Adams River,Little River,S. Thompson	Sept.16-Oct. 14
9.	Harrison	Chehalis River	Oct. 1-Oct. 27
10.	System Chum	Harrison River	Oct. 27-Dec. 31
11.	Main Stream	Fraser River, below Hope	Nov. 17-Dec. 31
12.	Lower Fraser	Chehalis, Harrison R.	Sept.15-Oct. 27
13.	Pink	Fraser,below Hope	Aug. 25-Oct. 7
14.	Coho	Chehalis	Nov. 7-Jan. 7
15.		Main Canyon	Oct. 6-Nov. 17
16.	Chinook	Birkenhead	March -May
17.		Harrison River	Oct. 15-Dec. 1
18.		Main Canyon,early run	Aug. 15-Sept. 29
19.		Main Canyon, late run	Sept.15-Nov. 1
20.	Eulachon		April24-May 7
21.	Sturgeon		June 1-July 15
22.	Steelhead (Coquihalla)		June 25-Aug. 7
23.	Bracken		April -Aug.
24.	Sagittaria latifolia (wild potato)		Sept.22-Nov. 1
25.	Wild onions		May -June
26.	Wild Tiger Lily - Cow Parsnip		May -June
27.	Camas,salmonberry and thimbleberry shoots		April -May
28.	Hazelnuts		Sept. 1-Oct. 6
29.	Vaccinium membranaceum (huckleberries)		July -Sept. 1
30.	Vaccinium ovalifolium, parvifolium		Sept.
31.	Salmonberries		June 9-Aug. 31
32.	Thimbleberries		July 7-Aug.
33.	W.T.Blackberries		June 3-Aug. 25
34.	Salal		Aug. 7-Oct. 27
35.	Oregon Grape		Aug. 10-Oct. 15
36.	Wild Crabapple		Aug. 18-Oct. 27
37.	Black and Grizzly bear, summer range		June -Aug.
38.	Black and Grizzly bear, fall range		July -Nov.
39.	Bears hunted in hibernation		Dec. -Feb.
40.	Deer, elk, mountain goat (low elevations)		Oct. -Feb.
41.	Duck and goose migrations		Nov.
42.	Most steelhead runs		Dec. -April

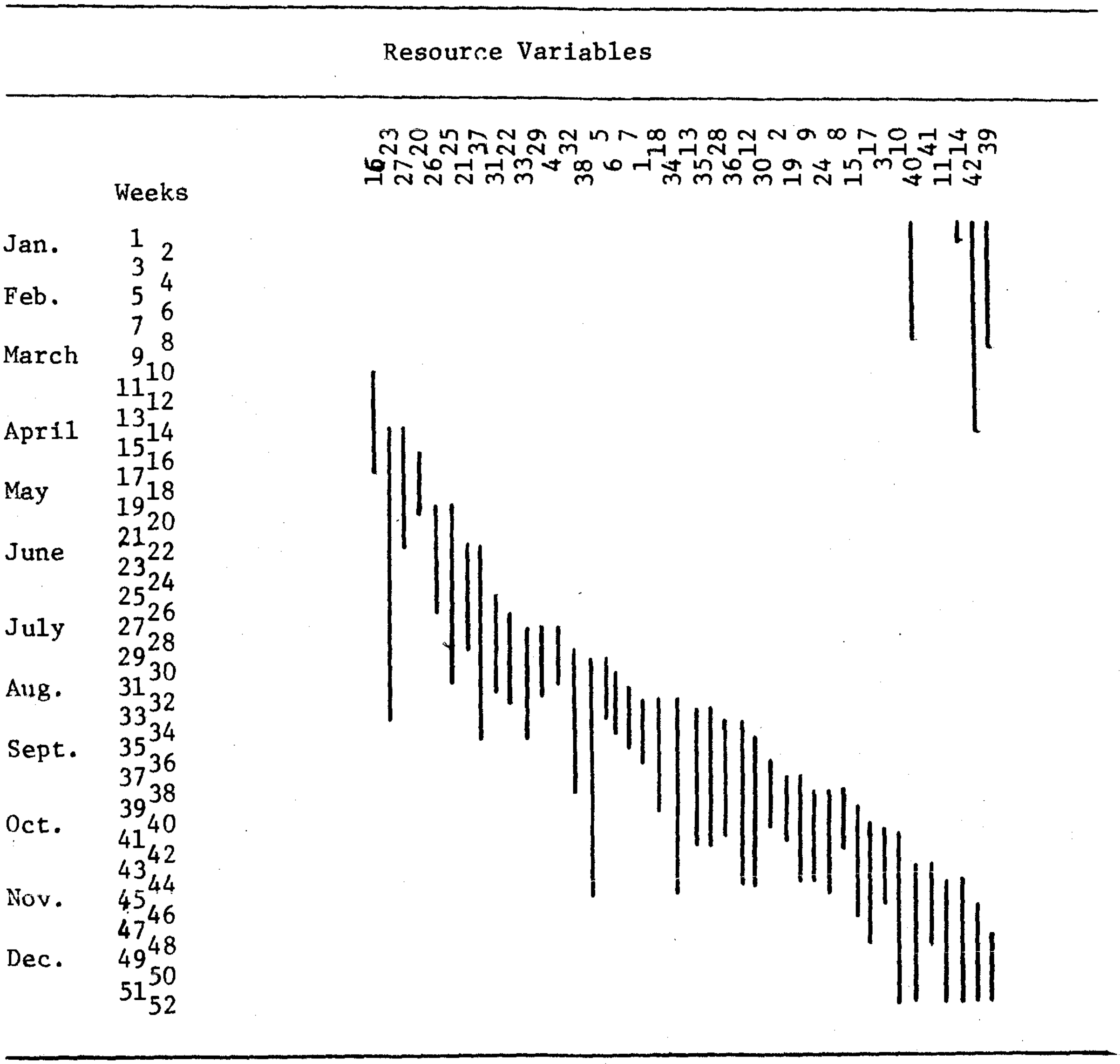


Figure 3: Potential nutritional resource variables over a one year period, (after Hanson 1973:39).

importance of the Yale fisheries to all of the Stalo people.

The resource variables, as discussed by Hanson (1973:24-46), depict the potential seasonal resources available to the native inhabitants of the Tait territory. They do not in themselves depict the pattern of resource exploitation. The work of constructing a cultural overlay to the resource pattern is left to the archaeologist and ethnologist. Unfortunately the very poor preservation of organic materials in the Hope-Yale locality makes this work very difficult to do from archaeological remains.

Among the potential resources of the Hope-Yale locality are a number not included by Hanson (1973), since they are not of a seasonal nature. These include various species of freshwater lake and river fish, such as Dolly Varden char, cutthroats, suckers and graylings as well as others which were caught and used (Duff 1952:70). Duff (1952:71) also lists a variety of animals, such as groundhog, beaver, racoon, wildcat, squirrel, marten, eagles, grouse, fish-cranes, robins, bluejays and crows, which were sometimes eaten. Shell-fish were also utilized to some extent. These were obtained from the coast whenever possible, either fresh or dried. In addition to the saltwater shell-fish, freshwater mussels were gathered from Harrison, Stave and Pitt Lakes, (Duff 1952:71). Also eaten were hazelnuts and cakes of dried beard-moss (Duff 1952:74).

A minor amendment to Hanson's (1973:37-39) list of resources concerns sturgeon. Hanson (1973:39) suggests these fish were only taken during June and July, while they were spawning in shallow sloughs. Duff (1952: 67-68) however, notes that sturgeon were taken the year round in the Fraser River and its larger sloughs. It was perhaps during June and July when these fish were most easily caught, and it is in this way that they can perhaps be considered as a seasonal variable.

Ethnographic Data

No attempt will be made here to present an all-encompassing summary of ethnographic data relating to the inhabitants of the Hope-Yale locality. The reader is referred to Duff (1952), Barnett (1955) and Mitchell (1963). Certain aspects will however be presented, where it was felt they would contribute significantly to the understanding and/or interpretation of the archaeological data.

(1) Territory

Ethnographically, the territory encompassing the Hope-Yale locality is within that of the Coast Salish. Boas (1894:454) referred to the inhabitants as "...the Cowichan of the mainland..." He maintained that linguistically, the people of the Lower Fraser, as far upstream as Yale, were closely related to the Vancouver Island Salish, specifically, the Cowichan and the Nanaimo. Boas (1894:454) referred to the people in the Hope vicinity as the Tait. Hill-Tout (1902:355) collectively referred to the inhabitants of the Lower Fraser as the Halkomelen. He too notes that there was an important branch located to the west, across Georgia Strait. According to his informants, Halkomelen meant "those who speak the same language". Other names that have been used to describe the inhabitants of this area are the Lower or Middle Fraser Tribes (Duff 1952: 11).

In his detailed ethnographic account of the Upper Stalo, Duff's (1952:11) informants also called their language Halkomelem, but translated it as "the language of Nicomen". Duff refers to the people of the Lower Fraser as the Stalo, meaning "river". This is also the name the natives prefer and use themselves (1952:11). The Stalo people extend from the Fraser delta to the Lower Canyon locality and are comprised of many separate groups. Duff (1952:12) writes:

> "The differences between the upper and lower Stalo culture are too great to permit treating the whole area as a single cultural unit despite the fact that there is no sharp division but rather a gradual transition as the river is ascended. On the other hand, differences between adjacent Stalo tribes are not great enough to distinguish each as a separate unit..."

Duff has therefore described the Tait, Pilalt and Chilliwack together as the Upper Stalo. The groups to the west of these are grouped together as the Lower Stalo (Figure 4). Duff (1952:12) notes that in repeated cultural features, the Lower Stalo groups can be aligned much more closely with the Gulf of Georgia groups than with the groups of the Upper Stalo. Further, the Upper Stalo show marked cultural affinities with the interior of British Columbia and Washington (Borden 1968a:24).

The Hope-Yale locality lies within the ethnographically recorded territory of the Tait, meaning "up-river people" or simply "up-river". These people occupied the largest single territory of all Stalo groups. Duff (1952:19) records this as extending from Five Mile Creek, north of Yale, downriver to Popkum and Seabird Island, 35 miles away. The reader is referred to Duff (1952) for further particulars.

Two hypotheses have been put forward as to how long the Stalo have occupied their territory. Boas (1895:549), on the basis of physical characteristics, reasoned they had occupied this region for a very long time, as the population appeared to be very stable. Hill-Tout (1902: 355,444,449) and Smith (1950:334), on the other hand, viewed the Halkomelem speakers as late-comers to the area. From ethnographic data, Duff (1952:12) was not able to bear out either of these theories, but he

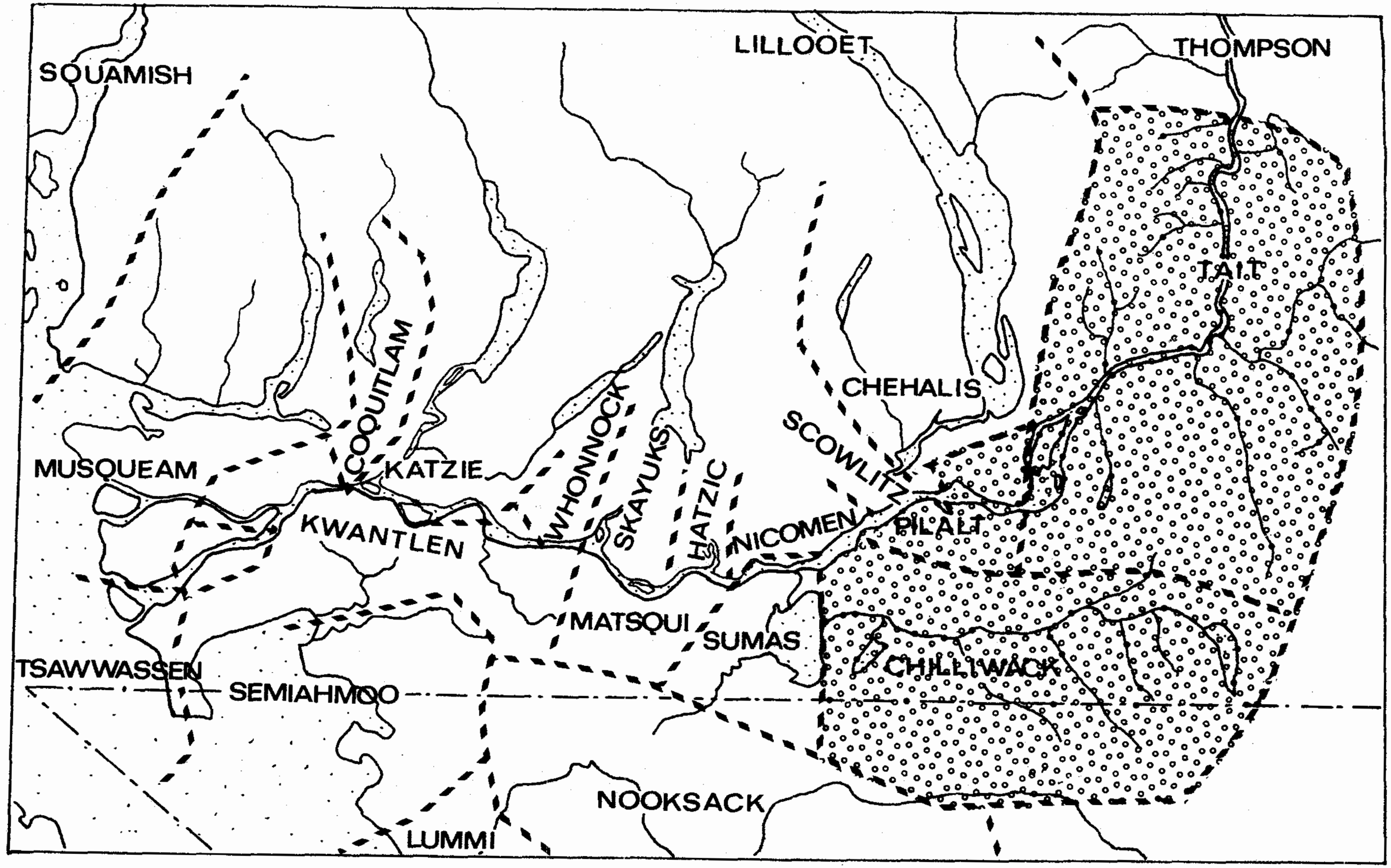


Figure 4: The Upper Stalo and adjacent groups, (after Duff 1952:20).

doubts that the Halkomelem peoples were late-comers as his informants knew no traditions of migrations or earlier populations. Suttles and Elmendorf (1962), in a paper on the linguistic evidence for Salish prehistory, also make no reference to any such late movement or expansion of the Halkomelem speakers into the Lower Fraser. On the contrary, they found that:

> "...maximum cognate relation figures link western Int [interior] languages, especially Lil [Lillooet] and Tho [Thompson], to adjacent languages of SG [South Georgia], NG [North Georgia] and PS [Puget Sound] branches. Contact between these languages was probably long standing, and continued into the historic period." (1962:45)

They explain dialectic differentiation as being a result of a north-to-south series of river valley concentrations, (Suttles and Elmendorf 1962: 45). The wide spread of Halkomelem may be a result of the communal use of the Fraser River fish resources.

From Duff's (1952) ethnography, we see that the Upper Stalo Tait group bordered, and formed the traditional boundary with, the Interior Salish Thompson. Exactly where this boundary was is not clear. Simon Fraser (Lamb 1960:97) and Hill-Tout (1902:355) write that Spuzzum was the dividing line between the Tait and the Thompson. Teit (199:168) however, states the Lower Thompson territory extended to a few miles below Spuzzum and Duff (1952:19) considers Five Mile Creek (or Sawmill Creek) the boundary. Duff feels that "In earlier days there was no doubt a good deal of friction at this boundary," (1952:19) and this possibly resulted in some degree of flexibility in the actual boundary, accounting for the differing reports as to the exact boundary location. He (1952:11) discusses the relationship between the Upper Stalo and their coast and Interior Salish neighbours:

> "The little unity the Stalo as a whole possessed was not a

> result of a social or political organization, but of common language, culture, and habitat. Certain factors, however, tended to preserve even this nebulous unity. Especially important was the curious circumstance that the finest salmon-fishery on the river, used by all the Stalo and many non-Stalo as well, was situated in the Fraser Canyon at the uppermost limit of Stalo territory. As a result, a man from Yale commonly rubbed shoulders at the fishery with men from Katzie, Musqueam, or even farther afield, but he seldom met his Thompson neighbours from a dozen miles up-river. The Canyon at one and the same time caused great internal fluidity of population along the lower river and blocked off easy contact with the upper river."

Duff goes on to say that only in the dead of winter were the Stalo in sole possession of the river. With summer came an abundance of salmon and "...in their wake many hundreds of aggressive saltwater Indians. Willingly or unwillingly, the Stalo had to share their river and its bounty with outsiders". (1952:25). Some of these groups, such as the Cowichan and Nanaimo, came from as far away as Vancouver Island.

The general picture of little contact between the Coast Salish Tait and the Interior Salish Thompson is reiterated by Teit (1900) in his Thompson ethnography. He writes (1900:268):

> "The tribes with which the Thompson Indians made war were those of the Fraser Delta, the Lillooet and the Shuswap. The Lower Thompsons, being the nearest to the Coast tribes were the only division of the tribe that waged war on those people, who, it is said, hardly ever made any reprisals, or ventured into the territory of the Thompsons."

He further notes that the slaves taken in war by the Lower Thompson were from the Lower Fraser River area (1900:269). For some reason, which he does not state, Teit believes that these wars between the Thompson and Tait "...were carried on during the last and early part of the present century," (1900:271).

Another coast-interior contact was in the Harrison River-Lillooet area. Boas (1894:456) writes of inter-marriage between the tribes of the Harrison River and the Lillooet tribes north of Harrison Lake. Duff

(1952:16) noted that the navigability of the Harrison River and Harrison Lake made travel northward into Lillooet territory an easy matter from a physical point of view. Ethnographic evidence has indicated a marked hostility between the Upper Stalo groups and the Lillooet. The Chehalis were,however, a Stalo group on good terms with the Lillooet "...and it is probably through them that any cultural influences from the north have penetrated into Stalo culture." (Duff 1952:16)

To the south, the Stalo had contacts with the Nooksack and Smith (1950:331) writes of trade goods passing from Yale to Bellingham via a Chilliwack-Nooksack-Lummi route. The Nooksack in turn had the most contacts with other Indian groups mainly to the north and west. To the south their only contact was with the Skagit, who, in turn, had their main contacts to the west. Smith (1950:331) concludes that the Nooksack were "...effectively cut off from travel across the mountains to the intermontane plateau in the east." We can therefore suppose the Stalo also had little contact in this direction, south of the Fraser River.

In summary, the ethnographic evidence indicates both basic similarities between the various Stalo groups as well as basic differences. In general, the Lower Stalo groups seem to align themselves to the Gulf of Georgia area, while the Upper Stalo groups are more closely aligned with the Interior of British Columbia and Washington. The boundaries between the Stalo groups appear to have been poorly defined, and food resources were often shared. The most frequent outside contacts were with the groups to the west, in the Fraser Delta and Gulf of Georgia regions. There appears to have been less intergroup contact to the east, and the territorial boundaries were both more rigidly defined and more frequently contested. By looking at the ethnographic trade relations, another aspect of intergroup association is illustrated.

(2) Trade Relations

Trade patterns reflect intergroup communication and general contact. Duff (1952:95) lists the two most important trading partners of the Upper Stalo as the Thompsons and the Lower Stalo, near the mouth of the Fraser River. Commodities traded to the Thompson were dugout canoes, dried salmon, sturgeon-oil, rush mats, abalone shells and goat hair; dried soap-berries, saskatoon berries and huckleberries, moss-cakes, wild lily roots, "Skametc" [?] roots, deer, elk and goat fat, dressed elk and deer skins, bark twine, cedar root baskets, and dentalia were received (Teit 1900:259; Duff 1952:95). Duff (1952:95) notes that the canoes, at least, were taken up at low water, usually by people who had friends or relatives among the Thompson. Of the items traded downriver, Duff (1952: 74,95) lists dried salmon as the most important. In return, fish, wild potatoes, cranberries, clams and sometimes sealskins were received. The clams were usually in dried form, but in cool weather fresh clams were occasionally brought up. This trading was carried out by both up-river and down-river groups during their frequent visits.

It is of interest to read in Simon Fraser's journal that objects of European or American origin were already in the possession of the natives upon his arrival in 1808. At a village near Yale he saw "...brass made into pipes hanging from the neck or across the shoulders, bracelets of large brass wire..." (Lamb 1960:100). Further downstream, at an island near Hope, he noted a copper kettle and a large English hatchet (Lamb 1960: 101). The precise origin of these objects, whether from the coast or from the interior, has not been determined.

Smith (1950:331) notes cross-country contacts from Yale to Bellingham via the Chilliwack-Nooksack-Lummi, in which the Nooksack acted as middlemen. One item of particular interest to the Nooksack was a glue made from Fraser River sturgeon, used in the making of sinew-backed bows (Smith 1950:332).

Archaeologically, little has been recovered which could shed new light in the area of trade. Mitchell's (1963) work at Esilao village possibly provides us with more examples of objects of European or American origin that were traded from one native group to another. Mitchell (1963:133) estimates that the village was abandoned at sometime between Simon Fraser's journey (1808) and the arrival of Hudsons Bay Company trade goods (1822-1827). From his excavations he recovered 120 light blue spherical beads, 34 (non-native) copper objects, 2 iron points and one piece of brass.

Another article traded may be soapstone. Duff (1956) has studied the distribution of soapstone artifacts in southwestern British Columbia. Duff's two sub-areas of the greatest concentration, and the sources, appear to be the centers of activity with this raw material (Duff 1956:99). Teit (1900:259) does ethnographically record the trade of steatite (a variety of soapstone) "...for making pipes", between the Thompson and Okanagan. In a similar way, nephrite was also likely traded from the Lillooet-Hope area to surrounding groups.

(3) The Village

Ethnographic data regarding Upper Stalo villages is drawn largely from Duff (1952:85-86), and is summarized here. Villages among the Upper Stalo seem to have been, with few exceptions, small and temporary, ranging in size from one to several extended families. The population of most of the villages was quite fluid and families frequently moved to other villages or to other uninhabited places. The result of this movement is that nearly all the favourable sites have been occupied at one time or another, a fact that was readily evident during the 1974 site survey of the Hope-Yale locality (von Krogh 1975:11). These movements were motivated in part by a search for richer food and firewood resources, but also in part by such social factors as inter-family friction, the splitting-up of extended families or simply a desire for change.

On the whole, village populations appear to have been small, Duff estimates 35 individuals. He says that "...it must be remembered...that these tribes spent a large part of each year away from the villages, often in camps at the fishery, which must have been much larger than the winter villages." (1952:85) Some villages appear to have been permanent. One of Duff's informants, E. L., mentioned Yale, Hope and Langley as being permanent. As an explanation E. L. offered:

> "In Yale they had no reason to move. There was always lots of fish, lots of game; and always quite a few people lived there. Even people from down this way [E. L. was from Katz or Ohamil, across the river] who had friends (relatives) up there would often put in a winter there," (Duff 1952:85).

Duff (1952:86) attributes the impermanence of villages to a general lack, among the Upper Stalo, of the traditions that gave other Northwest Coast lineage-local groups a strong consciousness of kinship and an identification with certain definite places. This may also have been a factor in the ownership concepts. Resource ownership did not develop beyond the level of family ownership of fishing-stations. Even so, if the "owner" of a fishing-station forbade anyone, related or not, reasonable use of the station, he was considered extremely selfish (Duff 1952:77). Resources on the whole, such as sturgeon-fishing sloughs, berry patches and hunting grounds, were freely used by all nearby groups. Large fish weirs were built and owned by a community, but were open to use by outsiders (Duff

1952:77).

(4) Housepits ... Ethnographically

As this thesis deals very specifically with this one variety of habitation structure, we will look at the ethnographic accounts of them in some detail.

Semisubterranean housepit structures have played an important role with respect to previous work in the Hope-Yale locality. Boas (1891:633) was perhaps the first to record the presence of these habitation structures in this area. He noted that their occurrence extended westward, along the Fraser River, as far as the confluence of the Harrison River. Later work by Hill-Tout (1902), Barnett (1944) and Smith (1947) indicated the presence of housepits extending to Musqueam, on the Fraser delta. A result of a systematic site survey in 1974 was that of 127 sites recorded within ethnographic Tait territory, 46 (37.7%) had indications of one or more housepits (von Krogh 1975:7).

Housepits have long been considered a cultural trait of the Interior Plateau, adopted by the inhabitants of the Lower Fraser (Boas 1890; Teit 1900: Ray 1939; Barnett 1944). More specifically, Barnett (1944:269) felt they were adopted from the Thompson, who, he notes, did not live far from the Coast Salish along the course of the Fraser River. Smith (1947: 266) suggested housepits were introduced from the Lillooet area, at the north end of Harrison Lake. She felt her study established a "...well defined strip of pithouses extending from upper Harrison Lake straight south to the upper reaches of the Chilliwack and Nooksack Rivers." (1947: 266) She felt the diffusion of housepits down the Fraser River represented a secondary means of introduction. From both archaeological site survey and ethnographic work, Duff (1952:47) found no information which would indicate there ever was such a "strip". Suttles (1957:169) in a critique of Smith (1956), refutes her hypotheses, stating they have "... little justification in known ethnography or linguistics." There is no archaeological evidence to date which would suggest an origin for pithouses, in the Hope-Yale locality, other than generally that of the Interior Plateau.

The common model for an ethnographic housepit is the one described by Teit (1900:192-195), from the Interior Thompson area, Figure 5. This structure is characterized by:

- circular excavation, 20-40 feet in diameter
- four post vertical construction
- four main rafters plus stub-rafters
- a conical roof
- entrance hole in the center of the roof
- notched log ladder for access
- single central hearth
- upright stone slab to protect ladder from fire
- simple excavation, level floor and sloping walls

Earlier descriptions by Dawson (1891:7) and Hill-Tout (1899:512) are essentially similar, with respect to excavation and wood framework. Variations do, however, occur. For example, a housepit replica was constructed after Teit's (1900) model by members of the Provincial Museum, (Smyly 1973: 49-51). When Isaac Willard, a then 79-year-old Salish resident of Chase, B.C., who had been born in such a dwelling, inspected the replica, his only criticism was that it looked like a "big teepee", that is, the roof should have had a more gentle slope (Smyly 1973:51). Other variations are more important with respect to archaeological interpretation. For example, Smith (1947) and Ray (1939:132-137; 1942:177) describe varia-

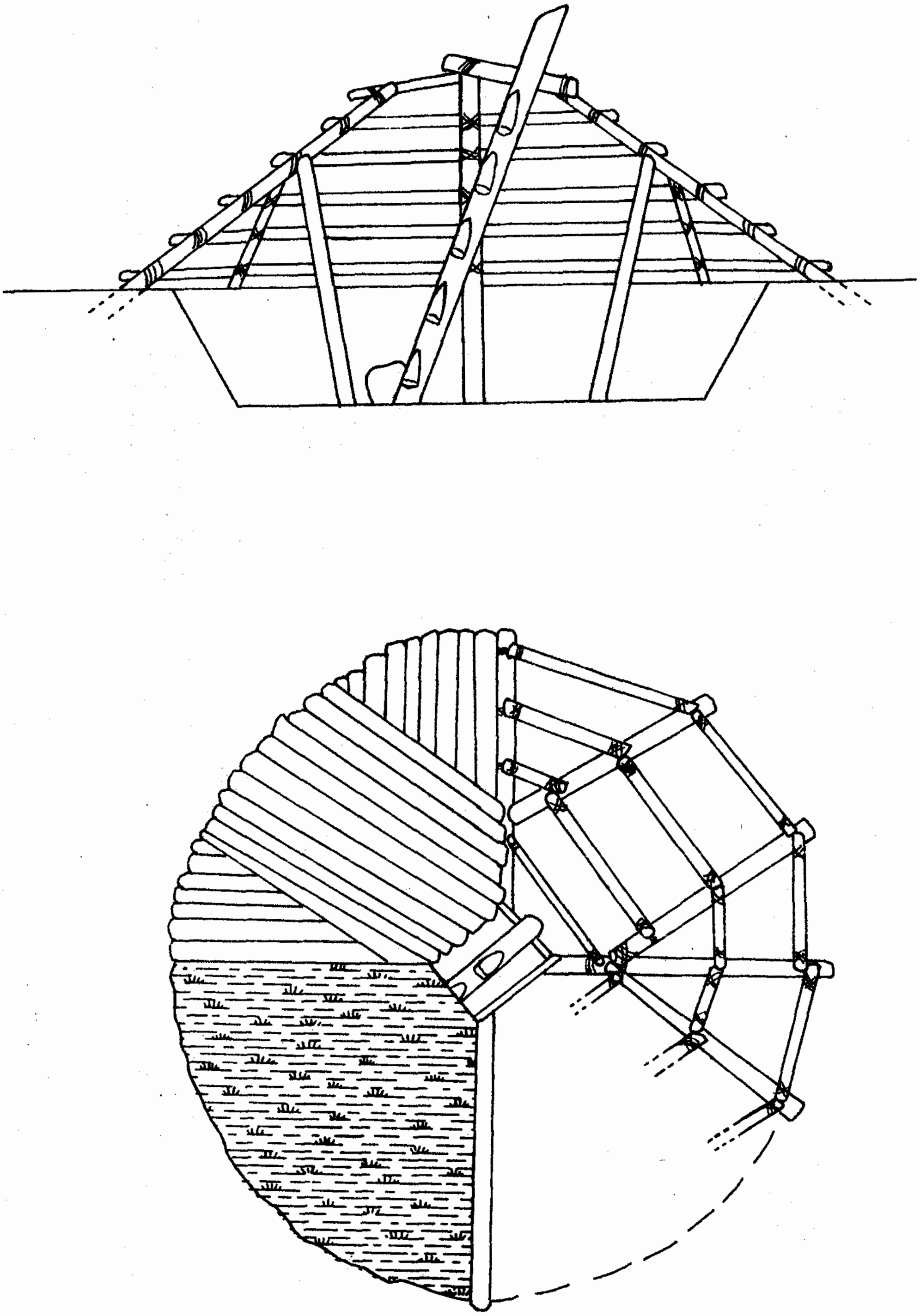


Figure 5: Plan and cross section of a pithouse (after Teit 1900:193).

tions in the shape of the initial excavation, different pitches of the roof and variations in post construction pattern. With respect to the number and location of hearths, Morice (1893:192), in reference to Carrier housepits, states that they were comfortable and needed but little fire to keep them warm, a description very similar to that of Teit. Hill-Tout (1899:513), with respect to the Thompson, however, notes:

> "Commonly there was but one fire in the centre of the housepit, but if the weather was very cold smaller fires would be kindled near the four great supporting posts. Fires were also at times lighted here for culinary purposes, when many families inhabited the same houses."

Housepits of the Interior Plateau were the common winter habitation, as they afforded good shelter from the severe cold (Boas 1890:816; Teit 1900:194; Duff 1952:46). Teit (1900:194) states they were occupied from December until February or the beginning of March. Morice (1893:129) feels they may have been occupied by the Carrier well into the spring, as in a myth pithouses are mentioned as being inhabited into the root digging season. Ham (1975:219-220), regarding the Canyon Shuswap, notes that to ready these structures for winter habitation, either by intial construction or simply by repair, would be an important fall activity. This would likely be the case wherever pithouses were commonly used.

Barnett (1938:128-129; 1944:265-270; 1955:55) has reported the presence of housepits in Coast Salish territory from Vancouver to Bute Inlet. From his work he notes "With one exception...the entrance-ways were described as inclined passages or tunnels, not as hatchways through the roof" (1944:266). At Musqueam, Barnett (1938:129) writes of a pithouse existing side-by-side with the more typical coastal habitation structure, a plank house. This pithouse was reported to have a flat roof, supported primarily by a single central post. The entrance was through a hole in the roof, by means of a notched ladder and the walls had mats on them, much like the walls of the nearby plank house. The dimensions of the excavation were 15 x 15 x 10 feet deep, or roughly square. Housepits, however, were not in general use on the Coast, and differ in this way from their Interior counterpart. As Barnett (1944:268) writes:

> "Not every Muskwium family owned or had access to an underground dwelling. Its construction was a family enterprise and was costly in labor. It was used only in the coldest part of the winter and as a rule no cooking was done there. There was no general abandonment of plank houses. The subterranean chamber was slept in when it was cold, and the weak and infirm spent most of their time there in bad weather. Some did move into them, but they were decidedly a luxury."

Ethnographically, Duff (1952:46) notes that housepits "...essentially like the Thompson type described by Teit, were used regularly by the Upper Stalo...". Duff's informants among the Tait had always considered pithouses as the usual winter dwelling. Details of actual pithouse construction for the Hope-Yale locality is sparse. With a few exceptions, (Smith 1947:260; Duff 1952:47), most housepit depressions in the area are circular, rather than square or rectangular. Post construction noted for houses at Yale were generally the same as that described by Teit (1900: 192-195). One informant denied the existence of any posts in or on the floor area, other than the notched ladder. This description is similar to one given by Smith (1947:257) where the posts stood against the wall of the pit.

(5) The Seasonal Round

Seasonal movements by the inhabitants of the ethnographic Tait territory, took place, as would be expected, in response to food resource availability. These seasonal movements did occur, even though, as we have already seen, the Hope-Yale locality has an abundance of potential food resources. The extent of these seasonal movements may have been minimal, when compared to those of the coast people (Mitchell 1971:49-50; Barnett 1955:18-34).

As the seasonal movements of the Tait have already been outlined by Duff (1952) and Hanson (1973), they will not be repeated here and the reader is referred to those works. Also see Table I and Figure 3.

(6) Food preparation

Food was prepared by the Upper Stalo in three ways, stone-boiling, roasting and by means of an earth oven (Duff 1952:74). Roasting of meat or fish was accomplished by suspending the meat on a pointed stick near the open fire, by turning the meat, it was roasted one side at a time. Little evidence of roasting is likely to be preserved archaeologically.

Duff (1952:74) notes that "soups were often prepared, using meat or fish, roots and berries." Dry meat was always boiled, usually after soaking overnight. This boiling was done in a basket or wooden trough. A result of this stone boiling is numerous broken rocks. These can be, and are,recovered archaeologically, though whether all broken rock recovered are the result of stone boiling is questionable. Hill-Tout (1902:361) also mentions enormous cedar troughs used for the preparation of food.

There is little in the way of ethnographic data regarding the use of ovens by the Tait. Duff (1952:74) lists their use, but does not mention any specific details.

Archaeological Background

The Hope-Yale locality has seen considerable archaeological and ethnological work with respect to other areas of British Columbia. From the growing body of data, a picture of the prehistoric material cultures, cultural activities and cultural sequences, representative of the past life-ways of the inhabitants in relation to their environment, is slowly beginning to emerge.

Archaeological activities in the Hope-Yale locality, as in British Columbia on the whole, fall into two major periods of research, the first beginning around the turn of the century and the second, marking a resurgence of interest in archaeological field work, beginning shortly before 1950 (Carlson 1970a). Ethnographic work falls largely within the early period, but continues intermittently until 1952, when an ethnography of the Upper Stalo was published by Duff (1952). Contrary to the archaeological work, and understandable in the light of changing life-ways of the native inhabitants, little new ethnographic work has been accomplished since then.

In 1808, the first European passed through the Hope-Yale locality. This was Simon Fraser on his voyage down the river which now bears his name (Lamb 1960). Simon Fraser, working for the North West Company, was primarily interested in exploring the river Alexander Mackenzie mistakenly believed to be the Columbia River. It is in Fraser's journal that the first recorded observations on the people of this locality are made.

Initial ethnographic and archaeological records begin with the work of Boas (1890; 1891; 1892; 1894) and Hill-Tout (1895; 1899; 1902). More recent work begins with Barnett (1938; 1944; 1955), dealing with the Coast Salish in general, and with Smith (1947; 1950; 1956), dealing with a "middle Fraser" region. Smith (1947) also carried out archaeological excavations at the McClallum site, near Agassiz. Duff (1950) began work in the area with an archaeological site survey. He followed this with an extensive ethnography dealing with the Upper Stalo people, (Duff 1952). Duff (1956) also carried out a detailed analysis of the distribution of prehistoric stone sculpture of the Fraser River and Gulf of Georgia. In this same period Borden was beginning extensive archaeological investigations in British Columbia. From 1956-1963 Borden conducted considerable archaeological work in the Hope-Yale locality. This included a site survey in 1956, followed later by extensive excavations at the Milliken site (DjRi 3), Esilao village (DjRi 5), and the South Yale site (DjRi 7) (1959; 1961a; 1961b; 1965; 1968a; 1968b). From this work Borden (1968a) outlined a cultural sequence going back some 12,000 years. Of particular interest is Borden's (1965; 1968a) description of the early occurrence of housepits in the Skamel phase, tentatively dated from 350 B.C.-A.D. 200.

In conjunction with Borden's work, Mitchell (1963) wrote a detailed account of archaeological excavations in the Hope-Yale locality. His work was concerned with housepit excavations at the Esilao site. Although Mitchell was unable to date the initial occupation of the structure, he estimates it was abandoned between 1808 and 1822-1827 (1963:133). Mitchell (1965) also wrote a preliminary report on excavations at the South Yale site and the recovery of an extensive pebble tool assemblage. Borden (1968a,b) later described this assemblage in greater detail and named it the Pasika phase. In 1973 excavations were briefly resumed at the South Yale site when construction of two transmission line towers threatened a portion of the site (Irvine 1973).

In 1963 Kidd (1968) conducted a major site survey of the Lower Fraser from Yale to the Fraser delta. In addition to recording many sites, Kidd made a number of suggestions as to sites that should be excavated and recommendations for further survey.

Archaeological site salvage work was initiated in the Hope-Yale locality at the Katz site (DiRj 1) in 1970-1971, when it was revealed that the completion of the Agassiz-Haig link of Highway 7 would destroy a major portion of the site. The primary effort of this project was concerned with housepit excavations. This material was analysed and described by Hanson (1973). From this work, Hanson (1973:267) placed the introduction of housepits in the Hope-Yale locality back to 480±90 B.C. (I-6191) on the basis of a single carbon-14 date. Hanson did not attempt to relate his excavated assemblages with the cultural sequence as outlined by Borden (1968a). He does, however, provide a detailed description of the recovered cultural material.

Thirty kilometers downstream from Hope, near Agassiz, excavations began at the Maurer site, DhRk 8, in 1971 (Percy 1972:160-161), work continued in 1972 and culminated with a major project in 1973 (LeClair 1973; 1976). The analysis of this cultural material was, at the time of writing this thesis, still in progress. In preliminary reports, LeClair (1976:35) describes excavations of a housepit structure rectangular in shape and with a side entrance. LeClair (1976:42) notes a number of similarities between the cultural assemblage from the Maurer site with that described by Borden (1968a) from the Eayem phase. Five radiocarbon estimates ranging from 1910-2830 B.C. are related to this structure.

During February and March of 1974 salvage excavations were once more resumed at the Katz site, as well as at the Pipeline site (DiRj 14) directly across the river from Katz, as a result of pipeline construction work, (von Krogh 1974a; 1976). This work was continued during the summer of 1974 with an extensive site survey of the Hope-Yale locality, major excavations at the Flood site (DiRi 38), a test excavation at DiRj 16 and systematic surface collections at DiRi 24 and DiRi 49 (von Krogh 1974b; 1975a). Figure 1 shows the sites located in the Hope-Yale locality. Other work in 1974 consisted of excavations on the Seabird reserve near Agassiz by Poulton (1974) which also dealt with a housepit structure.

Archaeological work continued in the Hope-Yale locality in 1975 with salvage work for the Department of Highways, (Archer and Whitlam 1975), and more work will have to be done since, due to the vast number of archaeological sites along the river, development will continue to conflict with the diminishing number of intact sites.

CHAPTER III

EXCAVATIONS AND STRATIGRAPHY

Prelude to Excavation

The main objectives of the archaeological excavations to be described here were to examine and subsequently attempt to answer a number of specific questions relating to housepit construction and the associated cultural material. Prior to this, previous work in the Hope-Yale locality, as well as the neighbouring areas, had to be examined.

We have already outlined ethnographic data on housepits, and this need not be repeated. It is much more difficult to compile as detailed a description of housepit construction archaeologically, as the preservation of organic materials is very poor in the Hope-Yale locality. Evidence for structural elements, such as vertical supports or rafters, must be sought in the form of post moulds or rock concentrations (which may have aided in anchoring). Also, it must be remembered that one or perhaps two, housepits excavated at any one site do not necessarily indicate the total intra-site variation. Recognizing these limitations, we can look at and characterize the housepits excavated to date to detect variation and to later test these for possible temporal significance.

At Esilao village, Mitchell (1963:53-58) describes a relatively recent semisubterranean dwelling. The main structural attributes described are:

- 36-42 foot diameter
- subrectangular outline
- no evidence of a side or tunnel entrance
- saucer shaped floor
- built up earth rim about the depression

- central hearth and one smaller charcoal concentration
- large rock slab associated with the central hearth
- four post vertical construction
- four rafters, as indicated by rock concentrations at locations corresponding to hip rafter footings
- low earth bench rising from floor in parts of the house

Mitchell (1963:57) feels that this structure falls within the general ethnographic Northwestern Plateau type as described by Ray (1939:134).

A description of two housepits excavated at the Katz site is given by Hanson (1973). These structures date much earlier than the one at Esilao, and a single radiocarbon date of 480±90 B.C. (I-6191) was estimated for a charcoal sample from the earliest occupation floor (Hanson 1973:267). These two housepits are characterized by Hanson(1973:267-271) as having:

- an encircling bench
- small hearths scattered around the periphery of the floor area
- a storage pit in the floor of the housepit
- an alignment of cobbles along the base of the bench
- a clay "capping" to the housepit roof
- living floor area 37 feet in diameter
- no evidence of post construction
- no evidence of a side entrance

Hanson (1973:287) states that the Katz site housepits share similar characteristics with the earliest subphase of the Cayuse Phase (50 B.C. - A.D. 250) as described from the Sunset Creek Site (45-KT-28) by Nelson (1968:98). As with the ethnographic housepit descriptions, differences also arise with respect to older housepit forms. Turnbull (1971, 1973) and Grabert (1971, 1974) give examples of these.

Work thus began with descriptions outlining the two different models of housepit construction as present in the Hope-Yale locality, an earlier form represented at the Katz site, and a later form, described ethnographically and through excavations at Esilao village. Thus, understanding what we might expect to encounter, the question arises: Are the housepits excavated at the Flood and Pipeline sites representative of one or the other previously described types? Or are they of a different and "new" type for the Hope-Yale locality, showing variation in some specific way? Is there temporal significance in housepit variation for the Hope-Yale locality?

From the ethnographic data on the Stalo and their neighbours, we have seen repeated and extensive contact with the Coast, and relatively little contact with the Interior. Duff (1952:12) has discussed the various Stalo groups and has described them as the Upper and Lower Stalo on the basis of differences between the eastern and western Stalo groups. The Lower Stalo align themselves more closely to the Gulf of Georgia groups and the Upper Stalo are aligned more closely with the Interior groups.

If the archaeology of the Hope-Yale locality and the neighbouring coastal and interior areas is examined, an impression of the past cultural affinities of this Upper Stalo territory may be formulated. Because of the limited scope of this thesis, two limitations will be placed on the following discussion. Since the presence of housepits has been established in the Hope-Yale locality by 480 B.C.-350 B.C. (Borden 1968; Hanson 1973) and as the material to be dealt with here is more recent, the discussion will be limited to the 1000 B.C. to A.D. 1808 time period. A further restriction will be to only examine trends in the lithic industries, as poor preservation of organics in the Hope-Yale locality does not make comparisons of these materials possible.

In looking at the lithic industries from the Interior, the work by Stryd (1972:1973) in the Lytton-Lillooet locality is perhaps that which lies geographically the closest to the Hope-Yale locality. From his work, Stryd (1973:27-28) has described three late phases from the Lytton-Lillooet locality, though at this time the exact description of these phases is under revision. Nonetheless, of the entire cultural assemblages from these phases (10,276 specimens) 98% of the stone tools were chipped. These chipped stone tools were well represented in all sites and components. Stone tools shaped by grinding account for less than 1% of all stone tools. Nephrite and steatite account for the largest portion of these, though slate and siltstone are also present (Stryd 1973: 42-44). Wilson's (1974a,b) work near Kamloops also indicated a very minimal ground stone industry for this Interior locality. Similarly, cultural sequences for the Interior Plateau Okanagan (Grabert 1974) and central Washington (Nelson 1969; Warren 1968), also show a marked preference for chipped stone in the lithic industries.

Mitchell (1971) has presented generalized culture types for the Gulf of Georgia area, including the Fraser Delta. He describes basically three culture types present between ca. 2000 B.C. and historic times. [This differs somewhat from Borden's (1968; 1970) and Carlson's (1970) terminology for this same period. Mitchell (1971:51) feels Borden's Stselax Phase and Esilao Phase, as well as Carlson's San Juan Phase, fall within the range of the Gulf of Georgia culture type. He also includes Borden's Whalen II Phase as likely belonging with the Marpole culture type (Mitchell

1971:56) and Carlson's Mayne Phase in the Locarno Beach culture type (Mitchell 1971:57).] It is not our purpose here to provide a complete review of coastal archaeology, but rather to make a brief statement concerning trends or shifts in the lithic culture as evident between 1000 B.C. and A.D. 1808 for the Gulf of Georgia area. On the whole, there is a general trend from more chipped stone to more ground stone. This begins with an exclusively chipped stone lithic industry and proceeds to an essentially ground stone industry. Mitchell (1971:47-61) notes that only a slight emphasis is placed on chipped stone in the Gulf of Georgia culture type, in existence by A.D. 1000 and possibly as much as 500 years earlier. Carlson (1970:121) notes that San Juan Phase artifacts (Gulf of Georgia type), dated from at least A.D. 1200, are most conspicuous because of the near disappearance of chipped stone. Carlson (1970:122-123) feels that the final de-emphasis of chipped stone tools likely occurred between A.D. 400 and A.D. 1200. Figure 6 shows the cultural sequences as outlined for the Gulf of Georgia, Lytton-Lillooet-Thompson and southern Fraser Canyon.

Looking at archaeological work from the Hope-Yale locality we see both the chipped stone and the ground stone industries flourishing in the 1000 B.C. to A.D. 1808 time period (Borden 1968; Hanson 1973; Mitchell 1963). Hanson (1973:188-290) feels that attributes from the Katz site reflect "interior" (chipped stone types), "coastal" (primarily ground slate) and "local" (cortex spalls, nephrite) traits. Mitchell (1963:140) closely examined Coastal-Interior affinities in the analysis of Tait ethnographic data and the archaeological data recovered from Esilao village. He states that "Of all the elements at the Tait village of Esilao showing either a marked interior or coastal affinity...67 percent pointed to the interior." He concludes that on the basis of the ethnographic and archaeological

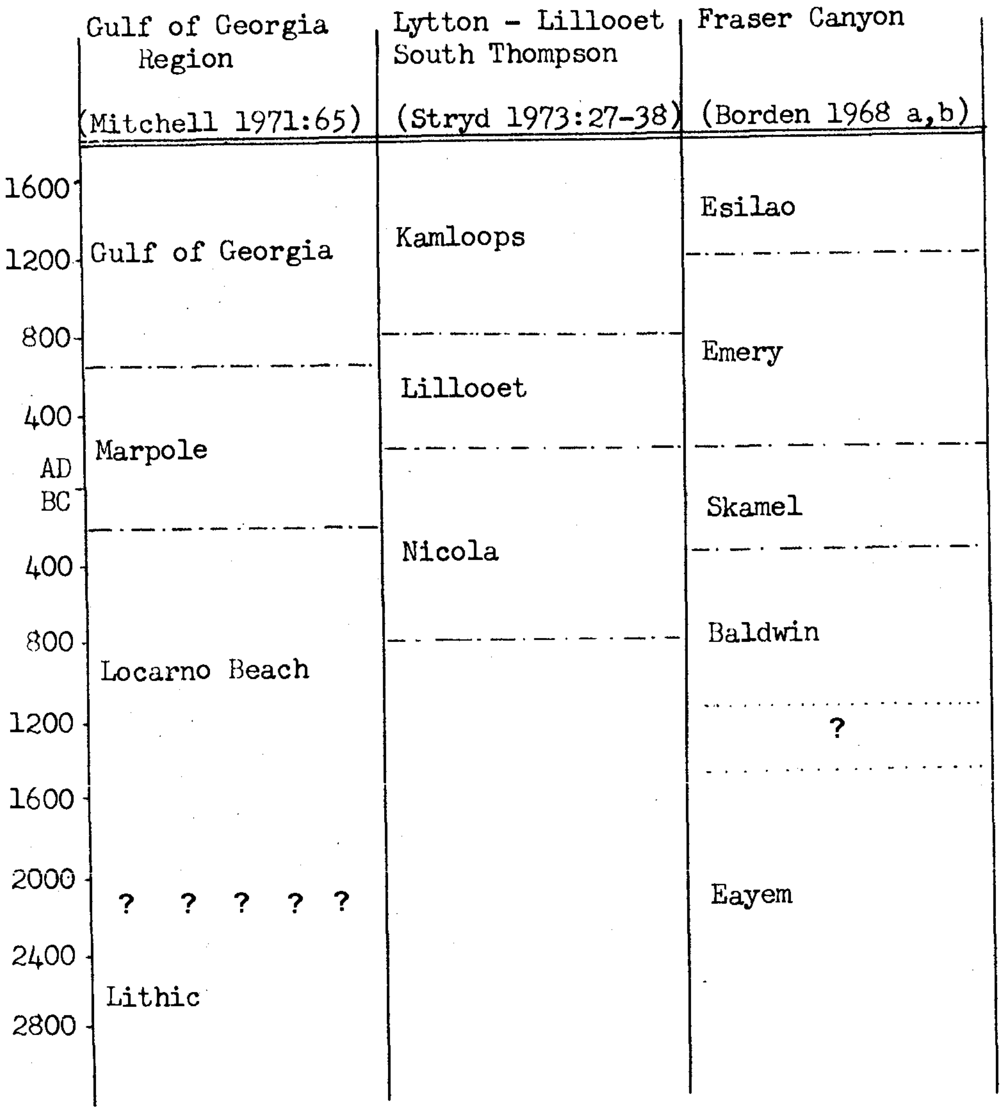


Figure 6: Outline of cultural sequences.

studies, the Canyon cultures are "...more closely allied with the interior than with the coast." (1963:141).

From the foregoing discussion we see that:

(1) chipped stone predominates in the lithic industries of the Lytton-Lillooet-Thompson localities of the interior.

(2) in the Gulf of Georgia region there is a general trend from more chipped stone to more ground stone, culminating with an almost total absence of chipped stone;

(3) the Hope-Yale locality shows affiliations with both the coast and the interior, as is indicated in the lithic industries as well as from the ethnographic data.

With this background, excavations were undertaken at the Pipeline site and later the Flood site, with the assumption that we would expect to encounter material cultural remains indicative of both Coastal and Interior influence. Logical questions arise from this situation. What is the extent of the coastal and interior influence? Can they be determined? Are population shifts from one area to another evident? Did the cultures in the Hope-Yale locality develop on their own or were they dominated by either coastal or interior influence?

Method of Excavation

Excavations at both the Pipeline site and the Flood site were based on both probability and judgemental samples. Even though work at both sites was salvage orientated, this was not a hindrance from attempting to answer specific questions. Because we did not know exactly how much excavation could be accomplished in the allotted time, excavations began with a simple random selection of units from a pre-determined universe for excavation. In this way the surface of the housepit was tested without judgmental bias. However, if a very large tree or stump was located on a randomly selected square, this square was returned to the sample and a new selection was made.

The judgmental selection of units for excavation served two distinct functions:

(1) to complete a N-S and/or E-W cross trench to establish house profiles to aid in later interpretation;

(2) to judgmentally test for the presence of features related to house-pit construction, as described by Hanson (1973), Mitchell (1963) and Teit (1900).

In addition, as many units as possible were excavated in order to get as complete a sample of cultural material as we could. This included both randomly sampled units, to increase the probability sample, and judgmentally selected units, to further test selected areas.

The Pipeline Site

The Pipeline site was initially located and recorded as DiRj 6 (Smith and Kidd 1963; Kidd 1968), Figure 1. The site is situated on the property of Westcoast Transmission Company Limited, on the south bank of the Fraser River, directly across from the Katz site. It is located 4.6 kilometers west of Hope, B.C. and lies at 49° 22' 08" North latitude, 121° 31' 00" West longitude. Smith and Kidd (1963) describe the site as a deep stratified midden with one or probably more housepits. They noted the site was already badly eroded by the Fraser River and felt, from the small quantity of ground slate recovered, that it may be a relatively early site. They recommended that the site be tested. The site was re-recorded in 1974

(Ferguson 1974a) at which time it was assigned a new designation of DiRj 14. This designation was later adopted by the Archaeological Sites Advisory Board.

The Pipeline site again came to the attention of the Archaeological Sites Advisory Board when it was found to lie in the path of a Westcoast Transmission Company Limited underwater pipeline right-of-way (von Krogh 1974a). At that time dredging for the pipeline was already underway. As riverbank erosion had increased over the last number of years, an extensive river bank stabilization project was slated to begin immediately, to be completed before the spring run-off (Figure 7). The result of this work and erosion was that much of the site was destroyed or badly damaged. Initial efforts by the Archaeological Sites Advisory Board were to attempt to preserve as much of the site as possible. This was successful to a limited degree.

At the time of our arrival on the site, at least three intact housepits were evident, Figure 8. Three other housepits were evident in profile, eroding from the river bank, but these were destroyed by river bank stabilization before anything more could be done. A number of irregularities over the ground surface may be the remains of additional housepits or cache pits, but to verify this would require test excavation.

When, to complete the laying of the pipeline, Westcoast Transmission informed the Archaeological Sites Advisory Board that a relatively intact housepit had to be destroyed within two weeks, salvage excavation work was begun. This work was carried out for thirteen days, in very unfavourable weather, between February 26 and March 11, 1974.

To test the circular depression, a universe (10 x 18 meters) clearly encompassing the depression was outlined, the area was then divided into

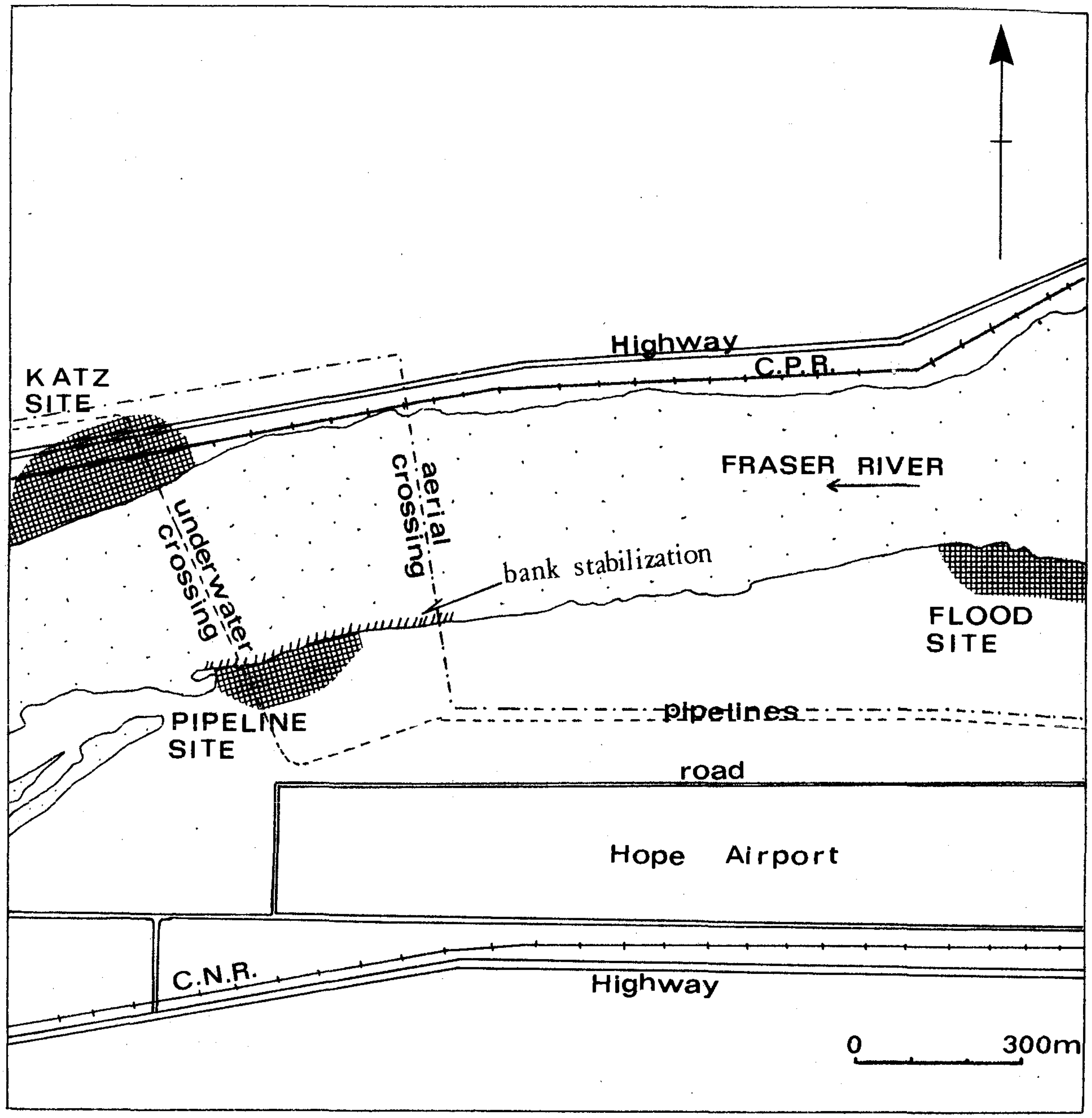


Figure 7: The Pipeline site in relation to the Katz and Flood sites.

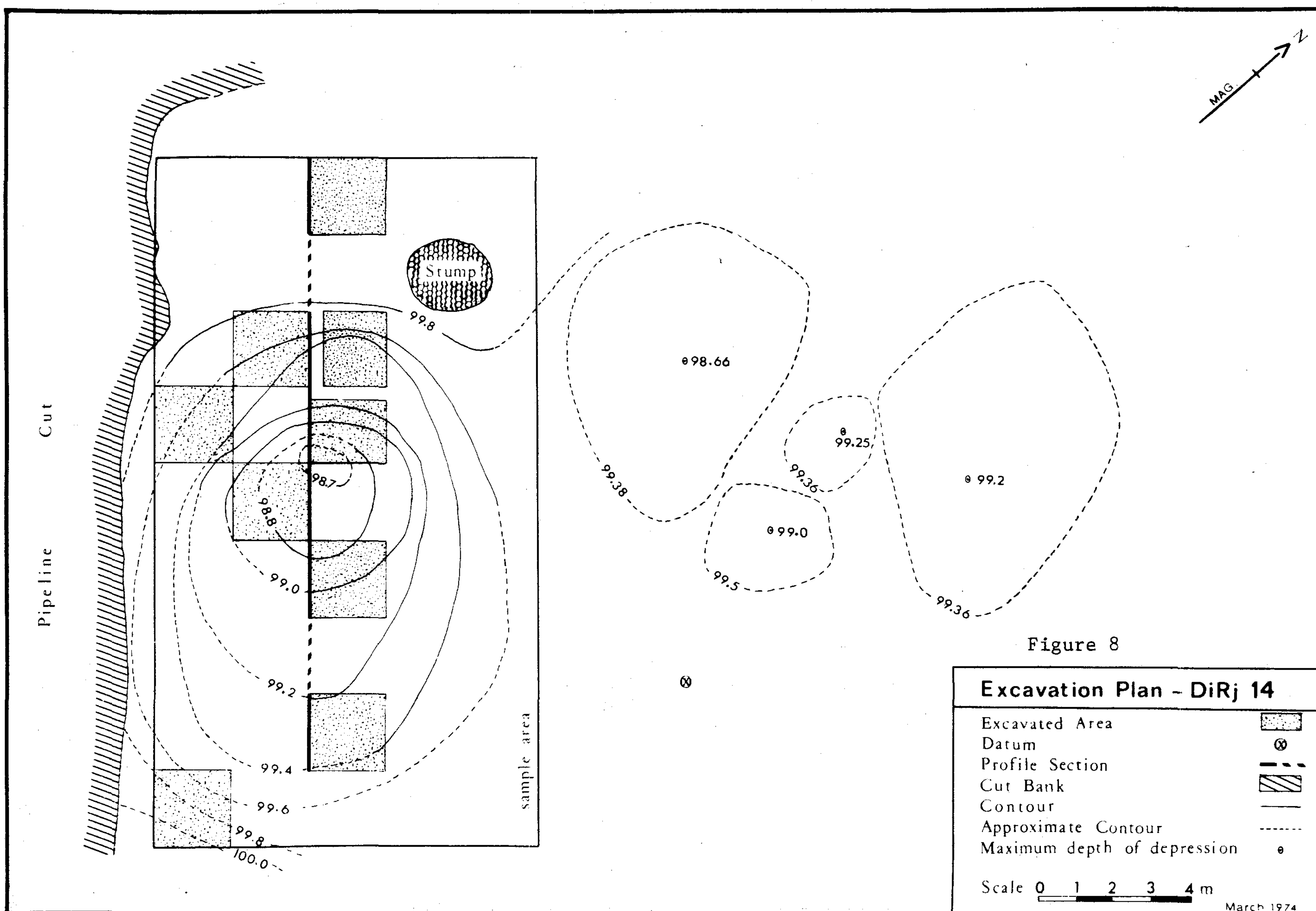


Figure 8

Excavation Plan - DiRj 14

forty-five 2 x 2 m. units. From this universe a 10% simple random selection of units were chosen for excavation, Figure 9. In addition judgmentally selected units were chosen where it was felt necessary. Table II lists the nine units excavated.

Excavations were carried out in arbitrary 10 cm. levels throughout. Shovel-shaving techniques were employed where there was generally very little cultural material. Trowels were used when greater care was required. All the excavated soil was put through one-quarter inch wire mesh screens. Each artifact exposed in situ was given a 3-dimensional provenience, measured from an arbitrarily established datum. Level material was then placed in appropriate level bags.

When the salvage excavations were halted, a portion of the actual site remained undisturbed. The area to the south and west of the intact depressions had been cleared and leveled in the past. It again underwent considerable disturbance as a result of the pipeline work. As previously noted, river bank erosion and stabilization damaged virtually all of the river frontage of the site, though the stabilization will preserve the remaining site deposit. The area to the east of our excavations is still forested, and, though it is second growth, the area appears to be relatively intact. The estimated area of the remaining site is 300 x 50 meters, extending along the river.

The Flood Site

The Flood site is situated on property belonging to Whonnock Lumber Company Limited, 100 meters west of their log dump on the south bank of the Fraser River. It is situated 3.7 kilometers west of the city of Hope, B.C. and lies 49° 22' 25" North latitude, 121° 29' 20" West longitude.

Figure 9: Numbered units at the Pipeline site.

1	10	19•	28	37
2	11	20	29	38
3	12•	21•	30	39
4•	13	22•	31	40
5	14•	23	32	41
6	15	24•	33	42
7	16	25	34	43
8	17	26•	35	44
9•	18	27	36	45

• excavated units

Table II: Excavated units at the Pipeline site.

	Random Selection		Judgemental Selection
Draw #	Unit	Sample Size	
1	12		14*
2	21		24
3	19	10 %	22
4	4		
5	26		
6	9		

* not excavated to sterile

The site was initially located and recorded as a result of an extensive site survey project in the Hope-Yale locality in 1974 (von Krogh 1974b, 1975a) (Figure 1). In accordance with the Borden (1952) site designation system, it was later assigned the designation of DiRi 38.

Today a relatively large area of undisturbed site remains intact. It is not possible from surface observations to determine exactly how much of the site has been disturbed by past agricultural and logging related activities, as well as erosion. It was reported that recent Whonnock Lumber clearing of the eastern portion of the site destroyed a number of large depressions (Ferguson 1974b pers. comm.).

From the initial surface indications, as many as nineteen depressions, measuring three meters to ten meters in diameter, may be housepits. [The minimum measure of three meters was chosen to describe housepits, since in later excavations of HP#2, we found the house to be merely four meters in diameter. Slumping and later fill would tend to reduce the size of a depression and thus the arbitrary 3 m. diameter was chosen.] Seven more housepits, with no surface indication, were located by stratigraphic evidence in the eroded river bank and an additional two housepits, again with no surface indication, were located as a result of our excavation work. Seven smaller depressions, less than three meters in diameter, are very likely some type of cache pit. Knowing that much of the surrounding area has been disturbed, and the number of housepits located for which there was no surface indication, the total of twenty-seven possible housepits for the remaining site area is considerable. A size breakdown of these depressions is given in Table III. (Figure 10).

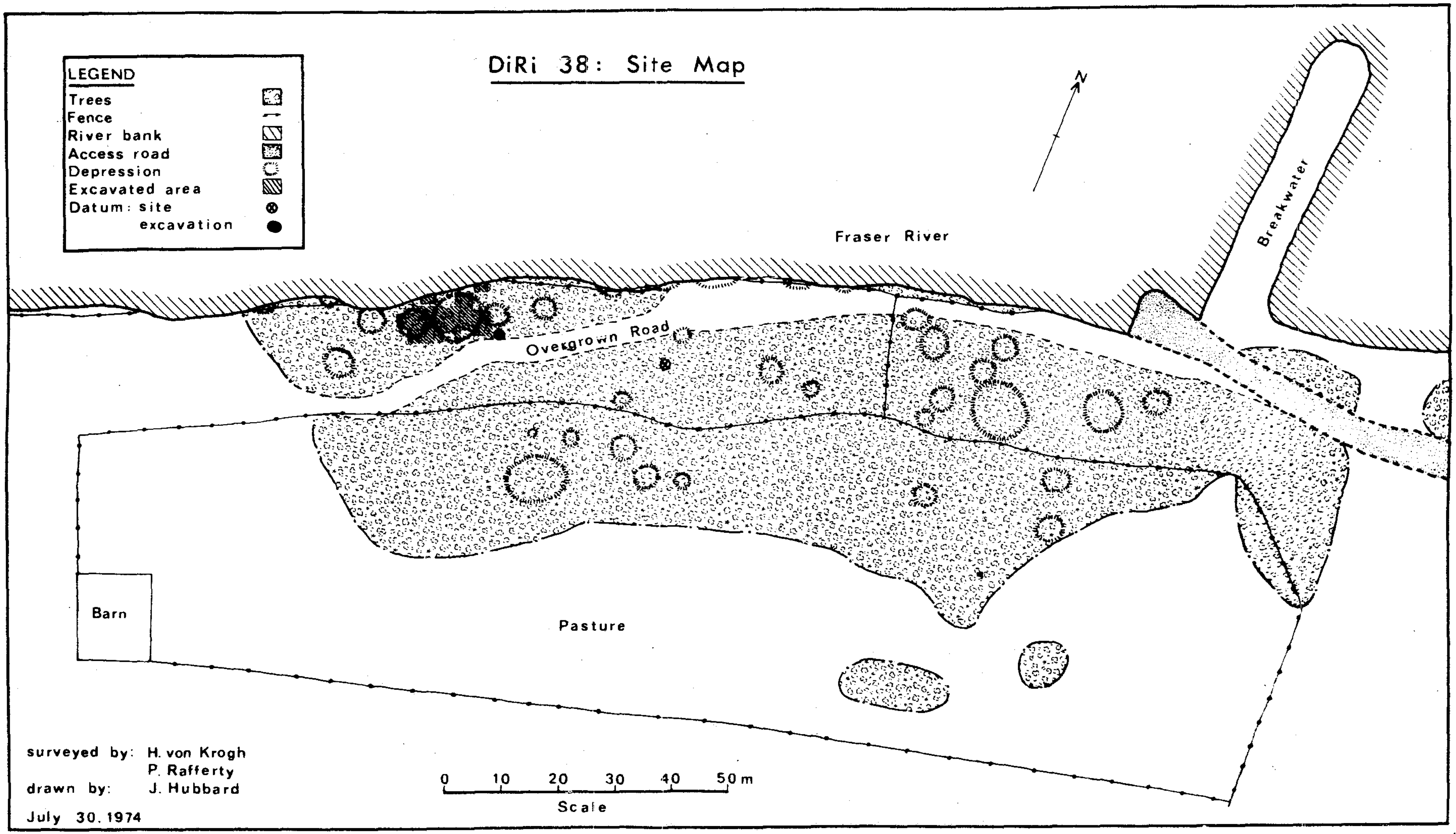

DiRi 38: Site Map
LEGEND
Trees
Fence
River bank
Access road
Depression
Excavated area
Datum: site
excavation
N
Fraser River
Breakwater
Overgrown Road
Barn
Pasture
0
10
20
30
40
50 m
Scale
surveyed by: H. von Krogh
P. Rafferty
drawn by: J. Hubbard
July 30, 1974

Figure 10

Table III: Housepit size distribution - DiRi 38

approximate diameter (m)	number
3	2 (2)
4	10 (2)
5	2
6	0 (1)
7	1 (1)
8	2 (1)
9	1
10	1
	N=26*

(1) number eroding out of river bank. Measurements may not be accurate.

* no estimate could be made for one housepit exposed through excavations.

Salvage operations were initiated at the Flood site when it was observed that housepits along the river bank were being steadily eroded away by the spring freshet. This increased erosion rate, also noted at the Pipeline site, is in part a result of the completion of Highway 7 along the north bank of the Fraser River. The completion of this highway required that a considerable portion of the river bed be filled in and stabilized with heavy rock, to provide the needed width for the highway and the C.P.R. tracks. The result of this recent reclaiming of a portion of the river bed is increased erosion on the south bank.

One particularly deep housepit (HP#1), roughly eight meters in diameter, which was very close to the river bank and already beginning to suffer from erosion, was selected for excavation. An arbitrary universe 8 x 13 meters was outlined so as to encompass the entire remaining structure. This area was then divided into fifty-two 1 x 2 meter units. From this "universe" a series of units were chosen for excavation by simple random selection. In addition, judgmentally selected units were chosen for excavation as work proceeded. One unit (Pit #80) was extended to the east, to test for the presence of another possible housepit. This led to the discovery of housepit #3. Extensive excavations were also extended to the west, where a small but very productive housepit (HP#2) was discovered, and to the north, to expose features visible in the river bank. In addition, a number of feature extension pits were excavated, to fully expose a number of features, as the project neared termination. The units excavated are listed in Table IV and are shown in Figure 11. A number of units are irregular or incomplete on the excavation plan. This is because in some cases the pits were judgmentally shifted to better test an area, such as unit 19 and 47. Other pits were not completed, mostly because large tree stumps interfered, as is also evident on the excavation plan (Figure 11), trees and tree stumps severely restricted excavations in some areas.

Excavations were carried out by a crew varying from 6 to 15 people from May 29 to August 30, 1974. As at the Pipeline site, excavations were carried out in arbitrary 10 cm. levels. Both shovel shaving and trowel excavation were carried out as was deemed necessary. All the soil excavated was put through one-quarter inch wire mesh screen. Each artifact exposed in situ was given a 3-dimensional provenience, measured from an arbitrarily established datum. Level material was then placed in an appropriate level bag.

Stratigraphy

The interpretation of housepit stratigraphy entails a number of special problems to which attention must be given. All of these relate to the nature of housepits, their construction, occupation and eventual collapse.

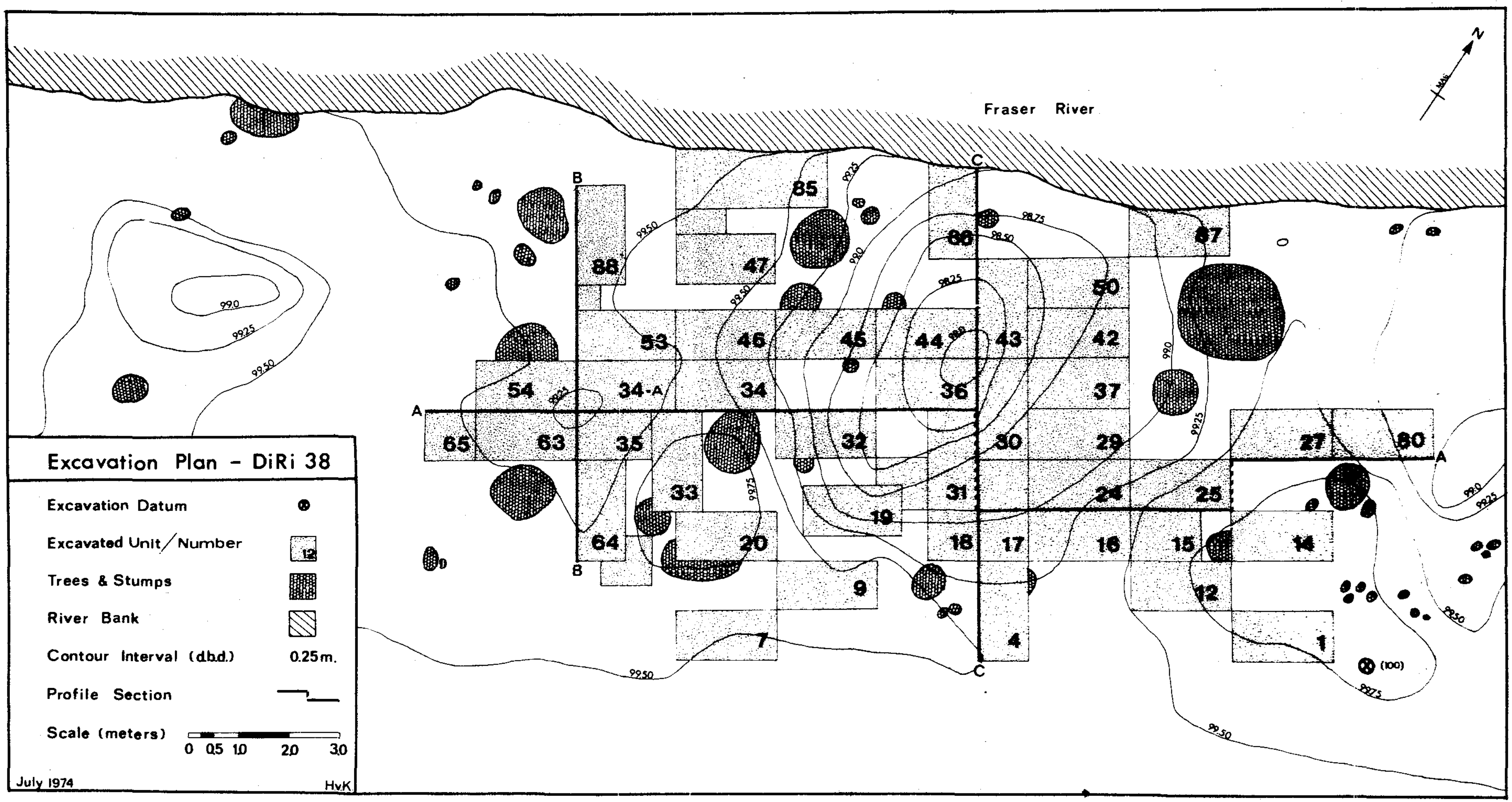

Fraser River
N
Excavation Plan - DiRi 38
Excavation Datum
Excavated Unit/Number
Trees & Stumps
River Bank
Contour Interval (d.b.d.) 0.25m.
Profile Section
Scale (meters)
0 0.5 1.0 2.0 3.0
July 1974
HvK
A
B
C
65
63
54
35
34-A
64
88
53
46
34
33
20
47
85
45
32
19
9
7
86
44
36
31
18
43
30
17
4
50
42
37
29
24
16
15
12
67
25
27
14
80
1
(100)
99.0
99.25
99.50
99.75
98.25
98.50
98.75

Figure 11

Table IV: Excavated units at the Flood site.

Number	Simple Random Sample	Judgementally Selected Units
1.	4	12
2.	29	14
3.	30	15+
4.	20	16
5.	37	17
6.	38* (tree)	18+
7.	7	27
8.	25	31+
9.	50	32
10.	34	33+
11.	42	34A
12.	5*	35
13.	34	36
14.	19+	43
15.	24	44
16.	1	45
17.	21* (stump)	47+
18.	46	53
19.	52*	54
20.	9	63
21.		64
22.		65
23.		80
24.		85
25.		86
26.		87
27.		88

* not excavated

\+ unit with some irregularity in plan outline. See text, Figure 11.

Before discussing the assemblages and occupation components at the Flood and Pipeline sites, a brief mention of these special problems is necessary. Hanson (1973:68-72) mentions some of these as they applied to excavations at the Katz site, many are necessarily repeated here, with some specific additions. These factors can be discussed in a general sequence, beginning with the initial excavation, following through with the abandonment and collapse of the structure.

(1) construction: The initial excavation, preceding pithouse construction, necessarily required digging into earlier cultural and/or geologic zones. Thus an earlier component, when present, would be disturbed and displaced. Hanson (1973:70) suggests that the depth of the initial housepit excavation was determined at the Katz site by the depth of easily removable strata (i.e. sand), thus when river cobbles were reached, the pithouse excavations was halted. This may also have been the case at Flood: HP#1, but not at Flood: HP#2 and #3 and Pipeline: HP#1, where the initial excavation was halted well above the river cobble level. Teit (1900:192) writes that the earth removed in the initial excavation was placed in large baskets and dumped near the excavation hole, for later use as a roof covering.

(2) roof deposit: As mentioned above, Teit (1900:192-194) states that the sediments removed in the initial excavation were later placed over the roof cover and subsequently beaten and stamped down firmly. Following this ethnographic description we can see further displacement, mixing and superimposition of cultural deposits. Assuming an earlier component is present, it is unlikely that absolutely all of the removed soil was placed on the pithouse roof. This would leave some displaced early component overlying later deposits outside of the bounds of the actual pithouse feature. We also have to keep in mind that the early component

materials are now located above the to-be-occupied housepit floor.

(3) filtering through roof: Teit (1900:192-194) reports that the pit-house was entered through an opening in the central roof. Assuming some form of roof entrance was being used, a constuction as described by Teit (1900:194) would not be entirely impervious to a filtering of the soil capping through it, and Teit reports that a warning was shouted before entering the house so that "...women who were cooking might have time to protect food from dust or dirt." This dust and dirt could also very well have included cultural material from the earlier component. To what extent this would be a factor affecting the cultural assemblages is difficult to assess.

(4) deposition on the roof: There can be little doubt that cultural material was deposited on the roof cover during the housepit occupancy. This could be a result of a roof entrance as well as "house cleaning", recorded by Hill-Tout (1899:513). It is also possible that the housepit occupants may have sat on the roof while knapping stone tools, leaving the resultant debitage where it landed.

(5) collapse of roof: The inevitable collapse of a housepit superstructure as a result of abandonment, would result in the deposition of the remaining structural elements as well as the roof covering onto the housepit rim and floor deposits. Erosion over time would tend to further level irregularities. The end result is a fairly intact floor zone covered by a deposit of mixed cultural materials.

(6) re-occupation: The re-occupation of a pithouse or housepit depression is evident at the Pipeline site, where three well defined occupation floors have been identified. Although it is difficult to prove in the absence of structural features, it appears as though these were a result of re-use

of the excavated housepit depression rather than re-occupation of the pithouse feature. This is suggested by the relative stratigraphic distance between the original floor and the subsequent occupation floors. The re-occupation of a housepit depression is exemplified in an example described by Stryd (1973:311-313, Figure 18) at the Mitchell Site, where in one housepit depression, he exposed six-well-defined living floors, with a possibility of more.

Linked with the re-occupation of a housepit depression is the possible re-excavation of it, or of a new depression intersecting an old one. Mitchell (1963:52) found this to be the case during his work at Esilao village. Hanson (1973:71) also feels he has evidence for repeated cleanings or partial re-excavation of the house. The resulting stratigraphy is even more complex than that normally encountered.

(7) floor zones: Anyone who has walked on a sandy beach will recognize the futility of attempting to isolate a discrete floor base in a soft sandy deposit. With the exception of a portion of the floor in Flood: HP#2 where a hard, compact floor was present, only floor zones could be isolated. These were generally stratigraphically distinct and recognizable by color variation, artifact concentration, concentration of charcoal flecks as well as the presence of cultural features such as hearths. The presence of floor zones does make it more difficult to isolate artifacts relating to one of a number of superimposed floors because, as mixing occurs in the floor zone, artifacts tend to work their way down into the sand deposit to some extent. Wilson (1974a:167) has noted of housepits at the Harper Ranch Site (EdRa 9), that artifacts not in direct association with floor zones were a result of "...being trodden on and pushed

down through loose sands and clays."

Stryd (1973:298), of one housepit excavated at the Bell Site, states:

> "Presumably the stratified cultural fill represents several house occupations, but no living floors could be identified on the stratigraphic sections other than the basal floor (Floor B). The occurrence of two features between 55 and 60 cm. b.s., however, indicates the presence of an additional floor (Floor A) at that depth."

This appears to be a result of loose or sandy deposits that do not show stratification readily.

(8) pithouse area: As a pithouse village is occupied, cultural material would be deposited around and between houses. This cultural material could become mixed to some extent with deposits excavated during pithouse construction, sediments sloughing from the roof as a result of weathering or of walking over the roof to the entrance, but more importantly, it is difficult to relate these deposits to those of a particular pithouse floor, as they need not necessarily have been deposited at the same time. If no earlier occupation of the site occurred, or if the assemblages are significantly typologically distinct, this is perhaps less of a problem, but where we are dealing with a relatively short time span, or where there is only a gradual shift in artifact types, it is a more perplexing problem.

(9) filling of the depression: A final factor to mention regarding housepit stratigraphy is post occupational fill. This takes the form of materials that are dumped into the depression simply to get rid of them. This was evident at the Flood site where historic garbage and rocks were dumped into a number of pithouse depressions as a result of local clearing and agricultural activities. This also appears to have occurred prehistorically. At Flood, housepits #2 and #3 were both almost entirely filled with fire-broken rock,debitage and discarded artifacts, many fragmentary. A more detail description will be given in the section dealing

with archaeological features. The point to make here is that this post occupational fill can form an additional stratigraphic zone in housepit deposits.

With an understanding of factors affecting stratigraphy at the two sites in question, it was possible to isolate discrete artifact assemblages, as to their specific location in a particular stratigraphic zone within the housepit features. These are listed in Tables V and VI, and are shown in the profile sections in Figures 12, 13, 14 and 15. Any artifacts that could not be adequately placed in any one of the described assemblages were placed in a separate assemblage group. Placement of artifacts into an assemblage was made on the basis of horizontal and vertical stratigraphy, as determined from numerous profile diagrams, but also from data in the excavation level notes and identification of soil types related to the location of individual artifacts.

Discrete occupation components can be identified among the seventeen artifact assemblages. By a discrete occupation component is meant either an occupation floor zone or a stratigraphically distinct, discrete cultural deposit. These are identified and listed for the Pipeline site in Table VII and for the Flood site in Table VIII. Further discussion of these occupation components will be undertaken in the later section dealing with intra- and inter-site comparisons.

At this point brief mention of the non-cultural fluvial deposits and their relationships to the cultural deposits, should be made. Little can be said with regards to the Pipeline site. The housepit was excavated into fluvial deposits and at no time was the river cobble zone

Table V: Discrete assemblages of artifacts from the Pipeline site.

Assemblage Number	Name	Number of Specimens
1	non-pithouse	92

Definition: This assemblage consists of cultural material recovered from excavations which were found to lie outside the bounds of the original housepit excavation. The assemblage, comparatively large for the site, could not be adequately subdivided on stratigraphic or typological differences. Because of unclear affiliation with any one occupation floor zone, and because it likely includes a mixture of cultural material from all three occupations that can be identified in the housepit, it is considered a mixed assemblage.

2	occupation floor #1	34

Definition: This assemblage is related to the initial excavation and occupation of the housepit feature. It represents the first occupation floor.

3	occupation floor #2	134

Definition: This assemblage consists of cultural material on or associated with the second occupation floor zone. This floor zone was identified both in soil profiles and by relative artifact concentrations, presence of cultural features and soil type.

4	occupation floor #3	26

Definition: This assemblage is related to the third and final occupation floor zone of this housepit feature. It was identified both in the soil profiles and by relative artifact concentrations, presence of cultural features and soil type.

5	mixed deposit	114

Definition: This assemblage consists of cultural material from mixed deposits. This includes mixed deposits from housepit construction as well as artifacts that could not be confidently assigned to one of the preceding assemblages.

Table VI: Discrete assemblages of artifacts from the Flood site.

Assemblage Number	Name	Number of Specimens
1	housepit #1 floor zone	230

Definition: This assemblage is related to the initial excavation and occupation of this housepit feature.

2	housepit #1 fill	246

Definition: This assemblage consists of artifacts found above the floor zone and under the surface humus zone. It is the roof fill deposit and represents a mixture of early component and later pithouse occupation artifacts.

3	housepit #2 floor zone	339

Definition: This assemblage is related to the initial excavation and occupation of this housepit feature.

4	housepit #2 fill	171

Definition: This assemblage, homologous to assemblage #2, is the roof fill deposit. It again represents a mixture of cultural material.

5	housepit #2 rock fill	473

Definition: This assemblage represents the cultural material found in the rock fill, found above the roof fill and beneath the humus zone. Again it is a mixed deposit.

6	housepit #3 floor zone	13

Definition: This assemblage is related to the initial excavation and occupation of this housepit feature.

7	housepit #3 fill	17

Definition: This assemblage, homologous to assemblages #2 and #4, is the roof fill deposit. It represents a mixture of cultural material.

8	housepit #3 rock fill	78

Definition: This assemblage, homologous to assemblage #5, represents the cultural material found in a rock fill, above the roof fill and beneath the humus zone. This is an assemblage of mixed cultural material.

9	intrusive fill	63

Definition: Included in this assemblage is the cultural material recovered from a deposit historically dumped into housepit #1. This deposit was located above a humus level. It included historic items such as glass, metal and a gum wrapper. The prehistoric material is included here, but is from an unknown origin, possibly a result of the road construction through the site or from agricultural activities. It is a mixed deposit.

continued--

continued--
Table VI:

Assemblage Number	Name	Number of Specimens
10	prepithouse deposit	342

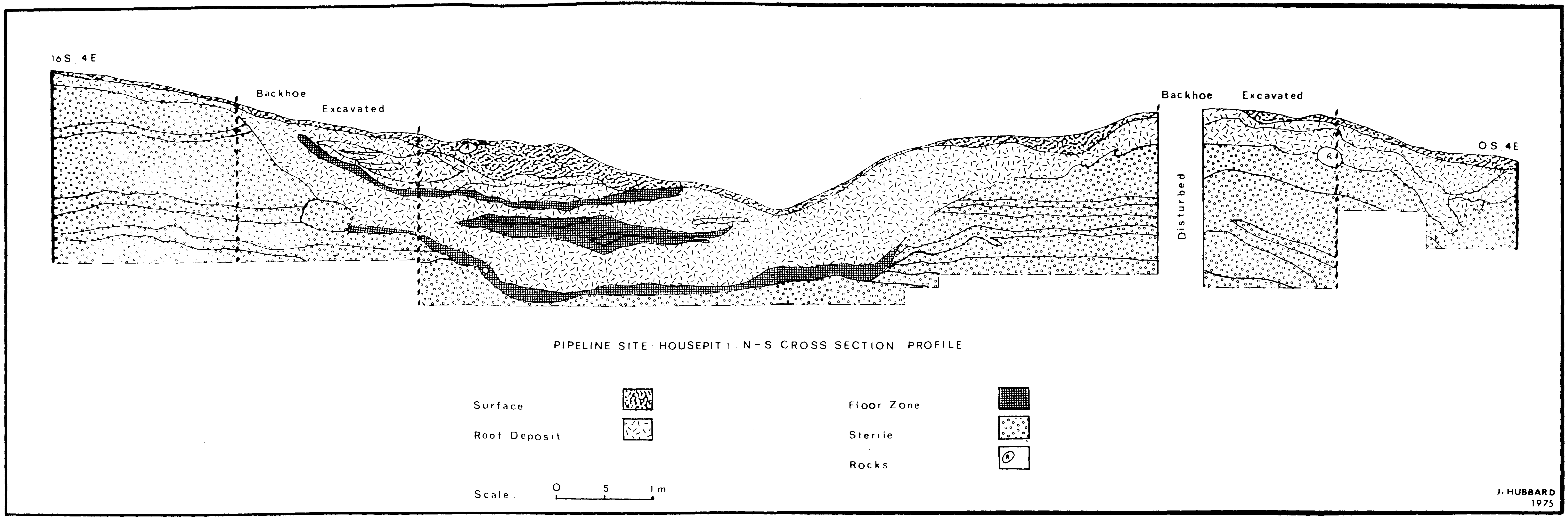
Definition: This assemblage consists of the cultural strata which was excavated through as a result of housepit construction. It thus includes cultural material present immediately prior to pithouse construction as well as material considerably older.

Assemblage Number	Name	Number of Specimens
11	Surface	279

Definition: This assemblage consists of those artifacts located within the immediate surface, or root mat zone, of the site. It extends over the entire excavation and is likely mixed to some extent.

Assemblage Number	Name	Number of Specimens
12	Mixed deposit	275

Definition: Rather than make arbitrary guesses, all those artifacts that could not adequately be assigned to one of the above assemblages were grouped here.



16S 4E
Backhoe
Excavated
Backhoe
Excavated
Disturbed
OS 4E
PIPELINE SITE: HOUSEPIT 1 N-S CROSS SECTION PROFILE
Surface
Roof Deposit
Floor Zone
Sterile
Rocks
Scale
0
5
1 m
J. HUBBARD
1975

Figure 12


HP3
4N 2E
99.0
4N 2W
3N 2W
HP 1
3N 7W
5N 7.3W
HP 2
5N 18 W
R
FLOOD SITE: HOUSEPITS 1,2,3 E-W CROSS SECTION PROFILE (A-A)
Surface
Rock Fill
Root material
Early
Roof Deposit
Floor Zone
Sterile
Cobble Level
Rocks
Scale : 0 .5 1m
J. HUBBARD
1975

Figure 13

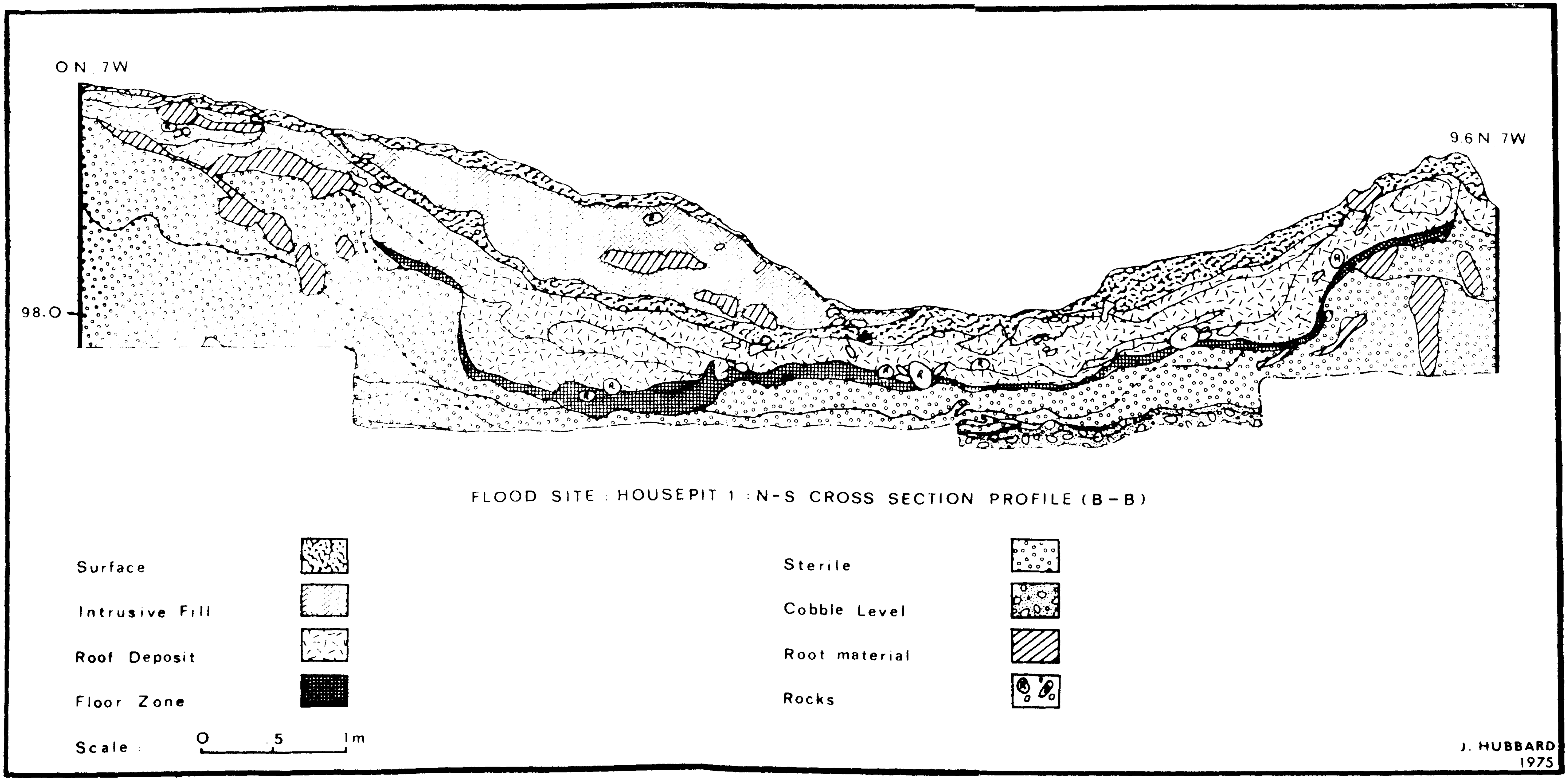
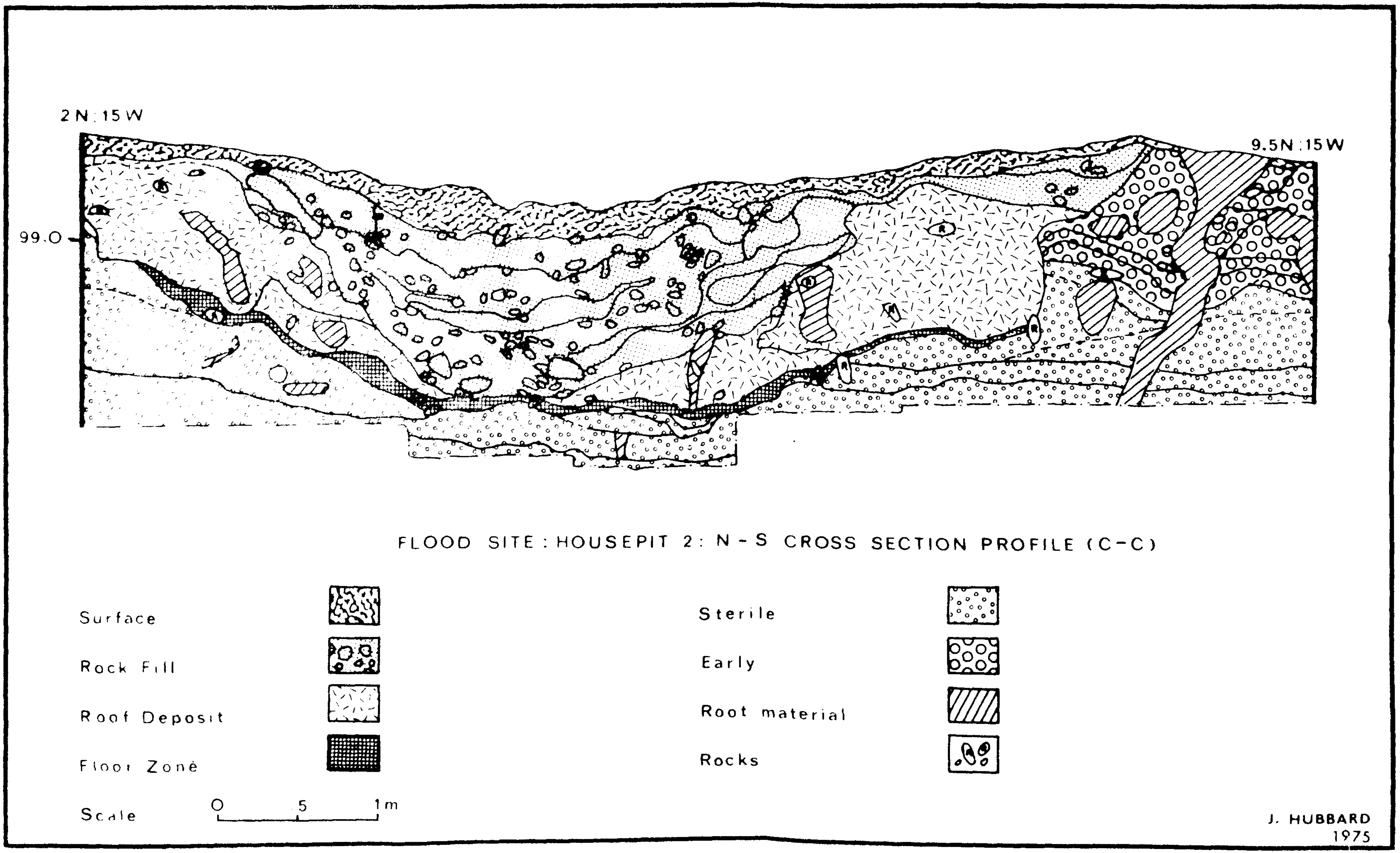

O N. 7W
9.6 N. 7W
98.0
FLOOD SITE : HOUSEPIT 1 : N-S CROSS SECTION PROFILE (B-B)
Surface
Intrusive Fill
Roof Deposit
Floor Zone
Sterile
Cobble Level
Root material
Rocks
Scale : 0 .5 1m
J. HUBBARD
1975

Figure 14



2 N : 15 W
9.5 N : 15 W
99.0
FLOOD SITE : HOUSEPIT 2 : N - S CROSS SECTION PROFILE (C-C)
Surface
Rock Fill
Roof Deposit
Floor Zone
Sterile
Early
Root material
Rocks
Scale
0
5
1 m
J. HUBBARD
1975

Figure 15

Table VII: Discrete occupation components from the Pipeline site.

Component Number	Name	Number of Specimens	Assemblage
1	Occupation floor #1	34	#2
2	Occupation floor #2	134	#3
3	Occupation floor #3	26	#4
4	Mixed deposits	206	#1,5
	Total	400	

Table VIII: Discrete occupation components from the Flood site.

Component Number	Name	Number of Specimens	Assemblage
1	pre-pithouse deposit	342	#10
2	housepit #2 floor zone	339	#3
3	housepit #3 floor zone	13	#6
4	housepit #1 floor zone	246	#1
5	mixed deposits	1586	#2,4,5,7,8,9,11,12
	Total	2526	

encountered, either in the original excavation of the housepit, or in the subsequent archaeological investigations. At the Flood site, through more excavation work both in the original excavation of housepit #1 and in later archaeological work, the river cobble was reached. This cobble zone, a natural bed of water-worn gravels and cobbles, represents a former bed of the Fraser River. Fluvial deposits were then laid down over this cobble zone. Direct comparisons of cobble depth and related fluvial deposits and depth must be made with care, as the cobble zone is in itself not perfectly level. This is very evident at the Katz site (von Krogh 1976) and to a lesser extent at the Flood site.

Similarly, the exact relationship between cobble zones at the two sites is not known. However, by looking at these data, we do get an idea of fluvial deposition as well as the general state of the environment along the shores of the river during this early time period. At the Katz site cultural material was found in fluvial deposits to a maximum depth of 61 cm. above the cobble zone. Occupations in the fluvial deposits were later radiocarbon dated at 745±90 B.C. (I-6189) for the lowest, and 525±90 B.C. (I-6190) for the uppermost, (Hanson 1973:267). During this time period some 120 cm. of fluvial sand was deposited on the site. Sometime after 525 B.C. housepit excavation and construction began, the earliest dated housepit occupation from Hanson's work being estimated at 480±90 B.C. (I-6191) (Hanson 1973:267). The appearance of housepits in itself suggests a more stable water level by this time. At the Flood site, the earliest occupation in fluvial deposits occurs approximately 100-130 cm. above the river cobble zone. A single radiocarbon date of 360±150 B.C. (GaK-5430), estimated from a carbon sample obtained from beneath an oven feature (see feature number 23), 160 cm. above the cobble level, can be taken as an estimated date of the earliest concentrated cultural occupation of the site area tested. A very thin scatter of cultural material in the levels below the oven feature, to a maximum depth of approximately 100-110 cm. above the cobble level, indicate earlier use of this area did occur.

From examining the fluvial deposits and associated cultural material, we can estimate that the Fraser River, in the Katz-Flood locality, was stable enough for housepit occupation along the banks by about 500 B.C.

CHAPTER IV

CULTURAL FEATURES

As the work at the Pipeline and Flood sites was centered upon the excavation of semisubterranean dwellings, the description of features assumes a very important role. In this chapter each housepit feature exposed will be individually described. With respect to housepits, a terminology similar to that adopted by Stryd (1973:261-262) will be employed. These terms are as illustrated in Figure 16. The description of the housepits will necessarily include the mention of many associated features. Following the description of the housepits, hearth and oven features will be generally discussed.

Pineline Site - HP#1

The housepit depression at the Pipeline site was found to be actually much smaller than initially indicated by the surface depression and only four excavation units were actually within the limits of the feature. Thus, beginning with a very small sample, the archaeology was further complicated by the presence of three successive occupation floors within the same depression. Nothing in the way of structural detail was recovered from the two more recent occupations. These occupations were, however, clearly defined by a concentration of cultural material and the presence of cultural features. From the initial occupation, we have the least artifactual, but the most structural, evidence, derived largely from the N-S cross-trench profile (Figure 12).

The structure appears, from the surface depression, to have been

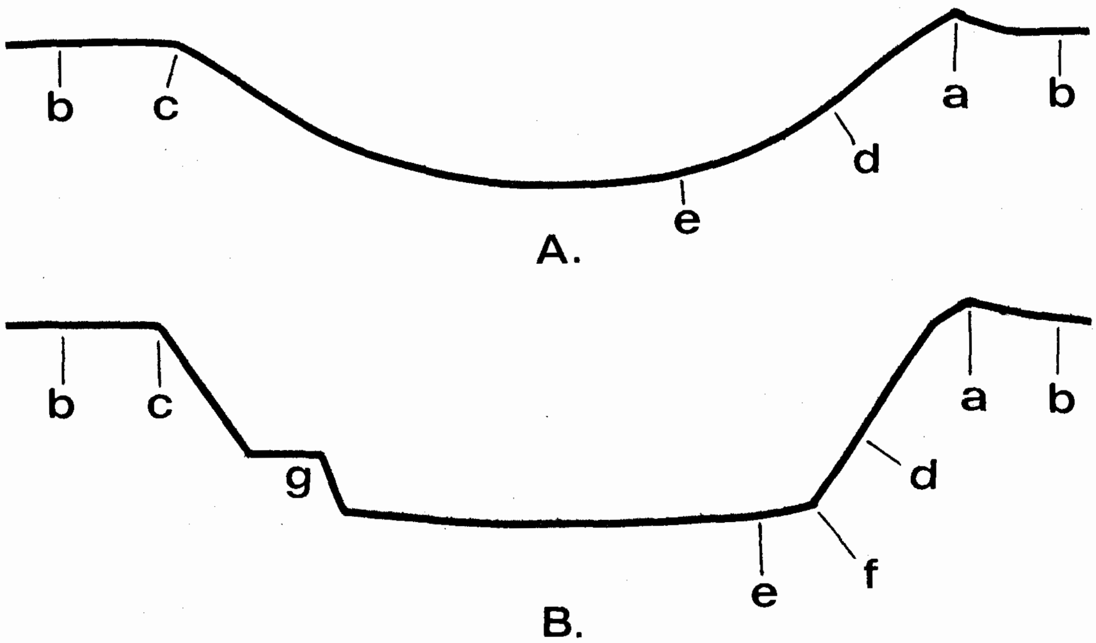


Figure 16: Idealized housepit profiles, (Stryd 1973:261-262).

A. Saucer shaped housepit
B. Steep sided housepit

a) rim with lip
b) ground surface
c) rim without lip
d) housepit wall
e) housepit floor
f) floor-wall juncture
g) bench or wall step

roughly circular. However, excavations were not extensive enough to substantiate this. From the one cross-trench profile, the floor area measured 4.7 m. and the living area (including the bench area) 6.0 m. Little evidence regarding actual structural detail was exposed. The floor was relatively level and the walls steep. Evidence for the presence of a bench or step area is indicated in Figure 12. Whether this bench encircled the entire feature or was of a more discontinuous nature was not clearly determined. No hearth features were exposed on the housepit floor and the only feature actually associated with the floor was a linear rock alignment, feature #10.

No evidence of an entrance way, or pertaining to the superstructure, was exposed. As already mentioned, no information indicating that a structure was associated with the later two occupation floors was recovered.

Flood Site - HP#1

This housepit depression was the initial focus of excavations at the Flood site. The surface depression, which measured roughly 8 m. in diameter and 1.5 m. in depth, reflected quite closely the actual dimensions of the structure. As a result of excavations the floor area was found to be 6.25 - 6.5 m. in diameter and the living area (including the area of the bench) to be 7.25 - 9.5 m. in diameter, see Figure 17. In outline, the structure was generally circular, the depth from ground surface to the floor being roughly 2 meters.

The housepit depression represents a single occupation, though one hearth feature (#13) on top of the housepit roof deposit indicates the site was visited after the abandonment and collapse of this feature. No floor zone related to this later hearth feature was discernable. Much of

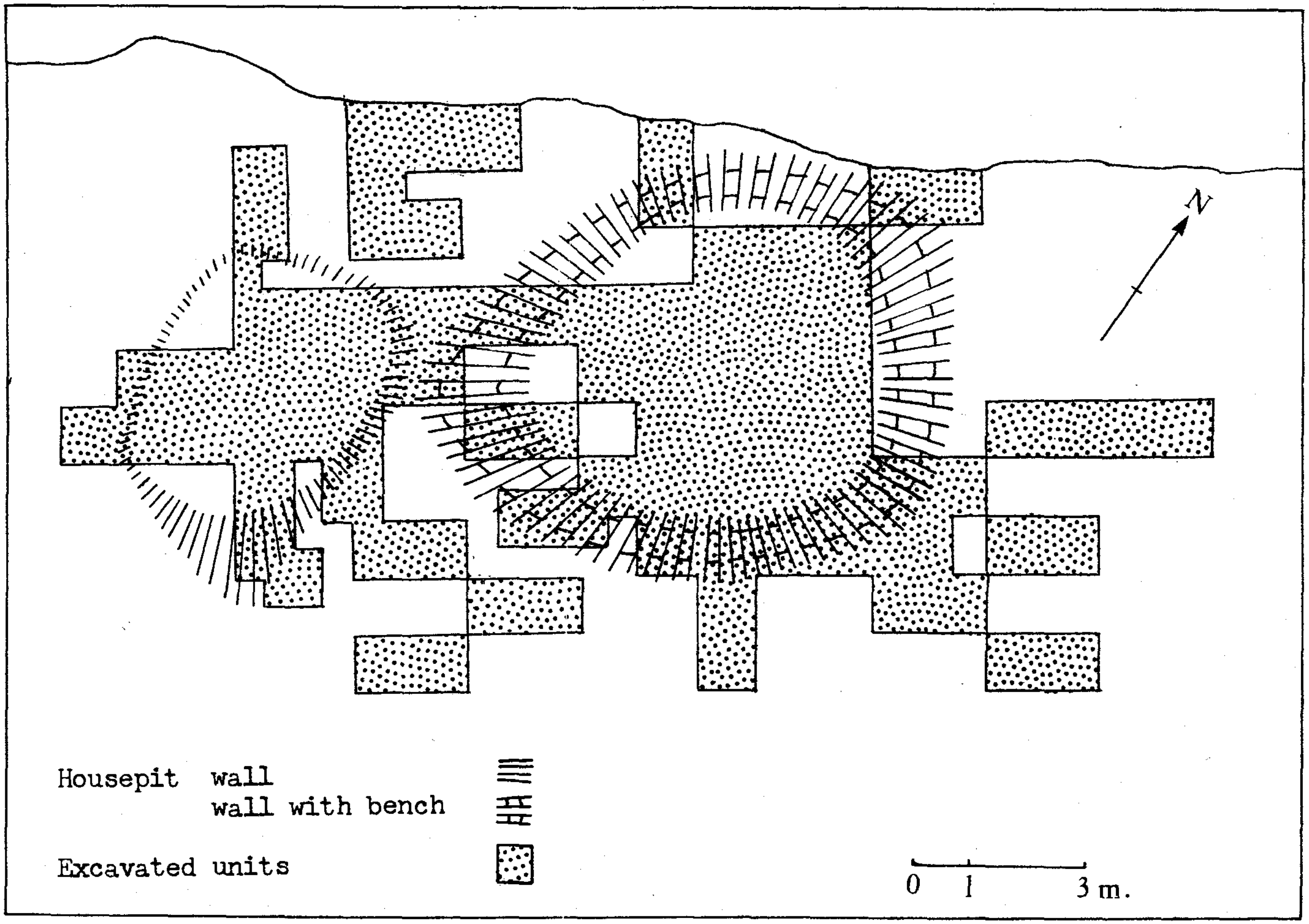


Figure 17: Housepit floor and wall-slope areas : Flood site.

the structural data is drawn from the various profile sketches, particularly the N-S profile (Figure 14) and the E-W profile (Figure 13). From these we see a structure with steep walls and a relatively flat floor. No distinct lip was visible about the rim. A step or bench area is seen on all of the profiles, and apparently circled the structure, as indicated in Figure 17. The width of this bench varied from 0.60 - 1.00 meters and had a height of roughly 0.60 - 0.75 meters.

Three hearth features were exposed, scattered over the floor area. As suggested by Hill-Tout (1899:513), this multiple occurrence of hearths may have been a result of extremely cold weather, or, perhaps more likely, considering the size of the structure, more than one family may have inhabited the house. Negative evidence also plays an important role. There are no cobble alignments on the floor area such as found at the Pipeline site and at Katz (Hanson 1973). There is also no evidence of a side entrance, which Barnett (1944:266) suggested was typical of Coast Salish housepits. And finally there is so little structural evidence in the form of post moulds or post footings that little can be inferred with respect to the original form of the superstructure.

With this negative evidence, and from the extent of our excavations, it is assumed the post construction and roof was basically similar to the types as described by Ray (1942:177-178) or Teit (1900:192-194) and that the entrance was in fact through the roof.

Flood Site - HP#2

This housepit was discovered during the course of excavations at the Flood site. The very shallow depression in the ground surface (0.25 meters) was hardly enough to hint of the existence of this structure. It is interesting to note here a feature not previously described in the Hope-Yale or neighbouring localities, namely, the occurrence of a housepit depression essentially filled with fire-broken rock, with small amounts of unaltered river cobbles and various soil lenses, (see Figure 14 and 15). Among the fire-broken rock were also considerable numbers of artifacts, in various stages of manufacture. To explain this occurrence, it is suggested that this fill consists of material that perhaps accumulated on a housepit floor as garbage, and were occasionally gathered together and removed. This garbage was subsequently thrown into the former housepit depression, simply becuase the depression was a convenient, and presumably nearby, disposal area. This hypothesis is supported by an observation made by Hill-Tout (1899:513), in which he states, "...The floors of these houses were kept covered with small fir branches, which were renewed about every three or four days." M. Smith (1947:258-259), in writing of the Agassiz area, notes that informants stressed careful housekeeping involved with housepit occupation, and mentions mat floor coverings and daily cleaning of refuse from the floor. Although it has not been established whether the housepits described here had such a floor covering, we do see that ethnographically, housepit floors did in fact undergo frequent cleanings. As a result of these cleanings, broken rock, some unaltered rock, debitage, broken artifacts and occasionally, perhaps by accident, a complete artifact, were likely discarded. It was not determined whether this rock fill originated from housepit #1 or perhaps another nearby housepit.

Housepit #2 is roughly circular in outline. The walls are very steep on the east, west and north sides, but slope considerably on the south side. The floor area is quite flat, and has an area of 4.0 x 4.5 meters, (see Figure 14, 15 and 17). On the floor of the housepit was a single, small hearth, with an associated large rock slab, similar to the arrangement described by Teit (1900:194). Other features within the housepit include a small cache pit (feature #8). The depth of the floor beneath the surface was in the order of 1.5 m.

There is no evidence of a post construction, either in the form of post moulds or post footings, that can be directly linked with this housepit feature, therefore little can be stated along these lines. It is also not certain whether this house had a roof entrance, as suggested by the hearth and large rock slab, or a side entrance as suggested by the sloping south wall. It is possible that both types of entrance ways were used.

Flood Site - HP#3

Very little can be said concerning this housepit as only one excavation unit cut through its wall. It is interesting to note that this housepit was also filled with great quantities of broken rock and other debris, of a nature identical to that from housepit #2. From the minimal profile cut (Figure 13), little can definitely be said regarding its general shape or the nature of construction.

Other Features

Besides the four housepit features and the associated rock fill in two of these, thirty-three other features were exposed to some extent.

The fourteen hearths exposed at both the Flood and Pipeline sites fall generally into four basic patterns;

(1) a circular arrangement of cobbles set on edge,

(2) a flat bed of rock underlying the hearth,

(3) a non-aligned scatter of rock and charcoal, and

(4) a charcoal concentration.

These vary greatly in size ranging in area from 0.40 x 0.40 m. to 0.95 x 1.40 m.

Generally associated with hearths are a very uniform set of features believed to have been baking ovens. As no comparable examples of this specific type of oven, with its very uniform construction pattern, have been previously described for the Hope-Yale locality, this interpretation is based on the very detailed description of the construction and use of ovens to roast and steam foods written by Teit (1900:236) and the structural makeup of the features. Concerning the construction and use of ovens among the Thompson, Teit (1900:236) writes:

> "Dry roots are cooked in the following manner: A circular hole is dug in the ground to the depth of two feet and a half, and large enough in diameter to contain the roots to be cooked. Into this hole are put four or five flat stones, - one in the centre and the others around the sides. Above these is piled a large heap of dry fir-wood, wood is then kindled, and allowed to burn until nothing but embers remain, when the small stones drop down to the bottom of the hole. The unburnt wood is next taken out, leaving nothing but ashes and stones. Enough damp earth is then shovelled in to cover thinly the top of the stones, and this is overspread to a depth of half a foot or more with the branches of bushes, such as service-berry, maple, alder, etc. Next follows a layer of broken fir-wood branches, over still another layer of fir branches. By this time the hole is nearly filled up. The roots are then placed on top, and covered carefully with a thick layer of broken fir-branches, a layer of dry pine-needles, and again a layer of fir-branches. The hole is covered with earth, and a large fire of fir-wood is kindled on top. In this way immense quantities of roots are cooked at one time. They remain in the oven - according to the kind being cooked - for from twelve to twenty-four hours."

Further, to steam foods, Teit (1900:237) writes:

> "Before any branches were put into the hole, a stick from an inch and a half to two inches in diameter was planted perpendicularly in the ground, reaching considerably above the level of the hole. When everything was covered up, the stick was pulled out, leaving an aperture into which water was poured, causing steam to rise from the hot stones underneath. When sufficiently steamed, the usual fire was kindled on top."

Perhaps the most important construction feature of each of the ovens at the Flood site (features #19, 20, 22 and 23) was a thick layer of charcoal which was found underneath a bed of flat, round, river cobbles. A similar bed or concentration of charcoal was not found on top of these rocks. A hypothetical reconstruction of the use of these ovens follows. First a shallow pit was dug into a sandy deposit. In this depression a large fire was built. When a sufficiently thick bed of hot coals had accumulated, the flat, round river cobbles were dropped onto the coals. These flat rocks would heat up quickly and maintain a uniform heat for some time. They would also provide a buffer between the food to be roasted or steamed and the glowing red-hot coals. Some of these rocks were broken in situ, others were broken before they were dropped on the coals. The food to be roasted or steamed was then likely handled in much the same way as that described by Teit (1900:236). As a result of the way such an oven was constructed, it could only be used once. To be utilized a second time, the rocks had to be removed, a new fire made and then the flat rocks re-applied. Evidence of such re-use is demonstrated in two oven features (#20 and 22) from the Flood site. All of the oven features located were found outside of the housepit structures. These ovens were not used contemporaneously, but rather over a period of time, as demonstrated by the deposition of fluvial deposits between the oven features. This is especially clear when comparing features #19, 20 and 22 and feature #23, all from the Flood site. Since none of the oven features were complete, it is difficult to estimate the size of these features. However, from features 19 and 23, assuming symmetry, the diameter appears to be in the range 1.33 - 1.45 m.

The use of earth ovens in food preparation by the Upper Stalo is recorded ethnographically by Duff (1952:74). Archaeologically, Hanson (1973:90-91) describes one feature as being a possible rock oven, but it does not have the same pattern of construction as do the features described here as ovens.

An analysis of the contents of oven feature #23 resulted in the recovery of one small piece of calcined unidentifiable land mammal bone, a small quantity of seeds, some charcoal fragments and some small nut shell fragments (Mouer 1975). Because of the very small sample, and because the specimens did not appear charred even though they came from an oven area, care must be taken in using the data, as it is possible the seeds are a result of recent contamination.

Generally grouped as rock alignments and concentrations are a wide variety of features. These, as well as cache pits and other features are briefly described in Tables IX and X.

Table IX: A summary of features exposed at the Flood site

Feature Number	Type	Excavation Unit	Dimensions	Component
1.	Rock Alignment	4	1.0x0.35*m.	4

Description: This linear arrangment of twenty rocks, 5 - 13 cm. in diameter, occurs to the back of the bench area in HP#1. It may have functioned as a retaining wall, to keep sand from collapsing into the housepit. The feature was not completely exposed, but it was not found elsewhere in the excavation, indicating it did not extend about the entire structure.

2.	Hearth	43	0.65x0.50m.	4

Description: This hearth was made on top of a bed of thin, flat, sandstone slabs. On the south side of the hearth three sandstone slabs were set on edge, forming a low retaining(?) wall. Burnt soil, charcoal and firebroken rock were concentrated above the sandstone base.

3.	Hearth	30-31	1.15x1.02	4

Description: This hearth was made up of a thick bed of charcoal on a roughly circular scatter of rocks. The rocks do not appear to have been purposefully arranged. Charcoal and firebroken rock occurred in great concentration above the hearth base.

4.	Rock Alignment	34	0.30 wide, 0.77 deep	5

Description: This vertical arrangment of eleven flat river cobbles, 6 - 26 cm. in diameter, was found in housepit #2 fill deposit. It may have been a footing for a rafter or hip rafter from housepit #1, though this association is not definite.

5.	Hearth	29/37	0.95x1.40 m.	4

Description: This large hearth area is defined by a dense concentration of charcoal and fire-broken rock on a bed of non-aligned flat beach cobbles. A number of these cobbles exhibit in situ heat fractures.

6.	Hearth(?)	37	0.50x0.65 m.	1

Description: This feature consists of a dense concentration of charcoal and fire-broken rock in a possible hearth area. The associated rocks are not aligned in any way.

7.	Rock Alignment	54	0.45x1.50 m.	2

Description: This feature consists of an alignment of two large flat rocks (roughly 50 x 30 x 14 cm. and 35 x 25 x 12 cm) set on edge. They in turn, seem to form a retaining wall (?), possibly to hold back the sand of the steeply cut wall of housepit #2. There is no further evidence of a retaining wall in this housepit.

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Table IX:

Feature Number	Type	Excavation Unit	Dimensions	Component
8.	Cache Pit(?)	63	0.60x0.70* m.	2

Description: This feature consists of a shallow depression (26 cm) in the floor of housepit #2. The feature was recognized when "floor zone" soil was found to continue into a depression. No associated artifacts were found in direct association with the feature and its exact function was not determined.

9.	Rock Concentration	87	0.23x0.38 m.	4

Description: This rock concentration appears to be that of a post footing, possibly for a rafter. The feature is made up of four large flat river cobbles (ranging from 30 x 17 cm. to 15 x 10 cm.) set closely together, three flat and the fourth on edge.

10.	Hearth	88	0.40x0.40 m.	5

Description: This hearth was formed by an arrangement of river cobbles laid out in a small circle. Charcoal was found in the hearth circle and a concentration of broken rock lay over the hearth area. This feature is located on the outside lip of housepit #2.

11.	Hearth	33/35	0.70x0.72 m.	2

Description: This hearth was formed by an arrangment of river cobbles, arranged in a small circle. A large rock slab (35 x 20 x 12 cm.) set on edge, was located on the east side of the hearth. This arrangement of hearth and rock slab is similar to that described by Teit (1900:194). A single charcoal sample from this hearth was radiocarbon dated, and produced an estimate of A.D. 620$\pm$100 (GaK 5429).

12.	Rock Concentration	64	0.77x0.87 m.	5

Description: This concentration of large flat rocks (ranging from 7 x 9 cm. to 12 x 34 cm.) may be that of a structural footing. Rocks used to make up this feature were all large flat river cobbles.

13.	Hearth	19	1.0x1.0 m.	5

Description: This hearth was made up of an irregular scatter of river cobbles over a circular area 1.0 m. in diameter. Charcoal and fire-broken rock overlay the actual rock base. This hearth was made after the collapse of housepit #1. It is located above the roof fill, and just under the surface fill.

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Table IX:

Feature Number	Type	Excavation Unit	Dimensions	Component
14.	Rock Alignment	15	0.85x0.30 m.	1/5(?)

Description: This vertical rock alignment of ten flat river cobbles, ranging from 6 x 6 cm. to 14 x 27 cm., appears to have been associated with a structural element. Its orientation is quite upright, and it may not have been directly associated with the construction of housepit #1. Figure 13 shows this feature and its location.

15.	Rock Alignment	45	0.39x.64 m.	4

Description: This feature is an arrangement of two large river cobbles, varying in size from 26 x 38 x 20 cm. to 28 x 40 x 12 cm. One cobble had a deep depression in its surface, forming a natural bowl. Laboratory examination showed that this natural bowl was in fact utilized. The large rock next to the bowl may have served as a seat. This is very similar to a mortar and rock seat feature arrangment exposed at the Pipeline site.

16.	Pebble Concentration	34A	0.50x0.65 m.	2

Description: This feature consists of a pebble concentration on the floor of housepit #2. The concentration was comprised of a small trench filled with 420 pebbles in the 1 x 2 cm. range, 500 in the 2 x 3 cm. range and 30 pebbles larger than 2 x 3 cm. The reason for or function of this feature is not known.

17.	Flake Concentration	85	0.60x0.60 m.	1

Description: This feature was comprised of a very localized, high concentration of 131 flakes, 10 of which were utilized. The majority of these flakes were of basalt, and they likely represent a localized chipping station.

18.	Hearth	85	0.51x0.58 m.	1

Description: This feature is a small, well defined, hearth, made up of a circular arrangement of flat river cobbles, set on edge, sloping outward. This feature is located within the bounds of feature 19.

19.	Oven	85	0.70*x1.45 m.	1

Description: This oven was made up of relatively round, thin river cobbles (complete, cracked or broken) arranged as a lining to a shallow depression. Carbon and charcoal was located exclusively beneath this cobble lining. Although one half or more of the feature was eroded out of the river bank, if we assume symmetry, the feature would be 1.45 m. in diameter. (Figure 18).

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Table IX:

Feature Number	Type	Excavation Unit	Dimensions	Component
20.	Oven	85	0.65x0.98 m.	1

Description: This semicircular arrangement of flat river cobbles is similar to that of feature 19. Under the cobbles was again a layer of charcoal and burnt soil. This feature appears to be the remains of an oven, that was dismantled, perhaps so the cobbles could be used again for the construction of another oven.

21.	Hearth	85	0.28x0.37 m.*	1

Description: Approximately one half of this hearth feature was exposed. It was made up of a circular arrangement of cobbles set on edge. It appears as though this hearth was approximately 0.60 m. in diameter. Charcoal was found concentrated among the rocks.

22.	Oven(?)	85	0.38x0.51 m.	1

Description: This rock alignment, made up of flat river cobbles, appears to be part of an oven feature such as described in features 18, 19 and 22. Like feature 19, this is only a small portion of such an oven. Again, this may be because the oven was dismantled so the rocks could be used again. Charcoal and burnt soil were found under the cobbles.

23.	Oven	85	0.65*x1.33 m.	1

Description: This oven was made up of relatively round, flat, river cobbles, arranged as a lining to a shallow depression. Carbon and charcoal, up to 7 cm. thick, was located exclusively beneath the cobble lining. Figure 18 shows the cobble lining with charcoal beneath. A riverbank erosion had claimed one half of this feature. If we assume symmetry, the oven would have a diameter of 1.33 m. A single charcoal sample from beneath this oven was radiocarbon dated, and produced an estimate of 360±150 B.C. (GaK 5430).

24.	Rock Fill	in the Housepit #2 depression		5

Description: This rock and dirt fill, located above the housepit roof fill deposit, and beneath the surface root zone, completely filled the surface depressionformed by the collapse of Housepit #2. See the description of Housepit #2 for further details.

25.	Rock Fill	in the Housepit #3 depression		5

Description: This feature consists of rock and dirt fill, located above the housepit roof fill deposit, and beneath the surface root zone. As with feature #24, this fill almost filled the depression formed by the collapse of Housepit #3. See the description of Housepit #3 for further details.

* indicates the feature was not fully exposed.

Figure 18: Oven features.

Upper rock concentration - Feature 23

Lower rock concentration - Feature 19

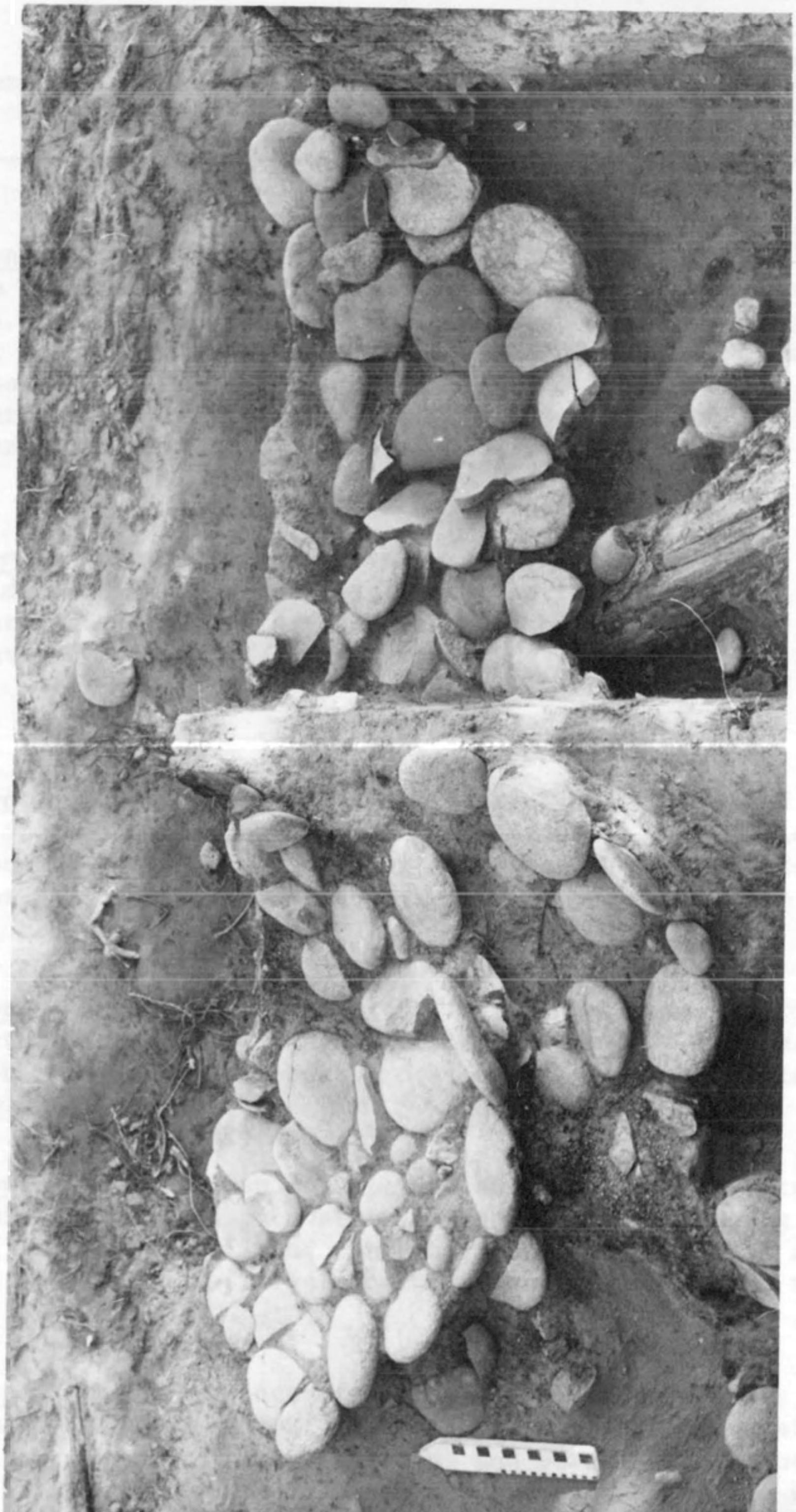

Figure 18

Table X: A summary of features exposed at the Pipeline site

Feature Number	Type	Excavation Unit	Dimensions	Component
1.	Hearth	4	0.71*x1.15 m.	4

Description: This hearth is made up of a thick bed of charcoal and what appears to be a roughly circular scatter of flat river cobbles along the outer edge. The hearth was not completely exposed, but it was visible in the cut bank, to the west, as a thick bed of charcoal. An estimate of the size of this feature would be in the range of 1.15 - 2.0 m. A single charcoal sample from this hearth was radiocarbon dated, and produced an estimate of A.D. 370±80 (GaK 5432).

Feature Number	Type	Excavation Unit	Dimensions	Component
2.	Conical Depression	9	0.35x0.50* m.	4

Description: This conical depression had a series of small pebbles lining the sides and larger rocks lining the bottom. Charcoal, burnt soil, clay and stained soil were exposed towards the bottom of the pit. This pit may have functioned as either a roasting pit or as some form of cache pit.

Feature Number	Type	Excavation Unit	Dimensions	Component
3.	Hearth	12	0.65x0.95 m.	4

Description: This feature is an oval shaped hearth, formed with an alignment of cobbles set on edge on the west side, and a random scatter of rocks to the east. Associated with the hearth was considerable charcoal, burnt soil and fire-broken rock.

Feature Number	Type	Excavation Unit	Dimensions	Component
4.	Hearth	14	0.30x0.60*	2

Description: Exposed here was a portion of what appeared to be a circular hearth, made up of a ring of cobbles, some set on edge. Associated with this hearth were fire-broken rock, burnt soil and charcoal.

Feature Number	Type	Excavation Unit	Dimensions	Component
5.	Hearth(?)	19	0.30x0.52* m.	4

Description: Not much can actually be said about this feature, because of the limited extent of excavation. Exposed was a grouping of cobbles associated with burnt soil and charcoal flecks. Nearby was a scattering of several cobbles and a large concentration of fire-broken rock.

Feature Number	Type	Excavation Unit	Dimensions	Component
6.	Burnt clay	21	0.75x1.25 m.	1

Description: The occurrence of a considerable area of very hard, burnt clay, situated on the earliest floor of the housepit depression. Associated with the burnt clay was charcoal and burnt earth. There did not appear to be any particular formation to the clay, thus its exact significance is perhaps questionable.

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Table X:

Feature Number	Type	Excavation Unit	Dimensions	Component
7.	Rock Alignment	24	0.24x0.64 m.	3

Description: This feature consists of an arrangement of two large cobbles, 19 x 19 cm. and 12 x 13 cm. in size. One cobble has been flaked on three sides and has a smoothed depression pecked into its upper surface. As with the similar feature from housepit #1 at the Flood site, the large cobble next to the mortar may have served as a seat. Found near this feature was a maul preform.

Feature Number	Type	Excavation Unit	Dimensions	Component
8.	Cobble Alignment	24	0.90x1.10* m.	2

Description: This feature consists of an alignment of large, elongated cobbles, set on edge, in a circular (?) pattern. Because the entire feature was not exposed, it is difficult to conjecture as to the actual form. Associated burnt soil and fire-broken rock suggests this is a large hearth, however the absence of charcoal, except for flecks, does not confirm this suggestion.

Feature Number	Type	Excavation Unit	Dimensions	Component
9.	Charcoal Concentration	24	0.16x0.50* m.	2

Description: This feature consists of an area of concentrated charcoal. Fire-broken rocks were associated with this feature, but these only occur above the actual charcoal concentration. No stones are associated with the charcoal towards the base of the concentration.

Feature Number	Type	Excavation Unit	Dimensions	Component
10.	Rock Alignment	24	0.80*x2.0 m.	1

Description: This feature consists of an alignment of cobbles running E-W through the housepit, along a small step in the floor. To the south of the alignment was sterile deposit. This alignment may have served as a support along the edge of the step.

* indicates the feature was not fully exposed.

CHAPTER V

ARTIFACT DESCRIPTION AND CLASSIFICATION

The analysis or classification of cultural materials can be carried out in a number of different ways. Before beginning such an undertaking, it must be kept in mind that the method chosen must suit the problems to be dealt with. Since the purpose of this analysis was to provide descriptive data of the artifacts, a typological classification (Rouse 1972:55) was employed. This method was felt to be the most applicable with respect to later intra- and inter-site comparisons, as the general use of descriptive categories has been employed by previous researchers in this and neighbouring areas (i.e. Crowe-Swords 1974; Hanson 1973; Mitchell 1963, 1971; Sanger 1971; Stryd 1973; Wilson 1974a,b). The classification of artifacts entails the imposition of constructs to order the data so that explanation is possible (Dunnell 1971:118). In typological classification specimens are divided into classes (or types) and sub-classes. This is done "...independently on each level, working with discrete clusters or patterns of attributes that bear no necessary relationship to the patterns or clusters on any other level", (Rouse 1972:54). The hierarchies presently created are thus not taxanomic, but rather analytic types.

At this point, a brief discussion of the basic attributes selected for use in this classification is in order. The initial division of the specimens into a chipped stone and a pecked and/or ground industry is based on the primary manufacturing technique employed. These two major industries are followed by a small category of unmodified miscellanies, such as clusters of quartz crystals or naturally perforated pebbles, and an equally small category of faunal remains. Further subdivision of the chipped stone industry was effected by examining the form and specific modification of the individual specimens in greater detail. These groups are yet further subdivided as was necessary by specific subtypes clearly present.

As is evident from the name, the pecked and/or ground specimens are combined in one industry since the extraction of a finished artifact from a parcel of raw material often involved both of these techniques. Also, because it is clear that on-site manufacturing occurred at both sites examined here, a degree of consistency is maintained in this way. Further subdivision of this industry is based on raw material types. Whereas with the chipped stone industry we could deal adequately with the form of modification, the pecked and/or ground stone industry is based on specific and very different types of raw material. Presumably these raw materials were selected for their specific and unique properties. These are discussed in each section. Again, by dealing with each raw material type, consistency is maintained with the on site manufacturing process. This is not to deny the importance of raw material types in the chipped stone industry, and a breakdown of raw material is given for each group as they are discussed. Further division of the pecked and/or ground stone industry is based on the form and specific modification of the raw material type. Although within this industry a few instances of overlap in form do occur, overall this is negligible. Tables XI and XII accompanying the written typology illustrate graphically the typological breakdown. These Tables are meant only as an illustration and not as a means of weighing the relative importance of one type over another. They do, however, illustrate

Table XI: Breakdown of the chipped stone industry.

- Bifacially Flaked
  - Formed Bifaces
    - Points
      - Leaf Shaped
      - Pentagonal
      - Single Shoulder
      - Contracting Stem
      - Straight Stem
      - Side Notched
      - Corner Notched
      - Basally Notched
      - Fragments
    - Oval to Round
    - With Long Projections
    - Pointed
      - Large
      - Small
    - Miscellaneous
    - Fragments
  - Unformed
- Unifacially Flaked
  - Formed
    - Pointed
    - Concave
    - Round to Oval
  - Unformed
    - Straight Edge
    - Convex Edge
    - Concave Edge
    - Pointed
    - Multiple Concavities and Points
    - Fragments
    - Retouched Flakes
    - Miscellaneous
- Burinated
- Utilized Flakes
- Cortex Spalls
  - Retouched
    - Formed
    - Unformed
  - Utilized
    - Edge Battered
    - Polished or Abraded
    - Notched
  - No Obvious Wear
- Split Cobbles
  - Retouched
  - Utilized
- Cores
  - Unidirectional
  - Multidirectional
  - Randomly Flaked Pebbles and Cobbles
- Bipolar Flaked Implements
- Flaked Pebbles and Cobbles
  - Uni- or Bifacially Flaked
  - Battered and Chipped
    - Pebbles
    - Cobbles
- Miscellaneous

Table XII: Breakdown of the pecked and/or ground stone industry.

- River Cobbles
  - Pitted and Chipped
    - Edge and/or End Pitted
    - Surface Pitted
  - Preforms
  - Hand Mauls
    - Preforms
    - Fragments
  - Mortars
  - Bilaterally Notched
  - Miscellaneous
- Abrasive Stones
  - Edge Ground
    - Saws
    - Facetted
  - Abrasive Slabs
  - No Visible Wear
  - Miscellaneous
- Slate
  - Points
  - Knives
    - Complete
    - Fragments
      - No Edge
      - With Edge
  - Chipped Slate
  - Miscellaneous
- Talc
  - Edge Ground
  - Surface Ground
    - Surface Ground
    - Surface Ground and Drilled
  - Pecked
  - Pipes
    - Preforms
    - Fragments
  - Pendants
  - Beads
  - Carvings
- Nephrite
  - Points
  - Adze Blades
    - Type I
    - Type II
    - Type III
    - Fragments
  - Chipped and Ground
    - Pebbles and Fragments
    - Pointed
    - Bits on Chips
  - Sawn Cobbles
  - Miscellaneous
  - Nephrite Fragments

a breakdown of the typology described.

It has already been mentioned that the purpose of this analysis is to provide descriptive data for the assemblages recovered. More specifically, it is intended that this typology be used in a number of different ways:

a) the data may provide information necessary for the testing or verification of the cultural sequence as outlined for the lower Fraser Canyon locality by Borden (1968a).

b) the data may be used to assist in making inferences about the nature of the activities carried out at the sites.

c) the data may be used in examining and making intra- and inter-site comparisons.

The artifacts examined in this analysis are only those recovered during the 1974 excavations at the Flood and Pipeline sites. The total sample numbers 2926 specimens. This does not include debitage, or waste material which results from the processes of manufacture, and debitage will not be dealt with in this thesis. A general breakdown of the lithic cultural material is given in Table XIII.

Table XIII: Distribution of lithic cultural material.

Site	Artifacts	Debitage*
Pipeline	400	2250
Flood	2526	9100

* an approximate figure that includes only flakes and flake fragments.

The following section deals with the typological classification of the cultural material examined. The general format or layout is adapted from Turnbull (1973). All measurements are in millimeters and weights, when given, are in grams. Standard deviations (S.D.) are also given where applicable. Since artifacts from two sites are being discussed, the sample size of each particular group is given for each site. The origin of a particular specimen, when discussed, is given by the use of Borden's(1952) grid designation. Thus, specimen 25 from the Flood site is indicated DiRi 38:25, while specimen 25 from the Pipeline site is given as DiRj 14:25. The distribution of artifacts for each particular type per assemblage and component is given in Table XIV.

Chipped Stone Industry

The chipped stone industry is represented by a total of 1497 or 48.9% of the artifacts examined in this analysis. On the whole, the chipping is of a poor quality. Primary flaking is of a random contracting or expanding type while secondary flaking, or edge retouch, when it occurs, is of the random, or discontinuous type (Loy, et al 1974a:25-26). The relative poor quality may be in part due to the raw materials used. The finer grained specimens, such as fine basalt or agate tend to show correspondingly improved flaking. On the whole, no mention will necessarily be made of the chipping technique. Where pertinent, technique will be included in the general description of the particular group.

Raw materials used in chipping stone were primarily various grades of basalt, with minimal amounts of cryptocrystalline rocks, quartz or quartzite as well as specimens that have been grouped less specifically

Table XIV: Artifact distribution per assemblage and occupation component.

	Flood Site													Pipeline Site					
Component	1	2	3	4	5									1	2	3	4		
Assemblage	10	3	6	1	11	2	4	5	7	8	9	12	n	2	3	4	1	5	n
I.Bifacial																			
A.Formed																			
1.Points																			
leaf shaped		1		1	2	1							5				1		1
pentagonal				1		1		2		1			5						
single shoulder	2	1			1	1							5						
contract. stem	1			2	1		2	2			1		9		1				1
straight stem	2							2					4						
side notched					2							1	3			1	2		3
corner notched	2				1	1							4		1			1	2
basal notched		1											1					2	2
fragments		1				1		1					3						
2.Round to Oval					1			1		2			4					1	1
3.With long Proj.										1			1	1				2	3
4.Pointed																			
large			1							1		1	3						
small	3	1		3	2		1	5				1	16	1	4			2	7
5.Miscellaneous	1												1						
6.Fragments	2	3		2		3		7		1		4	22		4	1	1	1	7
B.Unformed	2			4				6				3	15	3	5		2	1	11
II.Unifacial																			
A.Formed																			
1.pointed	1	1				1							3		1				1
2.concave	2				1								3						
3.round to oval														2	1		1	1	5
B.Unformed																			
1.straight	1	2		3	2	1	1	5				3	18	3	5		1	2	11
2.convex	5				1	1	3	1				3	14		4			1	5
3.concave	4	1						3		2		5	15		1		2	2	5
4.pointed	1							2		1		1	5	1	2	2		1	6
5.multiple				2		1		2		1		3	9		1		1		2
6.fragments	3	1		1	3		1	1			1	3	14		1		2	1	4
7.ret.flakes	4	9		4	3	3	3	8		4		14	52		5	3	5	1	14
8.miscellaneous							1						1		1				1
III.Burinated		1				1						2	4						
IV.Utilized Flakes	26	26		18	24	25	13	34	3	1	6	34	201	3	14	1	20	13	51

continued--

continued--
Table XIV:

	Flood Site													Pipeline Site					
Component	1	2	3	4	5									1	2	3	4		
Assemblage	10	3	6	1	11	2	4	5	7	8	9	12	n	2	3	4	1	5	n
V.Cortex Spalls																			
A.Retouched																			
1.formed		1		1				1				1	4						
2.unformed	12	6		7	6	4	6	6		1	2	3	53	1	8	1	3	9	22
B.Utilized																			
1.edge battered	3	2		2	6	3	1	12		1		3	33	1	5	2	1	5	14
2.pol.or abraded	2	4	1	3	1	2	1	3		2		1	20		1		1	4	6
3.notched		1		2				3					6				1		1
C.No Obs. Wear	14	16		15	8	10	3	15	1	4	1	16	103	6	18	3	19	19	65
VI.Split Cobbles																			
A.Retouched				2	1		1	3					7				1	1	2
B.Utilized	1	1		1		4							7					2	2
VII.Cores																			
A.Unidirectional																			
1.large	1			3	2	3	1	8	1	1			20	1	1		1	2	5
2.small	7	6		6	5	9	1	8	2	2	1	3	50		7	1	2	5	15
3.fragments	3	1		4	6	4	3	4	1	1	1	2	30	1	9				10
B.Multidirectional																			
1.complete	5	1		7	7	7	2	10	1	4	1	4	49		4	1		1	6
2.fragments	14	10		21	14	14	9	25	1	4	3	8	123				1	1	2
C.Randomly Flaked	4	1		3	5	2		3				1	19		2	2	2	4	10
VIII. Bipolar																			
complete	9	8		8	10	8	10	12			1	10	76	1	4		2	2	9
fragments	4	2	1	2	1	5	3	2				5	25	1	5		1	2	9
IX.Flaked Pebbles...																			
A.Uni- and Bi-	2	1		1	2					1			7		4		1	1	6
B.Battered and ...																			
1.large					1	1							2		1			3	4
2.small	1	1		1	3		2	2			1	2	13				2	2	4
X.Miscellaneous	1												1						

continued --

continued--
Table XIV:

	Flood Site													Pipeline Site					
Component	1	2	3	4	5									1	2	3	4		
Assemblage	10	3	6	1	11	2	4	5	7	8	9	12	n	2	3	4	1	5	n
I. River Cobbles																			
A. Pitted/Chipped																			
1. edge/end	5	7		5	4	2	4	9		4	2	3	45		1			7	8
2. surface	1	1		1		1	2	2		4			12					1	1
B. Preforms							2						2						
C. Hand Mauls																			
1. preforms						1		1					2			2			2
2. fragments		2		3				1		1			7						
D. Mortars			1										1			1			1
E. Notched Pebbles															2				2
F. Miscellaneous	1	3	1		3	2	1	1				1	13						
II. Abrasive Stones																			
A. Edge Ground																			
1. saws	1	19	1	2	1	1	1	3				1	30						
2. facetted		1	1	2	2	1		6				3	16						
B. Slabs	4	15	1	1	5	3		6		1		3	39		2		1		3
C. No Visible Wear	8	14		4	3	5	2	11		2		1	50		1	1			2
D. Miscellaneous	1												1						
III. Slate																			
A. Points	1	1						2					4						
B. Knives																			
1. relatively comp.																			
end or mid portion	6	10		1	1	2	2	11			1	2	36				1	2	3
complete	2			1		2		5			1		11				1		1
2. fragments																			
with edge	69	33	2	18	55	48	29	83	5	9	15	44	410			4	1	2	7
without edge	67	33	1	27	60	41	30	81	1	14	18	58	431		1		2	2	5
C. Chipped	4	1		2	4	2	4	5		1	4	1	28	3	2		2	3	10
D. Miscellaneous	2	1										1	4						

continued--

continued--
Table XIV:

	Flood Site													Pipeline Site					
Component	1	2	3	4	5									1	2	3	4		
Assemblage	10	3	6	1	11	2	4	5	7	8	9	12	n	2	3	4	1	5	n
IV.Talc																			
A.Edge Ground																			
complete	1	5		8	2	2	1	5				1	25						
fragments	3	7		6	3	1		11		2		3	36						
B.Surface Grd.																			
1.surface grd.		17		5	3	1	2	5				3	36						
2.grd./drilled		3				1	1	1					6						
C.Pecked	1	6	2		1		1	3					16						
D.Pipes																			
1.preforms					1		1						2						
2.fragments		2		1			3	1					7						
E.Pendants		6				2		1					9						
F.Beads		1						1					2						
G.Carvings		1		1	2	1		4	1				10						
V.Nephrite																			
A.Points	1												1						
B.Adzes																			
1.type I		3		1	1								5						
2.type II	2	1		1							1		5		2				2
3.type III	3						3	1					7	1					1
4.fragments	2	2					1			1			6						
C.Chipped/Grd.	2	7	1		1	2	2	2			1		18	1			1		2
D.Sawn Cobbles		3						1					4						
E.Miscellaneous		1											1						
F.Fragments	8	20		2	1	3	8	8		3		4	57	3	2		3	1	9
I.Quartz																			
A.Clusters		1					1						2						
B.Utilized							1						1					1	1
II.Nat.Perf. Pebbles												1	1		1				1
III.Ocher	1	2		10	1	5	1	3			1	6	30				3		3

as river cobbles. Artifacts derived from river cobbles (i.e. cortex spalls) were not separated into specific raw material types, as the name covers a wide variety of material not readily identifiable.

I Bifacially Flaked Artifacts N = 139

Bifacially flaked artifacts exhibit bifacial flaking along one or more edges. These can be subdivided into formed and unformed bifaces, on the basis of shaping attributes and the extent of the bifacial retouch on the specimen.

A. Formed bifaces N = 113

Formed bifaces are characterized by bifacial retouch which extends over the surface of the artifact so as to contribute significantly to the cross section of the body. Added to this is the fact that the bifacial retouch shapes the artifact, forming a patterned, well defined outline. Presumably this shaping is an attempt by the manufacturer to achieve a preconceived form (Sanger 1971:71). Formed bifaces are described in six different groups.

1. Points N = 48

The specimens included here as points all exhibit the presence of a hafting element, such as notching, stemming or basal thinning, and have thin edges that converge to a point (Loy, et al 1974b:25). No distinction is made here between symmetrical, hafted knives and dart points, spear points or arrow points, as wear on the edges of the specimens varies from no wear to heavy wear. It may be that some of these points served more than one function. A final interpretation of this aspects awaits a detailed study of the specimen wear patterns.

The subgrouping of points is based on shared attributes between specimens. As with Hanson (1973), Sanger (1971) and Turnbull (1973), among others, primary subgrouping relates to base shape and blade element description. Further division is based on size groupings, where applicable. Point blade cross-sections are described using Binford's (1963:203) terms, (Figure 19a-h). It must be kept in mind that all points do not conform exactly to the illustrated sections, therefore the section most closely resembling the specimen was used. Various possible blade forms are described by Loy, et al (1974a:20-21). Of these forms, three can be used to adequately describe the specimens here, (Figure 19i-k). Besides these three basic types, combinations of types also occur, i.e. straight-excurvate.

a. leaf-shape

Sample size: DiRj 14 : 1
DiRj 38 : 5

Figure 20a-d

Material: basalt (4) cryptocrystalline (1) granite (1)

Description: These specimens are leaf-shape in outline, with convex bases and excurvate body edges. The one specimen of a cryptocrystalline material (Figure 20c) shows an unusually good flaking technique. Transverse sections are biconvex (4), plano-triangular (1) and biplano (1). A brief summary of leaf-shape point attributes are as follows:

Attribute	number	range	mean	S.D.
length	6	37-61	47.1	9.0
width	6	18-30	23.0	4.8
thickness	6	5-11	7.5	2.3
weight	6	4-15	8.8	4.5

Figure 19: Point blade forms.

a-h Transverse blade sections (Binford 1963:203)
i-k Point blade forms (Loy, et al 1974a:Diagram 9)

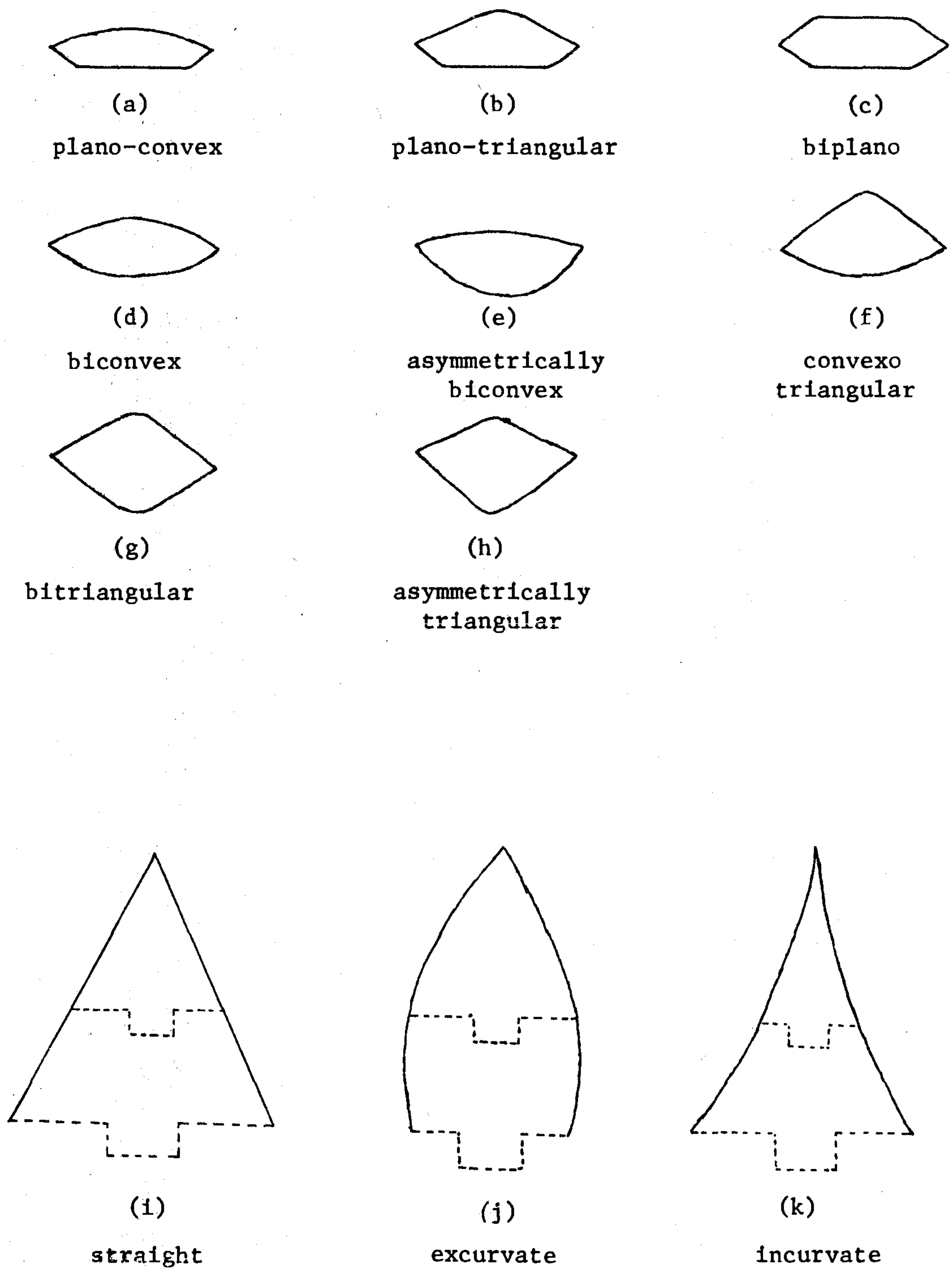


Figure 20: Point types.

a-d leaf shape
e-h pentagonal
i-k single shoulder
l-q contracting stem
r-t straight stem

Pipeline site

Component 1 (d)

Flood site

Component 1 (i,k,r)
4 (c,e,l,o)
5 (a,b,f,g,h,j,m,n,p,q,s,t)

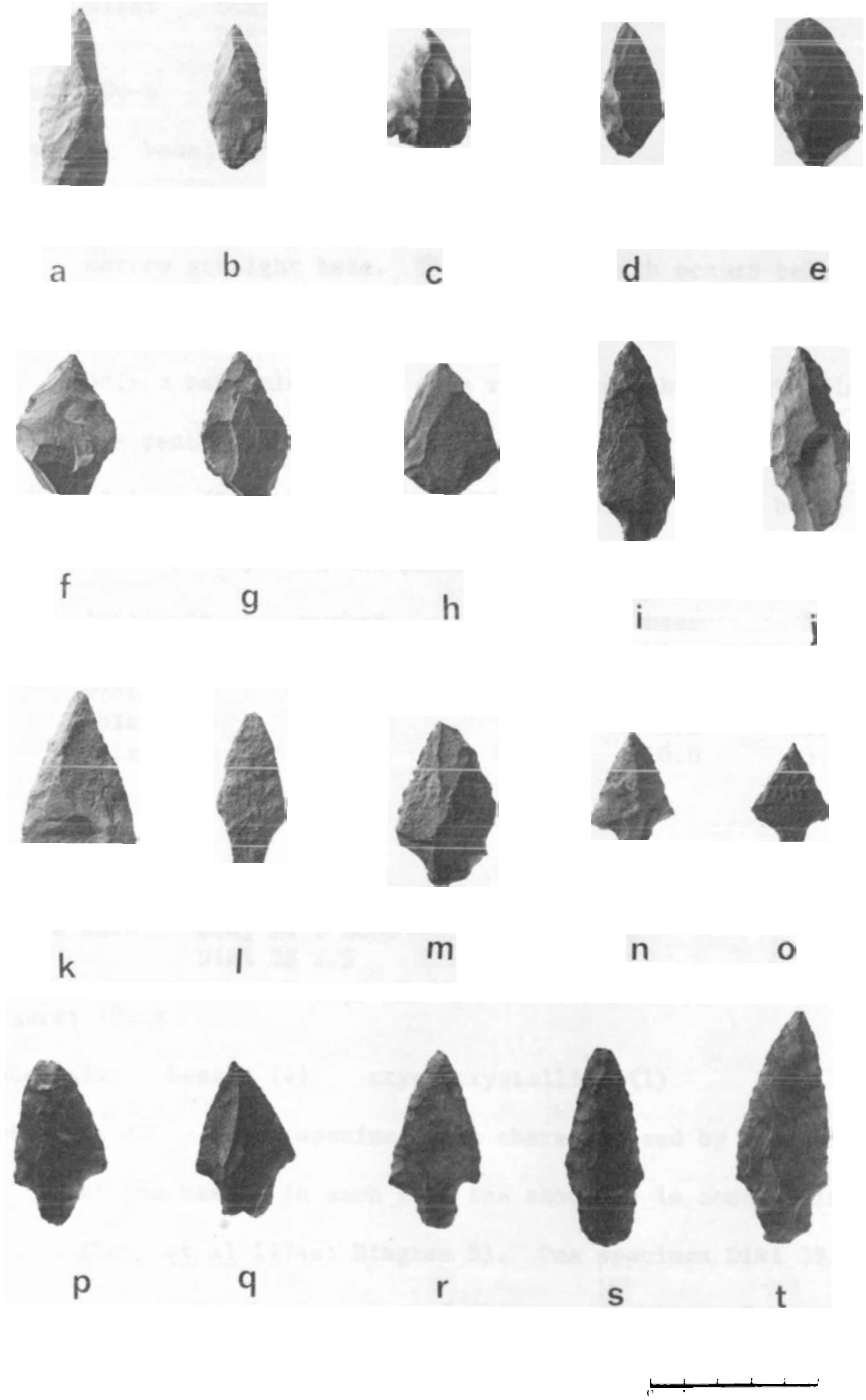


Figure 20

b. pentagonal

Sample size: DiRj 14 : none
DiRi 38 : 5

Figure:20e-h

Material: basalt (5)

Description: These specimens are pentagonal in outline, with a narrow straight base. The maximum width occurs below the centerline in all cases. One specimen DiRi 38:815 exhibits only a bare minimum of edge retouch which form the flake into its pentagonal form. Transverse sections are biconvex (3) biplano (1) and asymmetrically biconvex (1). A brief summary of pentagonal point attributes are as follows:

Attribute	number	range	mean	S.D.
length	5	40-48	45.0	3.2
width	5	26-31	28.2	2.3
thickness	5	5-11	8.0	2.4
weight	5	7-11	10.0	3.2

c. single shoulder

Sample size: DiRj 14 : none
DiRi 38 : 5

Figure: 20i-k

Material: basalt (4) cryptocrystalline (1)

Description: These specimens are characterized by a single shoulder at the base. In each case the shoulder is contracting (Loy, et al 1974a: Diagram 8). One specimen DiRi 38:2220 has all of the features of this group, but it is essentially unifacially flaked. It has nonetheless been included in this group, as the similarity in form is consistent with the other features of this group. Three specimens have excurvate blade forms, two have the excurvate-straight form. Transverse sections are biconvex (3) and planoconvex (2). A brief summary of single shoulder point attributes are as follows:

Attribute	number	range	mean	S.D.
length	5	42-73	56.4	11.8
width	5	23-29	25.4	2.3
thickness	5	5-11	8.2	2.6
weight	5	10-25	13.3	6.4

d. contracting stem

Sample size: DiRj 14 : 1
DiRi 38 : 9

Figure: 201-q

Material: basalt (7) cryptocrystalline (1) other (2)

Description: These specimens are characterized by a contracting stem. Though there is a considerable range in size, there are no apparent subgroupings in the limited sample recovered. Three of the eleven specimens are well chipped, possibly because they are also of a better quality raw material. Blade forms vary from straight to slightly excurvate. Transverse sections are plano-convex (1), biplano (3), biconvex (3), asymmetrically biconvex (1), and convexo-triangular (2). A brief summary of contracting stem point attributes are as follows:

Attribute	number	range	mean	S.D.
length	10	28-73	46.8	13.5
width	10	17-34	24.7	5.6
thickness	10	4-9	5.8	1.5
weight	10	3-17	7.5	4.8

e. straight stem

Sample size: DiRj 14 : none
DiRi 38 : 4

Figure: 20r-t

Material: basalt (3) other (1)

Description: These specimens are characterized by essentially straight stems. The four specimens of this type are all comparatively large in size, (Figure 21). All have excurvate blades. Transverse sections are biplano (2) and biconvex (2). A brief summary of straight stemmed point attributes are as follows:

Attribute	number	range	mean	S.D.
length	3	52-69	59.6	8.6
width	4	22-30	27.2	3.6
thickness	4	5-10	7.2	2.6
neck width	4	12-17	15.0	2.5
weight	3	7-21	13.6	7.1

f. side notched

Sample size: DiRj 14 : 3
DiRi 38 : 3

Figure: 22a-e

Material: basalt (5) other (1)

Description: These specimens are characterizedby being side notched. More specifically the entire notch is included along the blade of the artifact and the center of the notch to the base is less than one-third of the total length of the artifact (Loy, <u>et al</u> 1974a:19). Three specimens, two from DiRj 14 and one from DiRi 38, are well made. The remaining three are very crudely formed, by minimal edge retouch of flakes.

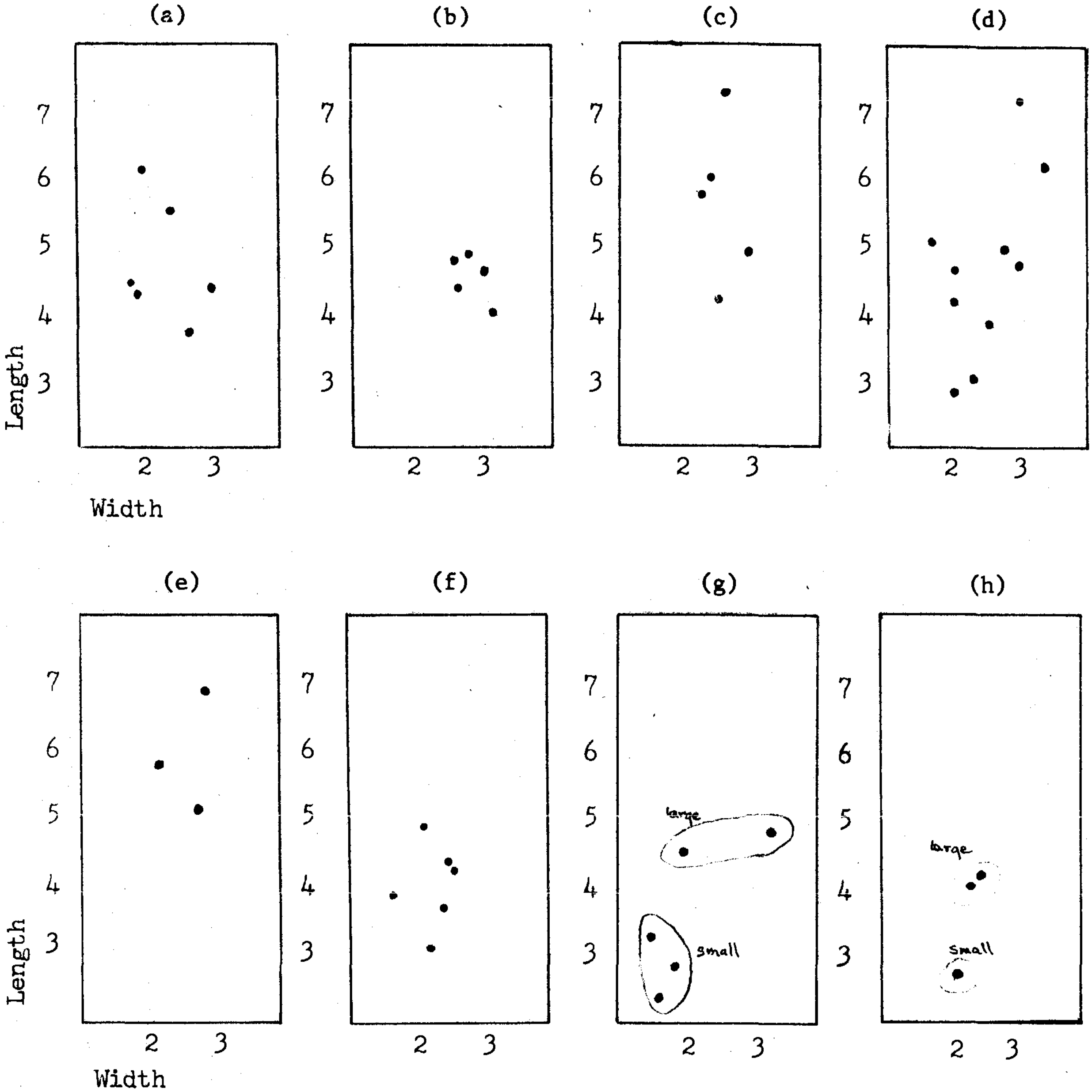


Figure 21: Length-width measurements of point types; a) leaf shape, b) pentagonal, c) single shoulder, d) contracting stem, e) straight stem, f) side notched, g) corner notched, and h) basally notched. Data is given on complete specimens only.

Figure 22: Point types and other formed bifaces.

Point types (a-m)

a-e side notched
f-h corner notched
i-k basally notched
l-m point fragments

Bifaces with long projections (n-p)

Round to oval bifaces (q-s)

Pipeline site

Component 2 (c)
4 (a,b,j,k,n,o,q)

Flood site

Component 1 (f)
2 (i)
5 (d,e,g,h,l,m,p,r,s)

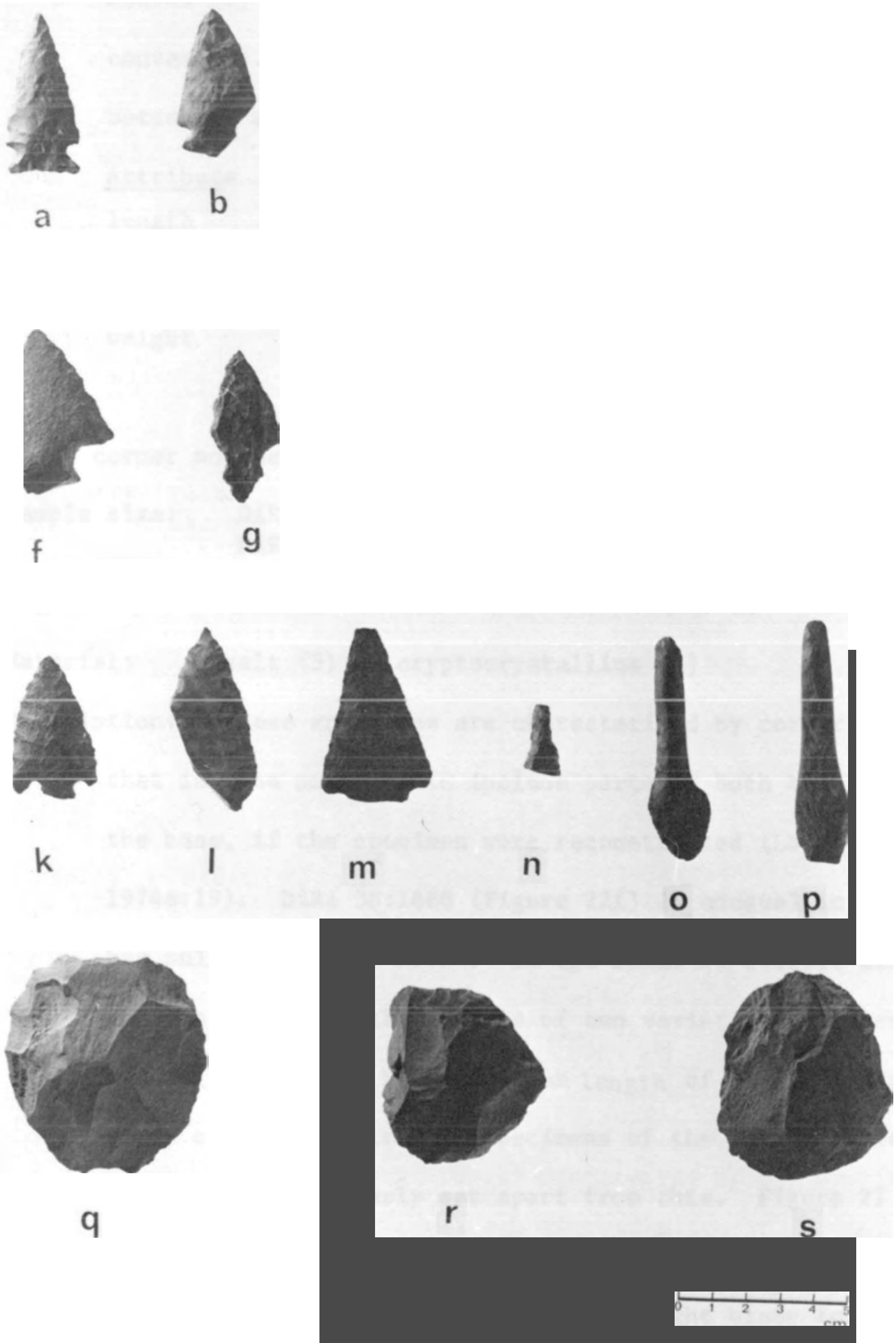


Figure 22

Five specimens have excurvate blade forms, one has an excurvate-straight form. Transverse sections are plano-convex (2) biplano (1) biconvex (2) and asymmetrically convex (1). A brief summary of side notched point attributes are as follows:

Attribute	number	range	mean	S.D.
length	6	31-49	40.5	6.3
width	6	17-26	22.6	3.2
thickness	6	4-8	5.8	1.5
neck width	6	14-19	16.5	1.9
weight	6	40-65	52.5	8.8

g. corner notched

Sample size: DiRj 14 : 2
DiRi 38 : 4

Figure: 22f-h

Material: basalt (5) cryptocrystalline (1)

Description: These specimens are characterized by corner notching, that is, the notch would include parts of both the blade and the base, if the specimen were reconstructed (Loy, et al 1974a:19). DiRi 38:1888 (Figure 22f) is unusual in that it has only one corner notch. On the basis of overall size, these specimens fall into one of two varieties. The smaller group (Figure 22h) has a maximum length of 33 mm. and a width of 18 mm., with two specimens of the larger variety (Figure 22f-g) clearly set apart from this. Figure 21 shows the length-width measurements. Five specimens have excurvate blades, one has an excurvate-straight blade form. Transverse sections are plano-convex (2), biplano (1), biconvex (1) and asymmetrically biconvex (2). A brief summary of small corner notched point attributes are as follows:

Attribute	number	range	mean	S.D.
length	3	24-33	28.7	4.5
width	4	15-18	16.3	1.5
thickness	4	3-5	4.3	1.0
neck width	4	8-11	9.5	1.3
weight	3	1-3	1.9	0.6

A brief summary of large corner notched point attributes are as follows:

Attribute	number	range	mean	S.D.
length	2	45-48	46.5	2.1
width	2	20-33	26.5	9.2
thickness	2	5-6	5.5	0.7
neck width	2	10-18	14.0	5.7
weight	2	4-10	6.9	4.1

h. basally notched

Sample size: DiRj 14 : 2
DiRi 38 : 1

Figure: 23i-k

Material: basalt (2) cryptocrystalline (1)

Description: These specimens all exhibit basal notching, as identified where the entire notch is within the reconstructed base area (Loy, et al 1974a:19). As with the previous group, it is possible to separate out two varieties (Figure 21h). The larger variety, (Figure 22j,k) represented by two specimens from DiRj 14, are very similar in size attributes. The smaller specimen from DiRi 38 (Figure 22i) is not complete, lacking a barb. Blade forms are excurvate (2) and exo-incurvate (1). Transverse sections are biconvex (1) and asymmetrically biconvex(2). A brief summary of small basally notched point attributes are as follows:

Attribute	number	measure
length	1	2.7
width	-	-
thickness	1	5
neck width	1	9
width	1	2.5

A brief summary of large basally notched point attributes are as follows:

Attribute	number	range	mean	S.D.
length	2	40-42	41.0	1.4
width	2	24-25	24.5	0.7
thickness	2	6-7	6.5	0.7
neck width	2	9-10	9.5	0.7
weight	2	5-6	5.8	0.7

i. point fragments

Sample size: DiRj 14 : none
DiRi 38 : 3

Figure: 221-m

Material: basalt (3)

Description: Included here are specimens clearly identifiable as point fragments, but broken in such a way as to make it impossible to fit them into the previously described groups. Two specimens appear to have been either side or corner notched. The third specimen may have been leaf shape.

2. Round to Oval Bifaces

Sample size: DiRj 14: 1
DiRi 38: 4

Figure: 22q-s

Material: basalt (4) quartzite (1)

Description: These specimens are characterized by a roughly round to oval outline with peripheral bifacial flaking. They may represent unfinished artifacts, in the process of being further modified. A brief summary of round to oval biface attributes are as follows:

Attribute	number	range	mean	S.D.
length	5	48-64	56.0	6.5
width	5	35-57	44.8	9.6
thickness	5	16-20	17.8	1.5

3. Bifaces with long projections

Sample size: DiRj 14 : 3
DiRi 38 : 1

Figure: 22n-p

Material: basalt (1) cryptocrystalline (1) other (2)

Description: These specimens exhibit bifacial retouch which has formed a long narrow projection, indicative of use as drills (Sanger 1970:84; Stryd 1973:349). The two complete specimens, one from each site, show considerable wear in the form of edge and surface polish, the other two specimens, both fragments, do not. The complete specimens are essentially key-shaped and very uniform in measured attributes. A brief summary of the attributes of bifaces with long projections are as follows:

Attribute	number	range	mean	S.D.
length	2	65-71	68.0	4.3
width	2	16-18	17.0	1.4
thickness	4	3-9	6.5	2.5
length of projection	3	12-45	33.3	18.5
width of projection	3	5-10	8.0	2.7

4. Pointed Bifaces

Sample size: DiRj 14 : 7
DiRi 38 : 19

Figure: 23a-k, 24b-d

Material: basalt (23) quartzite (1) other (2)

Description: All of these specimens are bifacially retouched to a point, or, if the actual point is missing, can be interpolated to form a point. Because of the fragmented state of most of the specimens, a more detailed breakdown of this group was not attempted. Some of the small tips included here may be point tip fragments. On the basis of gross size, pointed bifaces can be separated into small and large varieties. The twenty-one specimens of the small variety range in length from 21 to 49 mm. while the three specimens of the large variety range in length from 95 to 182 mm. The large specimens are generally more roughly flaked. DiRi 38:1278 is a hand-axe-like specimen that has only been crudely shaped (Figure 24c). DiRi 38:519/2077 is unusual in that, though the two pieces clearly fit together, they are at different stages of reduction, (Figure 24d). A brief summary of small pointed biface attributes are as follows:

Attribute	number	range	mean	S.D.
length	3	95-182	150.7	48.3
width	3	51-124	82.3	37.6
thickness	3	20-45	40.0	18.0

5. Asymmetric biface

Sample size: DiRj 14 - none
DiRi 38 - 1

Figure 23: Formed bifaces and unifaces.

Pointed bifaces (a-k)

Pointed unifaces (l-m)

Concave formed unifaces (n-p)

Round to oval unifaces (q-t)

Pipeline site

Component 1 (c,r)
2 (a,d,m,s)
4 (b,q,t)

Flood site

Component 1 (g,i,l,o,p)
4 (e)
5 (f,h,j,k,n)

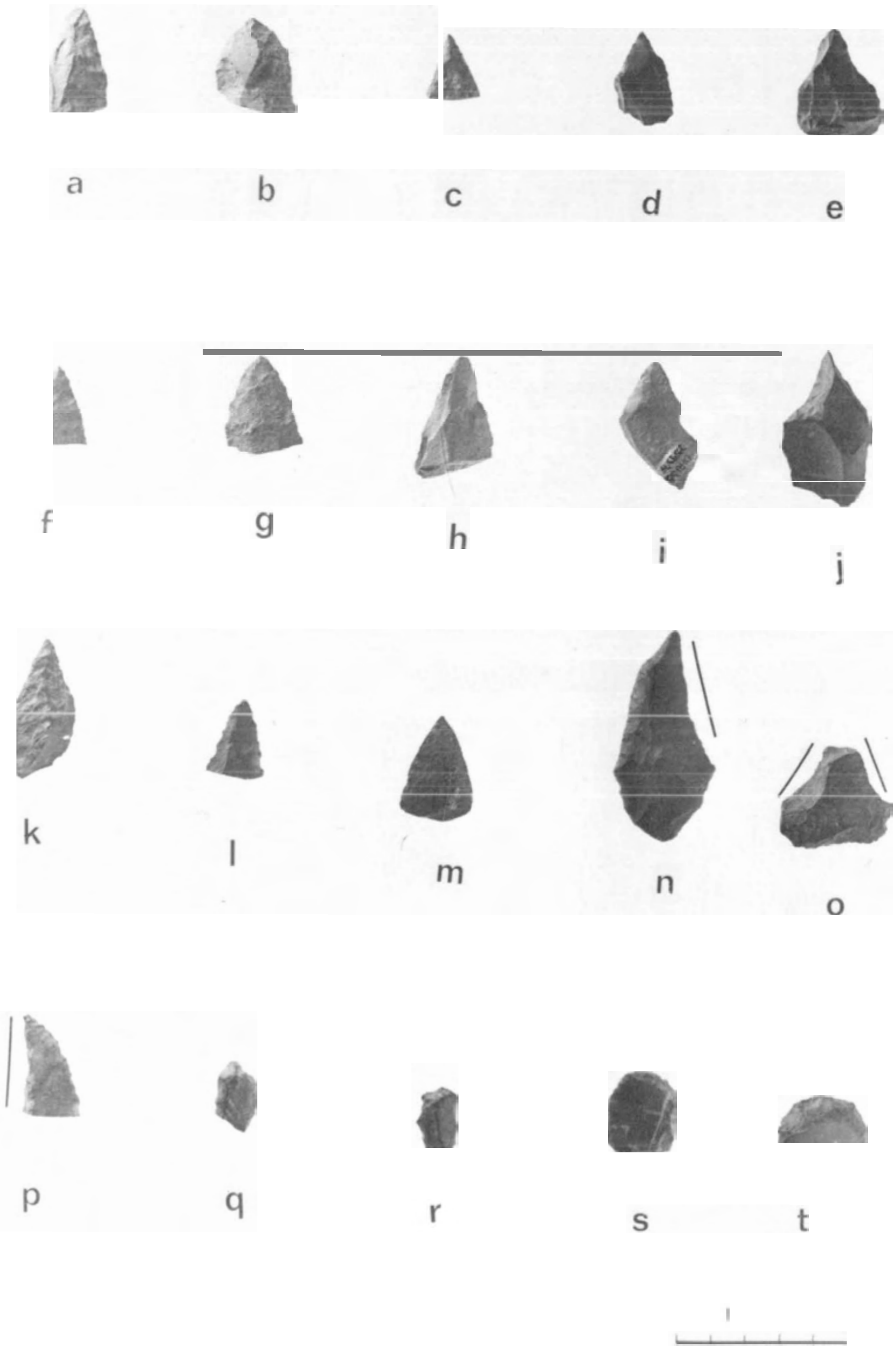


Figure 23

Figure 24: Formed bifaces

Asymmetric biface (a)

Large pointed bifaces (b-d)

Flood site

Component 1 (a)
3 (b)
5 (c,d)

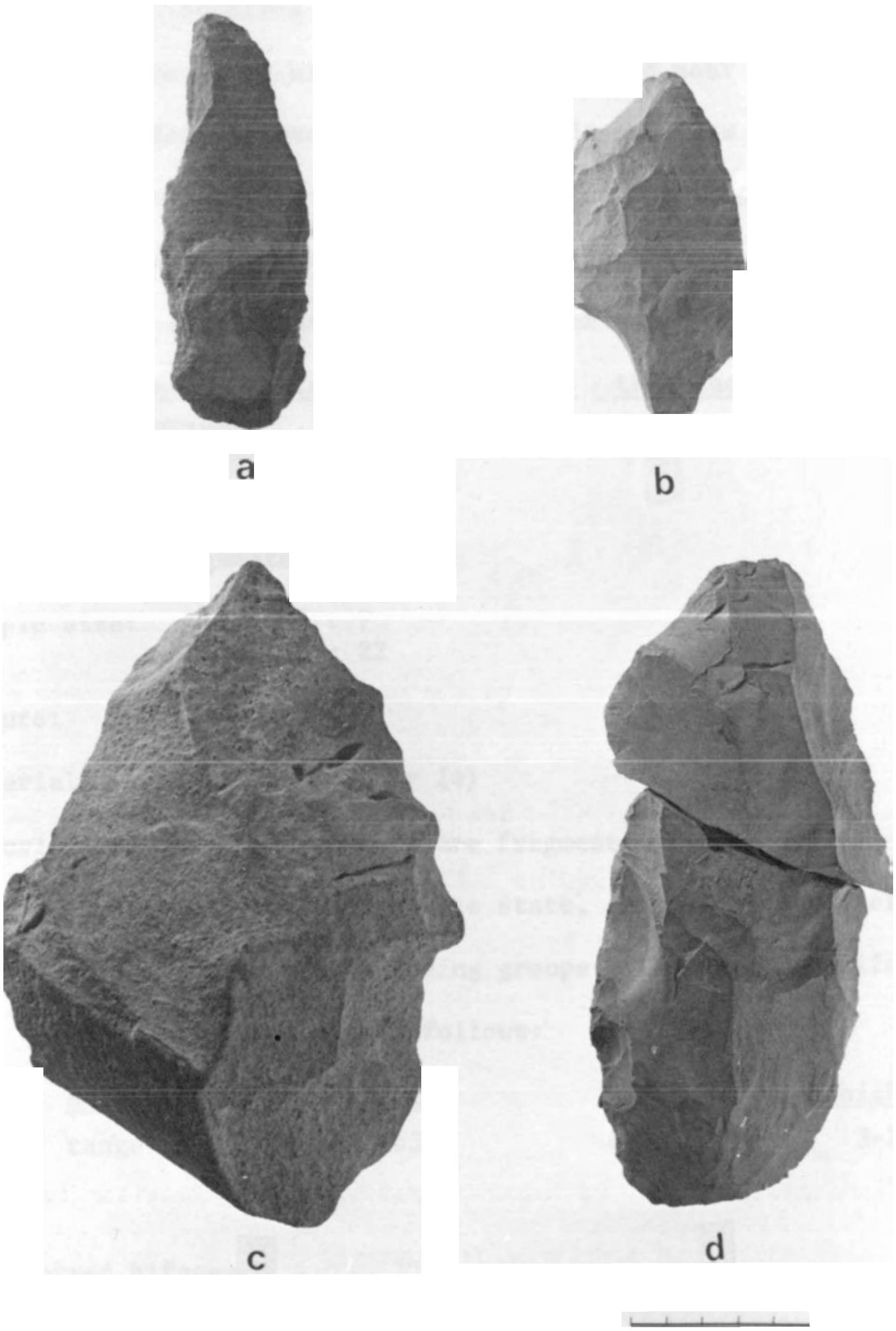


Figure 24

Figure: 24a

Material: basalt (1)

Description: Specimen DiRi 38:1900 is an asymmetrical hafted biface which has been bilaterally side notched near the base. The blade form is excurvate on one side and less regular, straight to incurvate, on the other. One surface is over 90% cortex and the chipping is of a very poor quality. A brief summary of the attributes for this specimen are as follows:

Attribute	length	width	thickness	neck width
DiRi 38:1900	114	39	13	33

6. Biface fragments

Sample size: DiRj 14 : 7
DiRi 38 : 22

Figure: none

Material: basalt (25) other (4)

Description: These specimens are fragments of formed bifaces that, because of their incomplete state, cannot be adequately placed in any one of the preceding groups. The range of biface fragment attributes are as follows:

Attribute	length	width	thickness
range	11-63	6-61	3-21

B. Unformed bifaces

Sample size: DiRj 14: 11
DiRi 38: 23

Figure: none

Material: basalt (29) cryptocrystalline (2) other (3)

Description: Unformed bifaces, or bifacially retouched flakes, appear to have undergone little deliberate shaping. On the whole, these specimens exhibit limited peripheral bifacial retouch along one or two edges. In addition to the bifacial flaking, nine specimens are also unifacially retouched. Seven specimens have a relatively straight retouched edge, one has retouch on a convex edge. The range of unformed biface attributes are as follows:

Attribute	length	width	thickness
range	29-80	17-51	4-23

II Unifaces N = 188

Unifaces are artifacts with unifacial retouch on one or more edges. All the specimens described here are based on flakes. Unifacially flaked cores and cortex spalls are discussed in later sections. As with bifaces, unifaces are subdivided into formed and unformed groups based on shaping attributes and the extent of unifacial retouch of the specimens. These artifacts were likely used for a variety of graving, cutting, scraping and piercing functions.

A. Formed Unifaces N = 12

Formed unifaces are flake tools shaped by unifacial retouch. They are characterized in that the removal of flakes has contributed significantly to the shape and cross-section of the specimen. The examples in this group can be separated into specific types on the basis of shared attributes. These are described for each group.

1. Pointed

Sample size: DiRj 14 : 1
DiRi 38 : 3

Figure: 23l-m

Material: basalt (2) other (2)

Description: These specimens are unifacially shaped such that two straight retouched edges converge to a point. Only two specimens are complete. Retouch is bilateral (2) and alternate (2). Wear polish occurs on the tips of two specimens. One specimen, DiRi 38:365, has been ground to some extent on the ventral, cortex surface. A brief summary of pointed uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length	2	21-87	59.0	40.3
width	4	17-37	25.0	8.6
thickness	4	4-7	5.0	1.7

2. Concave edge

Sample size: DiRj 14 - none
DiRi 38 - 3

Figure: 23n-p

Material: basalt (1) cryptocrystalline (1) other (1)

Description: These specimens exhibit at least one concave retouched edge. In two cases, this edge converges with an opposite convex edge to form a point. The third example has two concave retouched edges which may have formed a point, but the tip has been broken. Retouch is bilateral (1) and alternate (2). Only one specimen is complete. DiRi 38:1849 is noteworthy in that it has considerable surface polish on its dorsal and ventral surfaces. A brief summary of concave edge uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length (61)	1	-	-	-
width	3	17-34	27.0	8.9
thickness	3	5-8	6.3	1.5

3. Round to oval unifaces

Sample size: DiRj 14 : 5
DiRi 38 : none

Figure: 23q-t

Material: basalt (3) cryptocrystalline (2)

Description: These specimens are round to oval in outline, have steep unifacial retouch around 80% or more of their perimeter and are uniformly small in size. A brief summary of these small unifaces are as follows:

Attribute	number	range	mean	S.D.
length	5	20-26	23.6	2.9
width	4	12-25	23.5	6.3
thickness	5	5-10	7.0	2.0
edge angle	5	60-80	69.6	7.1

B. Unformed unifaces N = 176

Unformed unifaces are essentially marginally retouched flakes where little or no deliberate shaping has taken place. This retouch occurs on flakes and flake fragments exhibiting a wide range of shapes and sizes. As a result, unformed unifaces are described on the basis of marginal retouch forms.

1. Straight edge

Sample size: DiRj 14 : 11
DiRi 38 : 19

Figure: none

Material: basalt (22) cryptocrystalline (4) river cobble (4)

Description: These flakes have uniform, continuous marginal retouch along a straight edge. Nineteen of the specimens are more or less complete, the remaining eleven are fragments. Retouch occurs along one edge in twenty-one and along two edges in nine specimens. Three specimens show evidence of having been surface ground or polished. A brief summary of unformed, straight edge uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length	20	13-68	46.2	15.8
width	24	8-57	29.3	12.5
thickness	30	3-25	9.1	5.3

2. Convex edge

Sample size: DiRj 14 : 5
DiRi 38 : 14

Figure: none

Material: basalt (17) other (2)

Description: These flakes have continuous marginal retouch along a convex edge. Five of the specimens have retouch on more than just the one convex edge. In three cases this is alternate retouch. Fourteen specimens are relatively complete, five are fragments. A brief summary of unformed, convex edge, uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length	15	34-95	52.1	19.7
width	14	19-86	37.5	16.8
thickness	19	5-23	12.0	5.5

3. Concave edge

Sample size: DiRj 14 : 5
DiRi 38 : 15

Figure: none

Material: basalt (18) cryptocrystalline (1) river cobble (1)

Description: These flakes have marginal retouch which is along a a concave edge. In some cases the marginal retouch is very restricted, and can perhaps be described as a notch. The range between concave and "notched" edges does not readily allow specific separation. DiRi 38:2429 also has marginal retouch along a convex edge. A brief summary of unformed concave edge uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length	14	20-93	55.3	18.6
width	15	12-56	37.4	11.1
thickness	20	6-20	12.1	4.4

4. Pointed

Sample size: DiRj 14 : 6
DiRi 38 : 5

Figure: none

Material: basalt (6) river cobble (1) other (4)

Description: These flakes are marginally retouched in such a way that a small point is formed. This differs from the formed pointed unifaces in that the point is only on the margin of the flake and as a result has little effect on the remaining portion of the flake. In four examples, the unifacial retouch only supplements a naturally formed point. The specimen DiRi 38:2803, triangular in outline and cross-section, is unusual in that all three edges have been heavily ground.

A brief summary of unformed pointed uniface attributes are as follows:

Attribute	number	range	mean	S.D.
length	9	27-65	42.5	14.0
width	10	16-53	28.9	14.3
thickness	11	5-14	11.0	3.2

5. Multiple concavities with a point(s)

Sample size: DiRj 14 : 2
DiRi 38 : 9

Figure: none

Material: basalt (10) cryptocrystalline (1)

Description: These flakes have unifacial marginal retouch which produced multiple concavities on their perimeter. Two adjacent concavities produce a small point whose tip does not project beyond the interpolated flake margin. In six cases, more than one point or rounded projection has resulted. This group differs from unformed pointed unifaces in that the points are a result of two or more retouched concavities. A brief attribute summary of unformed unifaces with multiple concavities and points is as follows:

Attribute	number	range	mean	S.D.
length	11	28-104	60.1	22.3
width	11	16-57	40.9	12.8
thickness	11	6-25	14.6	6.1

6. Uniface fragments

Sample size: DiRj 14 : 4
DiRi 38 : 14

Figure: none

Material: basalt (16) cryptocrystalline (1) other (1)

Description: All of these specimens are unifacially retouched but because they are fragments, they cannot adequately be placed in any of the preceding categories. They do however, appear to be portions of either the formed or unformed uniface groups. A brief summary of the range of uniface fragment attributes are as follows:

Attribute	length	width	thickness
range	16-79	9-71	4-21

7. Retouched flakes

Sample size: DiRj 14 : 16
DiRi 38 : 52

Figure: none

Material: primarily basalt, but also river cobble.

Description: These specimens have unifacial retouch on one or more edges, but in all cases this retouch is scattered along the margin of the flake, or limited to a very small portion of the edge. A brief summary of the range or retouched flake attributes are as follows:

Attribute	length	width	thickness
range	29-119	19-60	5-21

8. Miscellaneous

Sample size: DiRj 14 : 1
DiRi 38 : 1

Figure: 25e-f

Material: basalt (2)

Description: These two specimens will be described individually

a) DiRj 14 :199 is a small peripherally retouched flake with a chipped notch near the base, (Figure 25e).

b) DiRi 38 :1918 is a flake with two alternately retouched notches. The flake has undergone no other modification, but has a roughly pointed outline, (Figure 25f).

A brief summary of miscellaneous uniface attributes are as follows:

Attribute	DiRj 14:199	DiRi 38:1918
length	24	25
width	12	21
thickness	2	4

III Burinated Flakes

Sample size: DiRj 14 : none
DiRi 38 : 4

Figure: 26

Material: basalt (3) cryptocrystalline (1)

Description: Grouped here are artifacts that have been modified by a burin blow (Crabtree 1972:49). As a result of the burin blow, a flake scar roughly parallel to the long axis of the object and at right angles to the striking platform results. Burins are not abundant in the assemblages described here. Because of the small sample and the relative rarity of burins on the Northwest Coast, a brief description will be given for each.

a) DiRi 38:409, made on a basalt blade, exhibits very fine workmanship, unusual for the collection on the whole. It is

Figure 25: Burinated and miscellaneous flakes. (Actual size)

Burinated flakes (a-d)

Miscellaneous unifaces (e-f)

Pipeline site

Component 2 (e)

Flood site

Component 2 (a)
5 (b,c,d,f)

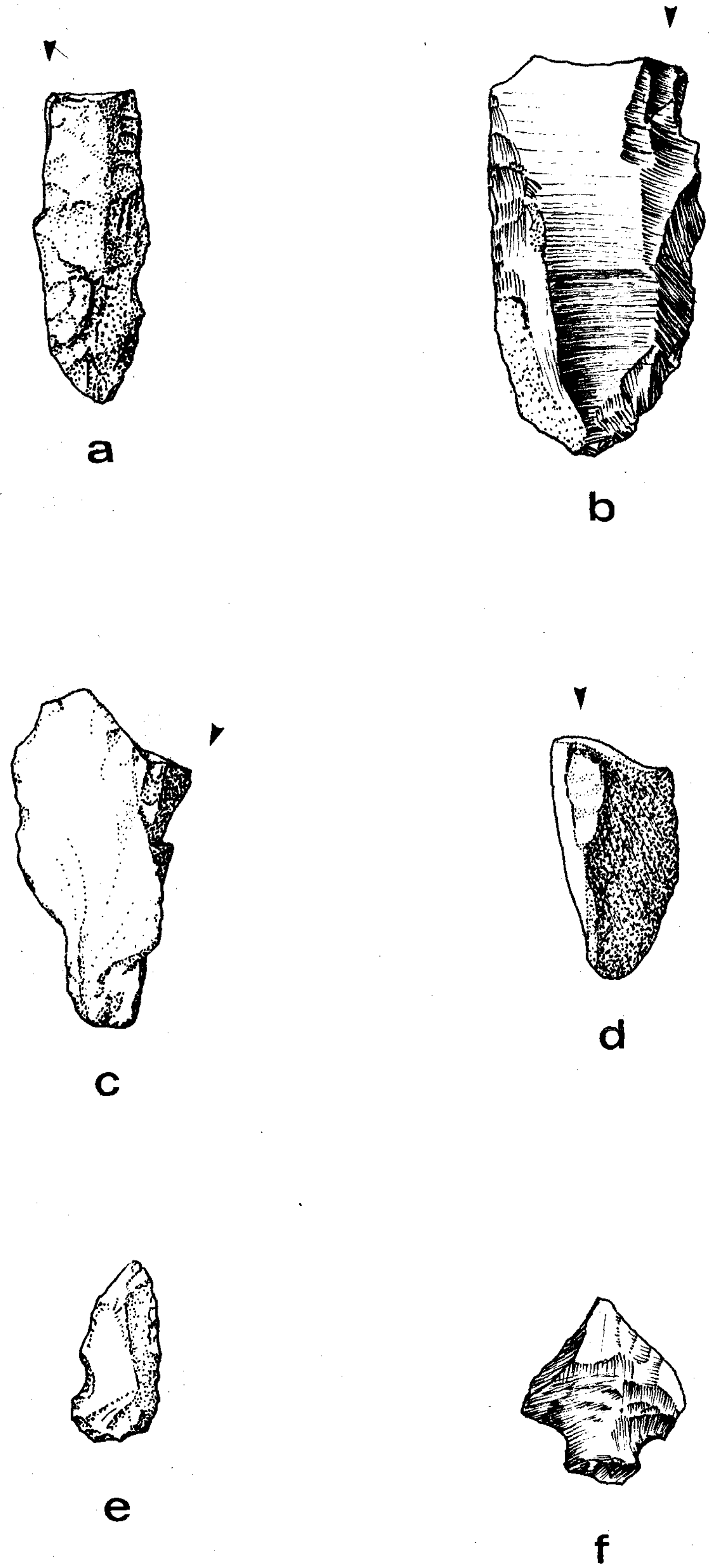


Figure 25

bifacially flaked across both surfaces of the proximal end and is unifacially flaked across the dorsal surface on the distal end. The blade has been truncated by snapping, and this surface used as the striking platform for burination. Several step fractures on the burin scar may be a result of attempted resurfacing or of use. Figure 25a.

b) DiRi38:1124, an agate flake, has undergone alternate bilateral flaking. The distal end has been snapped and this surface used as the striking platform. A series of burin blows then detached flakes from the dorsal surface. Figure 25b.

c) DiRi 38:2754; an irregular basalt flake, has been peripherally utilized to some extent, as well as having been burinated. The striking platform for the burin blow, on the distal end, has undergone no obvious preparation. Figure 25c.

d) DiRi 38:2920, a basalt flake, is an atypical burin. The burin scar is on the proximal end, dorsal side. This specimen has undergone no other modification and it is possible that it may have been an accidental occurrence. Figure 25d.

A brief summary of burinated flake attributes are as follows:

Attribute	number	range	mean	S.D.
length	4	32-53	42.8	8.7
width	4	16-30	22.0	6.7
thickness	4	5-10	6.5	2.4

IV Utilized Flakes

Sample size: DiRj 14 : 51
DiRi 38 : 210

Figure: none

Material: primarily basalt but also other materials to a lesser extent.

Description: Utilized flakes are flakes or flake fragments which exhibit evidence of usage. As a result of this use, the edges have become polished or irregularly chipped to some extent. No purposeful modification, such as retouch, has taken place. Utilized flakes range in maximum length from 10 to 210 mm. Of the total 261 specimens, 237 fall within a 10-85 mm. length range, the remaining twenty-four specimens are in a 90-210 mm. range. Many of the specimens in the large size range are of a coarse, granular river cobble material. In many cases they resemble cortex spalls, but they do not have a significant cortex surface.

Cortex Spalls N = 372

Cortex spalls, as described here, are primary flakes struck from water worn pebbles or cobbles. Since they are primary flakes, they necessarily have original cortex over much or all of their dorsal surface. These artifacts have been called cortex-flake tools (Coulson 1971:102), boulder chip scraper-knives (Mitchell 1963:70), boulder-spalls (Mitchell 1971:102), spalls (Stryd 1973:368) and the teshoa (Eyman 1968). To detach cortex spalls, a hammer and anvil technique has been suggested, (Hanson 1973:186; Eyman 1968:9). Eyman (1968) has carried out a detailed study of this tool type, including ethnographic evidence, distribution and function. Various uses suggested include hide preparation (Eyman 1968), for the preparation of fish (Coulson 1971:22; Donnan and Moseley 1967:503) and as slate saws (Eyman 1968:39).

The very granular nature of the cortex spall raw material makes the identification of wear patterns difficult, as observed by Hanson (1973:198) in examining the numerous cortex spalls from the Katz site. The great numbers of these tools at DiRj 1, DiRj 14 and DiRi 38 can be explained by an abundance of raw material and the ease with which cortex spalls can be manufactured. As stated by Eyman (1968:9), "When the edge of the teshoa had done its job, it could be discarded, and a new one could quickly be made whenever it was needed." Just as this may account for the great numbers of cortex spalls, it may also account for the numerous unmodified cortex spalls, although other suggestions regarding unmodified cortex spalls are presented in a following section.

The maximum length distribution of the relatively complete cortex spalls that were either retouched or utilized and those with no visible wear is shown in Figure 26. The breakdown of size for the various types is given in Table XV. Terminology regarding bulb location and the position of retouch or wear follows that outlined by Hanson (1973:195), Table XVI.

A. Retouched Cortex Spalls N = 79

These cortex spalls all exhibit peripheral retouch to some extent. The retouch, for the most part, is unifacial. Retouched cortex spalls are grouped into formed and unformed categories.

1. Formed retouched cortex spalls

Sample size: DiRj 14 : none
DiRi 38 : 4

Figure: 27a-c

Material: river cobbles

Description: These specimens have been shaped, through retouch, to

Table XV: Cortex spall maximum length distribution.

Length	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	200–209	210–219	> 220
A. Retouched																						
1. formed							1	1	2													
2. unformed		1	6	4	4	4	5	2	7	1	7	2		1	1	1	1			1		
B. Utilized																						
1. edge battered					1	3	3	2	1	5	3	4	1	1	1							
2. polished or abraded					1	2	1	3	4	6	2	4										
3. notched							1	1				1	1		1							
C. No observable wear	1	3	7	15	19	14	22	10	11	11	7	4	3	1	1		1			1		1

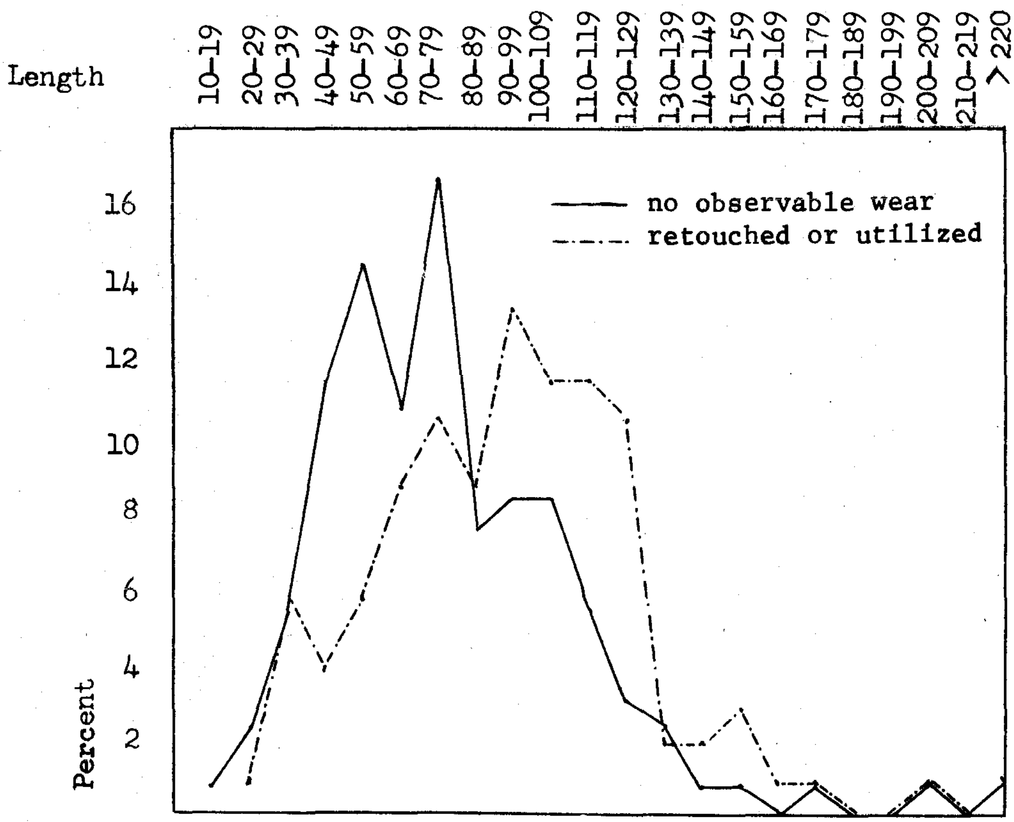


Figure 26: Cortex spall maximum length distribution.

Table XVI: Cortex spall bulb and wear/retouch position.

Bulb \ Position of wear/retouch	opposite	sub-parallel (one)	sub-parallel (two)	opposite / sub-parallel	peripheral	random	Total	
round				1	1	1	3	Retouched (unformed)
side	1	3		1	5	1	11	
corner	1	1	2	3	1	1	9	
end	1	4	2	1	6	4	18	
not visible					1	1	2	
round								Edge battered
side	1	3	2	1	3	3	13	
corner	1	2		1	1	2	7	
end	1	1		1	2		5	
not visible								
round		1		1			2	Polished or abraded
side	3	3		1	2		9	
corner	1	1		2	1		5	
end	1	3			3		7	
not visible								
round								Notched
side	1	1				1	3	
corner	1	1					2	
end								
not visible								

Figure 27: Cortex spalls.

a-c formed retouched
d-f unformed retouched
g edge battered

Pipeline site

Component 4 (e)

Flood site

Component 1 (d)
2 (a,f)
4 (c)
5 (b,g)

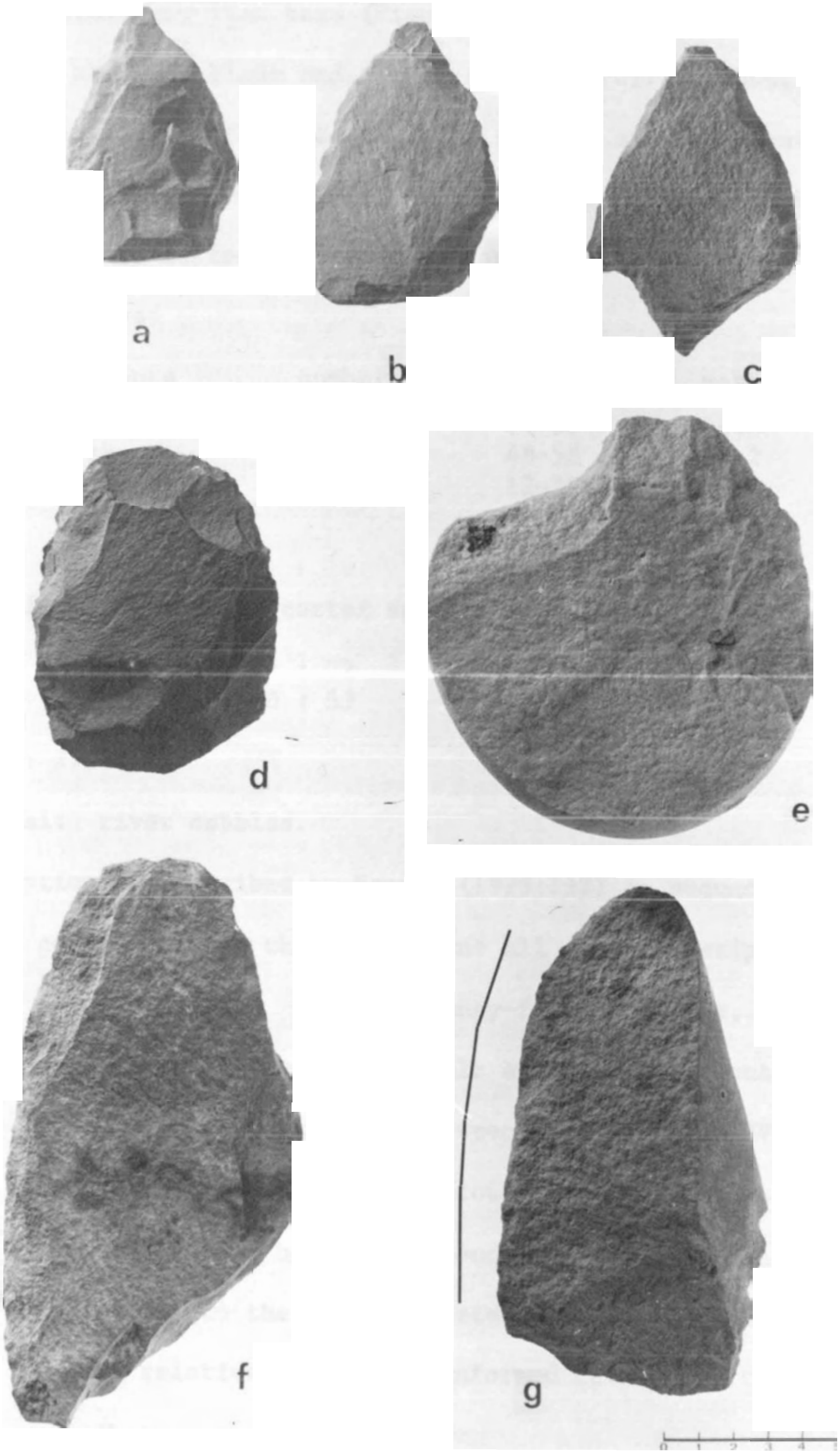


Figure 27

form a point. Three examples are leaf shaped with a relatively flat base (Figure 27a,b) while the fourth has a straight blade and a tang (Figure 27c). Although the majority of the retouch is unifacial, small segments of bifacial retouch occurs on all four specimens. A brief summary of formed retouched cortex spall attributes are as follows:

Attribute	number	range	mean	S.D.
length	4	77-97	88.0	8.6
width	4	48-58	52.2	4.2
thickness	4	12-22	14.7	4.9

2. Unformed retouched cortex spalls

Sample size: DiRj 14 : 22
DiRi 38 : 53

Figure: 27d-f

Material: river cobbles.

Description: Described by Hanson (1973:192) as secondarily flaked cortex spalls, these specimens all exhibit peripheral retouch to some extent. Of the seventy-five specimens, forty-eight are relatively complete. Bulb and wear positions are given for the relatively complete specimens in Table XVI. It is noteworthy that unifacial retouch (95.8) occurs far more frequently than bifacial retouch (4.2%), again these figures apply only to the more complete specimens. A brief summary of the relatively complete unformed retouch cortex spall attributes are as follows:

Attribute	number	range	mean	S.D.
length	48	28-204	85.2	41.0
width	48	16-142	65.9	32.6
thickness	48	5-37	17.5	8.9
weight	48	3-790	193.2	231.8

B. Utilized Cortex Spalls N = 80

Utilized cortex spalls are specimens which indicate they have been utilized by exhibiting edge damage such as blunting or polish. These specimens are divided into three groups on the basis of wear types.

1. Edge battered cortex spalls

Sample size: DiRj 14 : 14
DiRi 38 : 33

Figure: 27g

Material: river cobbles

Description: These cortex spalls have had part of one or more edges battered and, as a result, blunted. Hanson (1973:197) suggested this blunting may indicate a use such as for chopping. There is no indication of purposeful flaking. Of the forty-seven specimens, twenty-five are relatively complete. Data on bulb and wear positions of these specimens is given in Table XVI. A brief summary of the relatively complete, edge battered cortex spalls attributes are as follows:

Attribute	number	range	mean	S.D.
length	25	54-142	101.3	27.4
width	25	38-97	69.1	19.4
thickness	25	8-37	21.4	9.0
weight	25	23-404	195.0	130.89

2. Cortex spalls with polished or abraded edges

Sample size: DiRj 14 : 6
DiRi 38 : 20

Figure: 28e-f

Material: river cobbles

Description: These cortex spalls have one or more edges which exhibit some degree of wear in the form of polish or abrasion. Suggested causes of this wear are as a result of hide (Eyman 1968:9) or fish preparation (Coulson 1971;22). DiRi 38:2291 (Figure 28e) has an acute V-shaped edge with striations parallel to that edge, the result of a back and forth "sawing" or cutting motion. Only three of the specimens are relatively complete. A brief summary of the attributes of cortex spalls with polished or abraded edges are as follows:

Attribute	number	range	mean	S.D.
length	23	50-128	96.3	20.3
width	23	46-106	75.3	20.2
thickness	23	11-35	20.1	6.9
weight	23	30-484	189.5	126.4

3. Notched Cortex spalls

Sample size: DiRj 14 : 1
DiRi 38 : 6

Figure: 28c

Material: river cobbles

Description: These cortex spalls exhibit one or more well worn concavities along their perimeter. Hanson (1973:197) classified similar specimens as cortex spall spoke shaves. Five specimens are on relatively complete cortex spalls, two are on cortex spall fragments. Data on the position of the bulb and notch location is given in Table XVI. One specimen, DiRj 14 :104, also has edge polish or abrasion. A brief summary of notched cortex spall attributes are as follows:

Attribute	number	range	mean	S.D.
length	5	76-150	114.4	32.6
width	5	52-134	83.4	32.0
thickness	5	15-22	18.8	3.1
weight	5	88-316	201.8	105.5
notch diameter	7	7-46	17.4	13.2
notch depth	7	4-15	5.7	4.4

C. Cortex spalls without observable wear

Sample size: DiRj 14 : 65
DiRi 38 : 103

Figure: 28a-b,d

Material: river cobbles

Description: The cortex spalls included here do not have any observable form of wear. They represent cortex spalls that may have been unsuitable and thus rejected for use or were used in such a way that easily observable wear patterns did not develop (Hanson 1973:198). It must be kept in mind, as mentioned earlier, that the majority of cortex spalls were derived from very granular or coarse grained rock, the nature of which may preclude the identification of wear in many cases. The simple fact that these specimens were brought to the site may indicate some form of use. One hundred thirty-two specimens are relatively complete. Bulb position data is presented in Table XVI. A brief summary of the attributes of cortex spalls with no visible wear are as follows:

Figure 28: Cortex spalls.

a,b,d without observable wear
c notched
e,f with polished or abraded edges

Pipeline site

Component 4 (d)

Flood site

Component 2 (c,f)
4 (e)
5 (a,b)

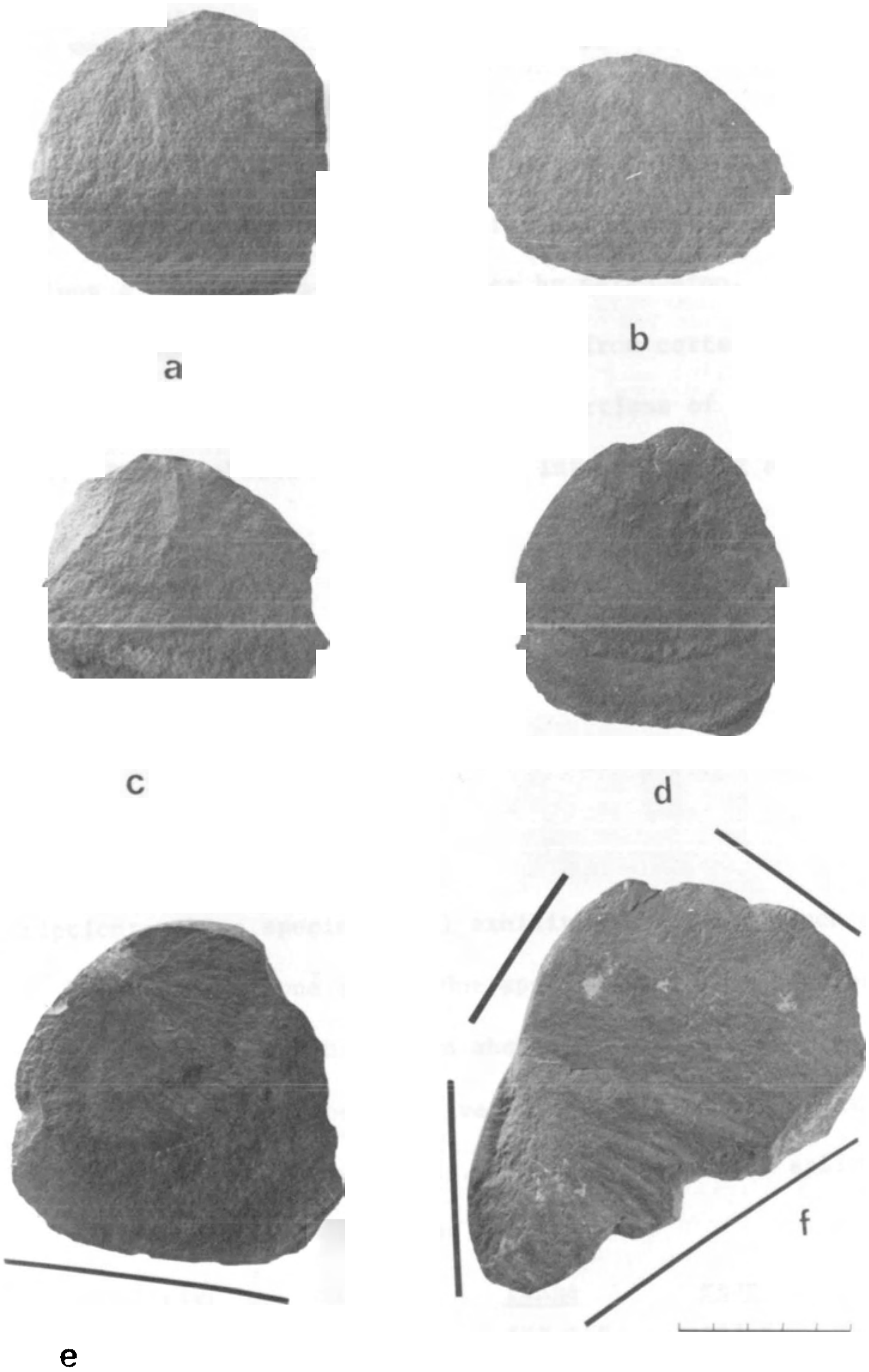


Figure 28

Attribute	number	range	mean	S.D.
length	132	26-264	78.4	35.6
width	132	10-211	57.9	28.9
thickness	132	4-65	15.7	9.4
weight	132	5-3000	142.0	321.8

VI Split Cobbles N = 18

These specimens are based on river cobbles that have been split, either along a natural fracture plane or by percussion. If split by percussion the specimens are differentiated from cortex spalls in that they are not flakes, they are substantial portions of cobbles, (Mitchell 1971:104). Split cobbles are subdivided into retouched and utilized groups.

A. Retouched split cobbles

Sample size: DiRj 14 : 2
DiRi 38 : 7

Figure: 29a,b

Material: river cobbles

Description: These specimens all exhibit unifacial retouch along at least part of one edge. One specimen has also been bifacially retouched. None have been shaped by the retouch, though the retouch is patterned in five cases. DiRi 38:2390 has also been battered on both ends. A brief summary of split cobble attributes are as follows:

Attribute	number	range	mean	S.D.
length	9	117-238	167.6	49.9
width	9	75-129	106.6	20.3
thickness	9	22-58	40.2	12.9

Figure 29: Split cobble and large miscellaneous.

Split cobbles (a-b)

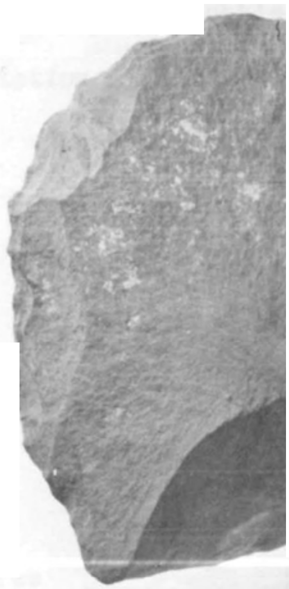
Miscellaneous (c)

Pipeline site

Component 4 (b)

Flood site

Component 1 (c)
4 (a)



a

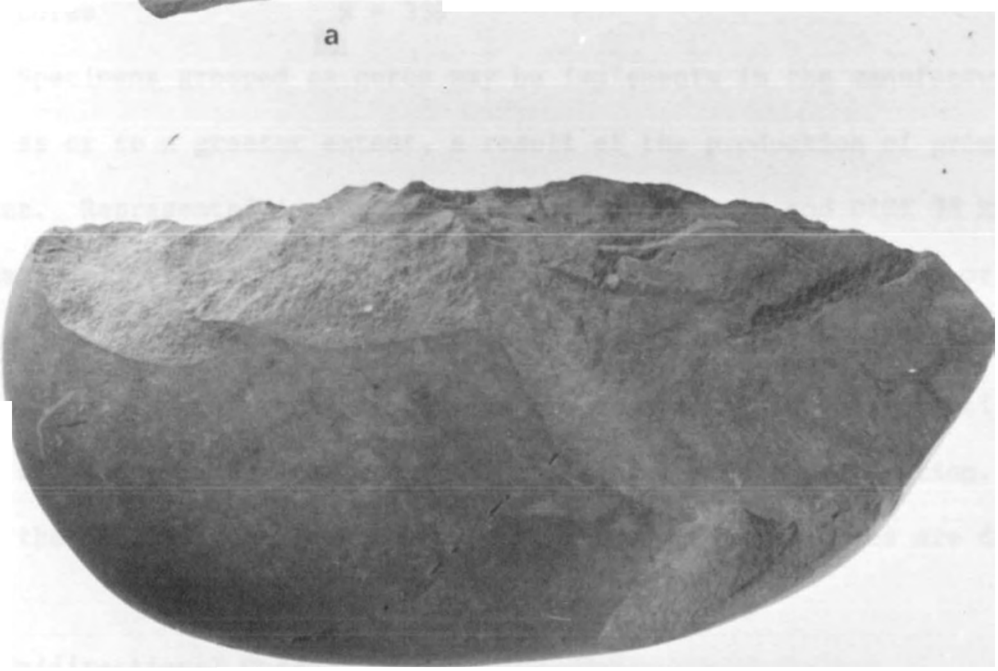


Figure 29

B. Utilized split cobbles

Samples size: DiRj 14 : 2
DiRi 38 : 7

Figure: none

Material: river cobbles

Description: All these specimens exhibit edge chipping from utilization along at least part of their perimeter. In addition, five specimens also exhibit considerable edge polish. A brief summary of utilized split cobble attributes are as follows:

Attribute	number	range	mean	S.D.
length	9	73-214	138.0	44.6
width	9	52-140	82.4	30.5
thickness	9	18-51	35.2	10.1

VII Cores N = 339

Specimens grouped as cores may be implements in the manufacturing process or to a greater extent, a result of the production of primary flakes. Represented in the assemblages from DiRj 14 and DiRi 38 are cores in all stages of this process, from pebbles with only one or two flakes removed, to completely exhausted cores. Using Stryd's (1973:369) definition of cores, these specimens are essentially devoid of utilization or retouch other than that for striking platform preparation. From the flaking technique and extent, three groups of cores are described.

A. Unidirectional Cores

Sample size: DiRj 14 : 30
DiRi 38 : 100

Figure: 30f-1

Material: basalt (119) river cobble (9) cryptocrystalline (1)
quartzite (1)

Figure 30: Bipolar implements and unidirectional cores.

Bipolar implements (a-e)

Unidirectional cores (f-l)

f-i small unidirectional cores
j-l large unidirectional cores

Pipeline site

Component 2 (a)

Flood site

Component 1 (h,k)
2 (g)
4 (c)
5 (b,d,e,f,i,j,l)

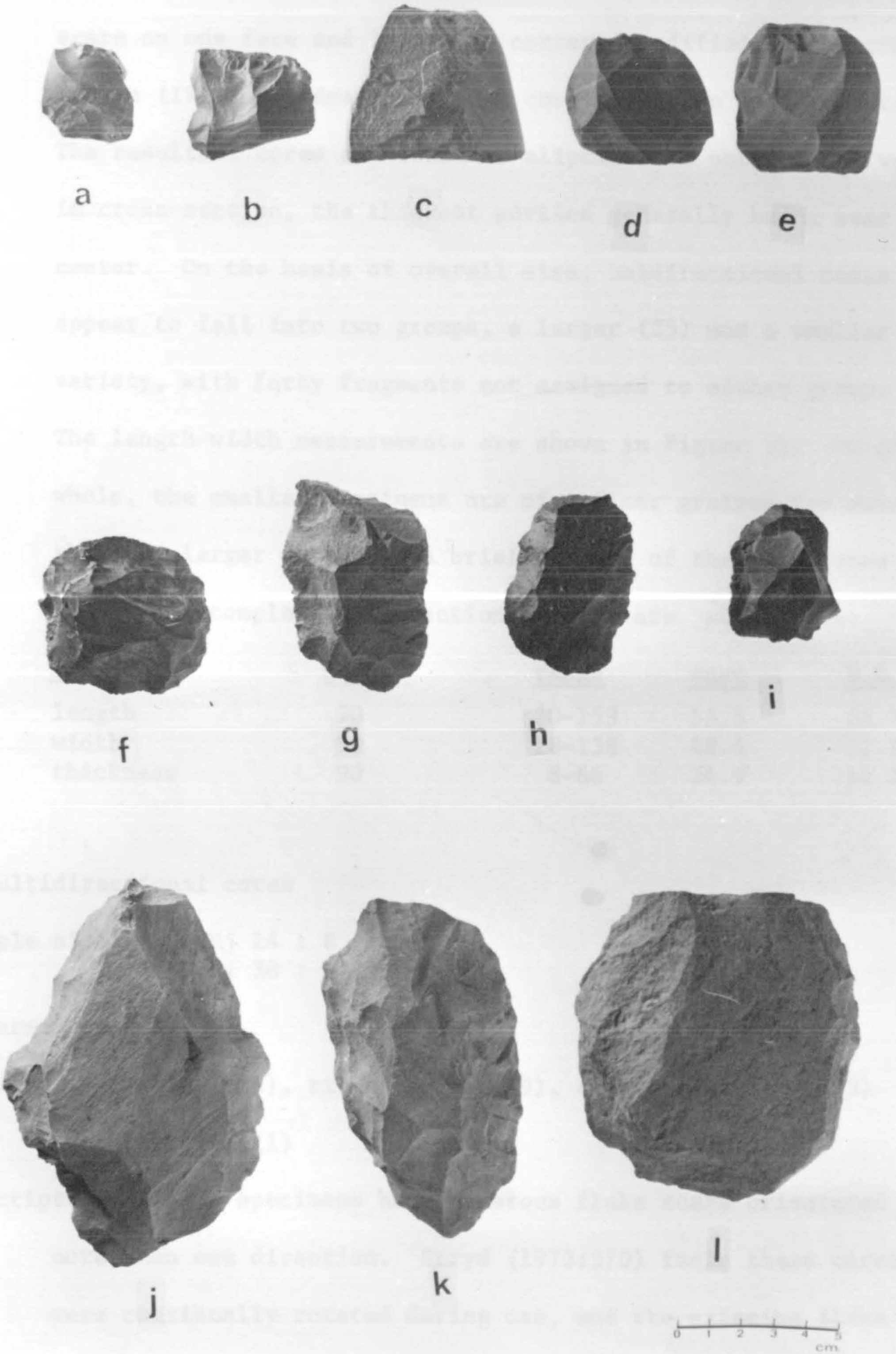


Figure 30

Description: Unidirectional cores are cores that have undergone unifacial peripheral flaking. This process produces flake scars on one face and leave the cortex unmodified on the other. Hanson (1973:204) describes such core reduction in some detail. The resultant cores are round to eliptical in outline and vary in cross-section, the thickest portion generally being near the center. On the basis of overall size, unidirectional cores appear to fall into two groups, a larger (25) and a smaller (65) variety, with forty fragments not assigned to either group. The length-width measurements are shown in Figure 31. On the whole, the smaller specimens are of a finer grained raw material than the larger variety. A brief summary of the attributes of relatively complete unidirectional cores are as follows:

Attribute	number	range	mean	S.D.
length	90	20-153	53.5	26.7
width	90	18-138	48.4	22.8
thickness	90	8-66	24.9	12.2

B. Multidirectional cores

Sample size: DiRj 14 : 8
DiRi 38 : 172

Figure: none

Material: basalt (155), river cobble (19), cryptocrystalline (5) quartzite (1)

Description: These specimens have numerous flake scars orientated in more than one direction. Stryd (1973:370) feels these cores were continually rotated during use, and the existing flake scars used as striking platforms for subsequent flake detachment.

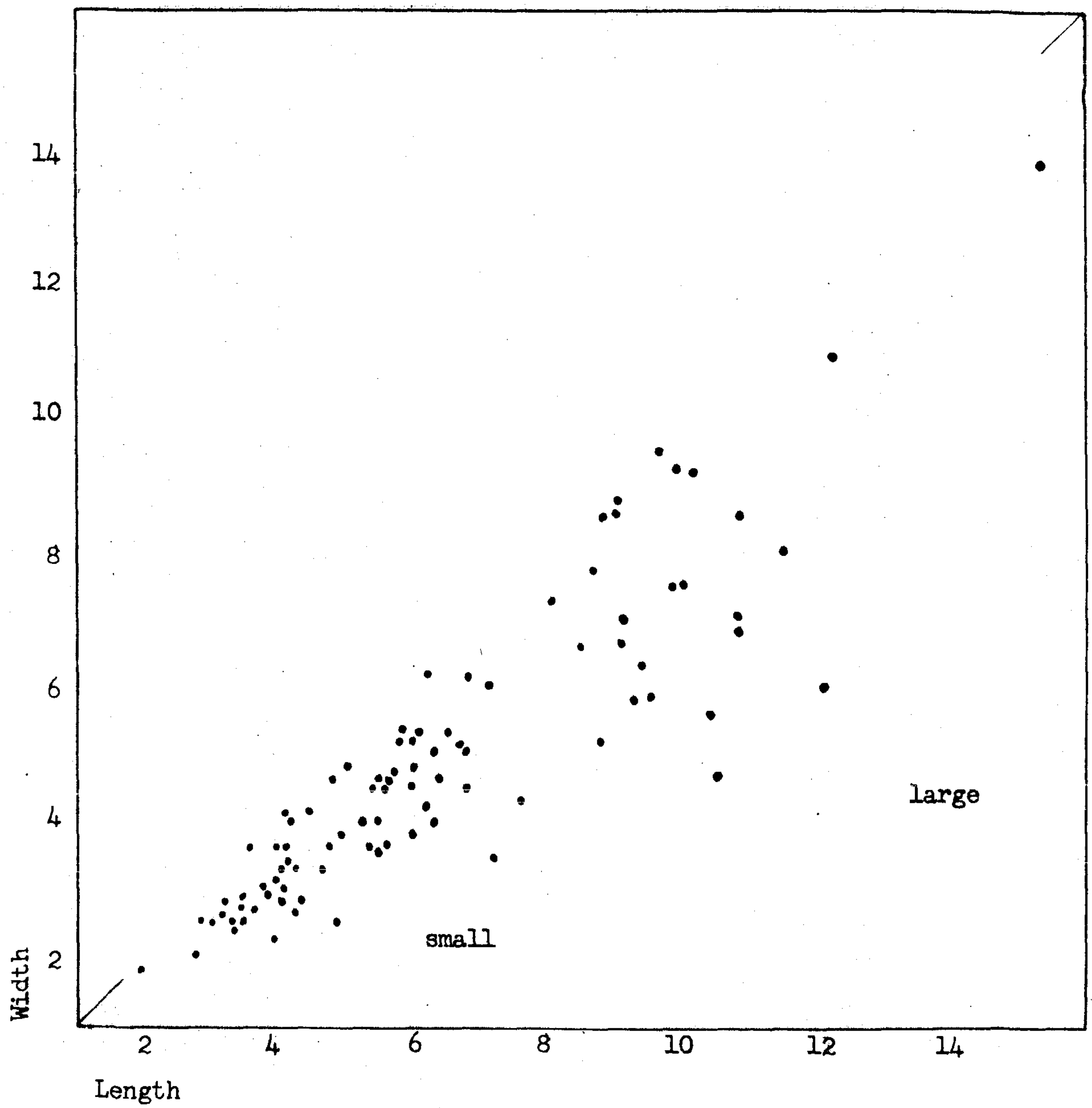


Figure 31: Length-width measurements of the relatively complete unidirectional cores.

As a result, the cores are polyhedral with flake scars covering most or all of the surface. Proportionately, little cortex remains. Unlike the unidirectional cores, these specimens are diverse in cross-section and outline. The overall size measurements are shown in Figure 32. Fifty-five specimens are relatively complete. The remaining specimens (125) are multidirectional core fragments. A brief summary of the attributes of the relatively complete multidirectional cores are as follows:

Attribute	number	range	mean	S.D.
length	55	44-143	71.8	24.8
width	55	22-107	54.2	19.3
thickness	55	14-80	32.4	13.7

C. Randomly Flaked Pebbles and Cobbles

Sample size: DiRj 14 : 10
DiRi 38 : 19

Figure: none

Material: river cobbles or pebbles

Description: These specimens are river pebbles or cobbles that exhibit only limited and non-patterned flaking. In all cases only one to four flakes have been removed. Flaking is unifacial (22) or alternate (7). DiRj 14:34 is a spall core, and the major spall detached (DiRj 14:27) has also been recovered. A brief summary of randomly flaked pebble attributes are as follows:

Attribute	number	range	mean	S.D.
length	29	44-240	118.5	60.8
width	29	22-181	82.5	43.5
thickness	29	7-130	36.1	27.6

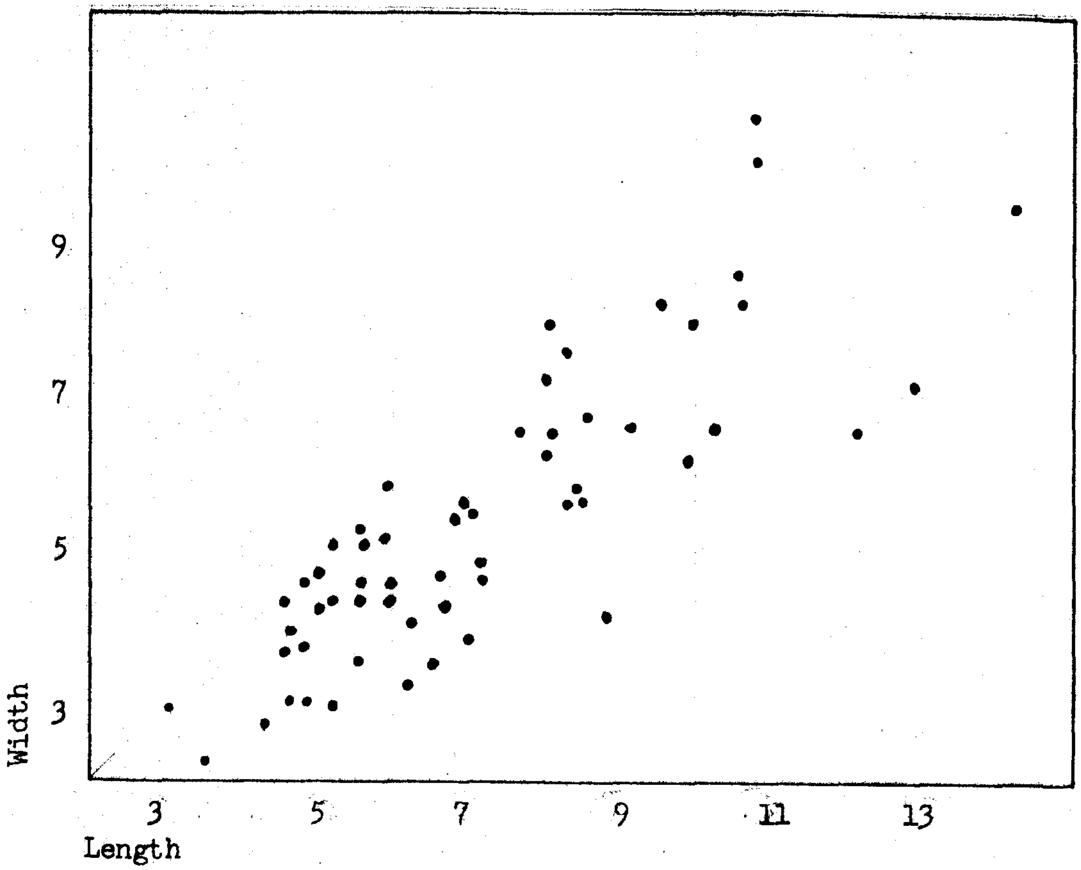


Figure 32: Length-width measurements of the relatively complete multidirectional cores.

VIII Bipolar Flaked Implements

Sample size: DiRj 14 : 18
DiRi 38 : 101

Figure: 30a-e

Material: basalt (113) river cobble (1) cryptocrystalline (5)

Description: These specimens, described as pièces esquillées by MacDonald (1968:86-90), have undergone a bipolar flaking technique as indicated by bipolar flakes having been driven off from two opposing edges. Eleven specimens have more than one set of opposing edge pairs. MacDonald (1968:86) suggested this was a result of rotating the specimen during use. Complete specimens are generally rectangular in outline. See Figure 33 for the length-width size measurements. An important aspect to be kept in mind when examining bipolar flaked implements is that there is no stage at which they can be considered completed, consequently a collection of these implements includes examples at various stages of manufacture or use (MacDonald 1968:86).

Of the specimens described here, thirty-four are fragments, with only one bipolar flaked end intact. This fragmentation is likely a result of the bipolar reduction or use of these specimens. Identified among the debitage were a number of bipolar flakes.

The description of bipolar implements is relatively new in the Fraser River drainage area. Sanger (1970:84) recovered fifteen such specimens, but felt they were a by-product of a general chipping technique. Ham (1975:143), Hanson (1973:185-186) and

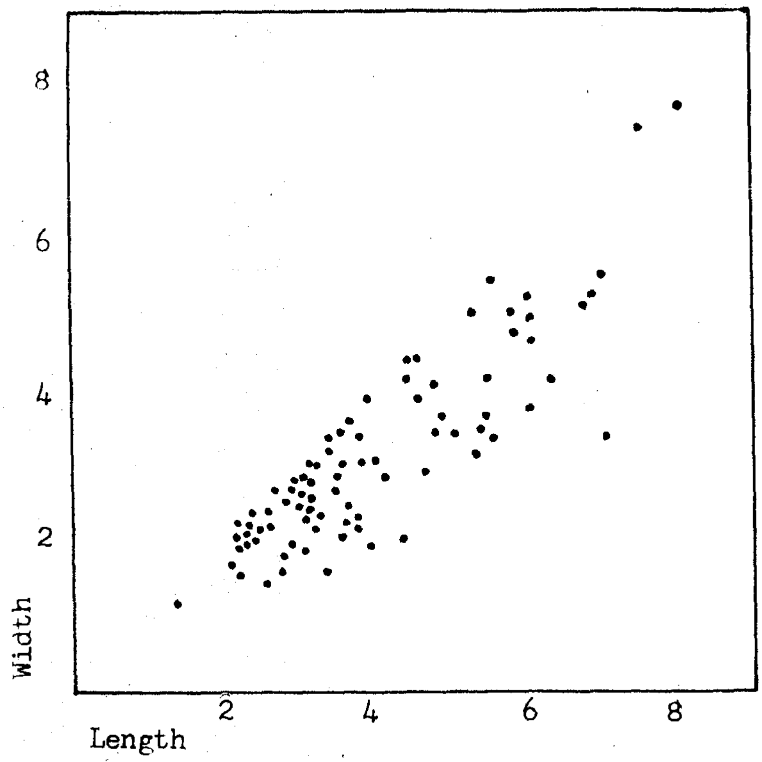


Figure 33: Length-width measurements of the relatively complete bipolar implements.

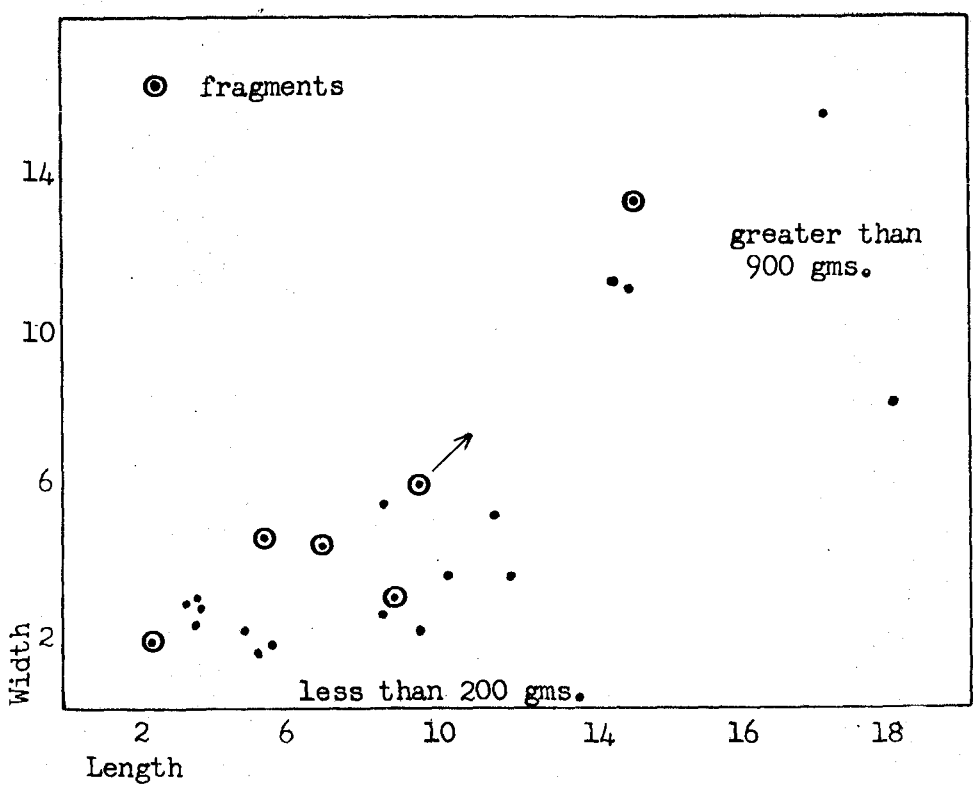


Figure 34: Length-width measurements of the relatively complete battered and chipped pebbles and cobbles.

Percy (1974:108-112), among other recent reports, deal more extensively with them. The exact use of bipolar implements is not clearly understood. MacDonald (1968:88-90) has suggested functions such as chipped stone wedges, use in working wood or bone, or simply as flake cores. A brief summary of bipolar flaked implement attributes are as follows:

Attribute	number	range	mean	S.D.
length	85	14-81	39.6	15.1
width	85	7-78	30.7	13.2
thickness	85	4-36	13.1	6.3

IX Flaked Cobbles and Pebbles N = 36

Flaked cobbles and pebbles can be grouped into two types, the first includes those specimens that have been intentionally flaked in a patterned way, the second includes specimens that exhibit one or two chipped and battered ends.

A. Unifacially and bifacially flaked

Sample size: DiRj 14 : 6
DiRi 38 : 7

Figure: 35f-i

Material: river cobbles or pebbles

Description: These specimens have bifacial (3) or unifacial (10) flaking in a patterned form. In all cases the retouch is not peripheral and the cortex is largely intact. Eight of the specimens are similar to Borden's (1968b:55) pebble tool types as described from the Pasika complex. These are types I a (1), I b (4), I e (1), II (1) and XI (1). Of the remaining specimens, two are pebble fragments and three have bifacial retouch.

Figure 35: Chipped and flaked pebbles and cobbles.

Battered and chipped pebbles (a-e)

Unifacially flaked pebbles and cobbles (f-h)

Bifacially flaked cobble (i)

Pipeline site

Component 2 (d)

Flood site

Component 1 (g)
2 (c)
5 (a,b,e,f,h,i)

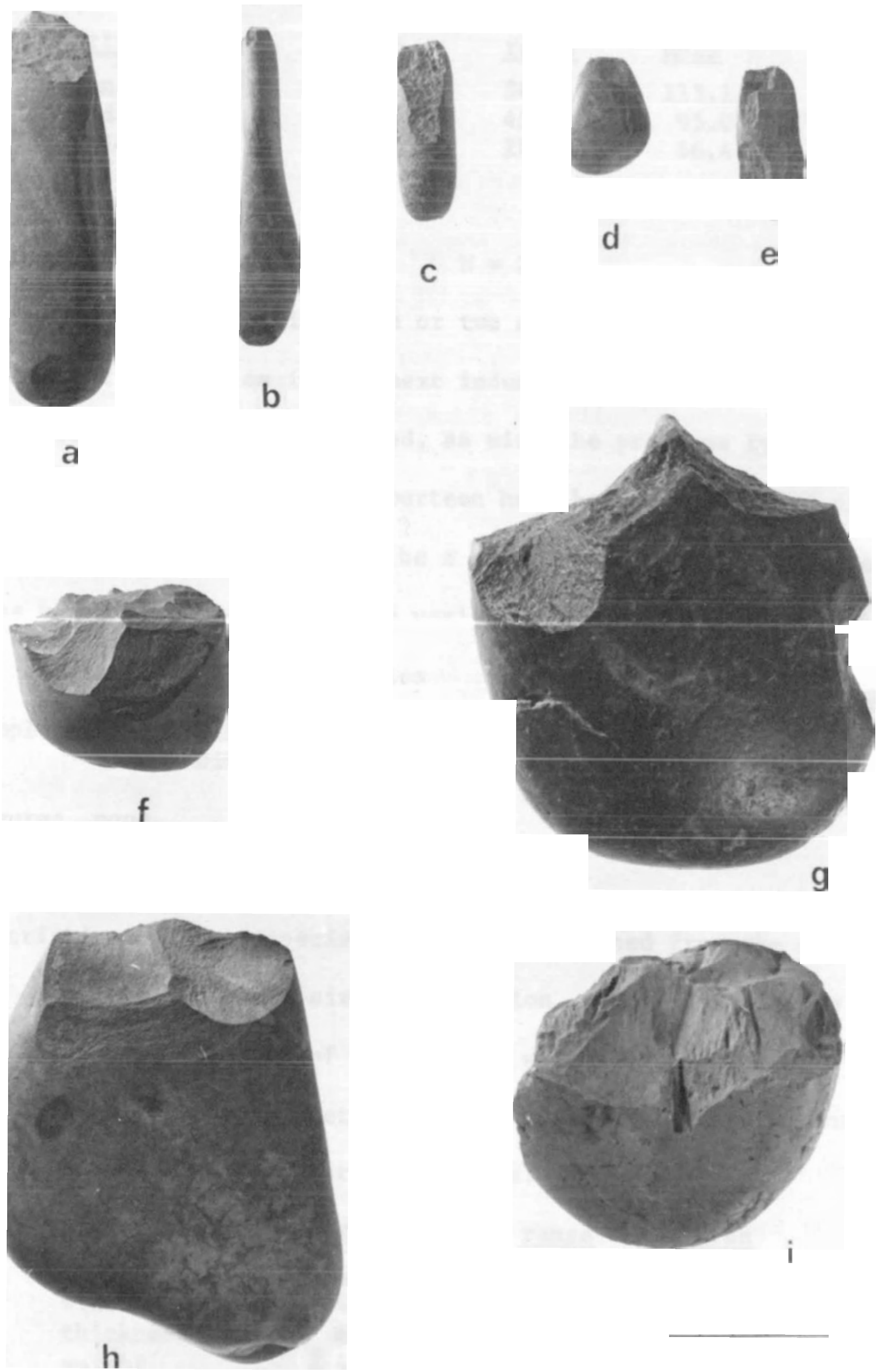


Figure 35

A brief summary of flaked pebble and cobble attributes are as follows:

Attribute	number	range	mean	S.D.
length	11	50-210	113.1	43.6
width	11	48-200	95.0	41.2
thickness	11	18-68	46.4	14.2

B. Battered and Chipped N = 23

These specimens exhibit one or two chipped and battered ends. The ends are not pitted, as in the next industry, and they do not appear to have been intentionally flaked, as with the previous type. Of the seventeen complete specimens, fourteen have been chipped, and often battered on two ends. This may be a result of bipolar flaking techniques. On the basis of overall size two varieties are evident, Figure 34.

1. Battered and Chipped Cobbles

Sample size: DiRj 14 : 4
DiRi 38 : 2

Figure: none

Material: river cobbles

Description: These specimens are distinguished from the next group on their overall size distribution. They have minimum width of 8 mm., length of 145 mm. and weight of 964 gm. Two specimens are not complete. A brief summary of battered and chipped cobble attributes are as follows:

Attribute	number	range	mean	S.D.
length	4	145-220	179.3	37.5
width	4	81-156	115.0	30.9
thickness	4	42-71	59.8	12.4
weight	4	964-2757	1704.0	760.6

2. Battered and chipped pebbles

Sample size: DiRj 14 : 4
DiRi 38 : 13

Figure: 35a-e

Material: river pebbles

Description: This group is again distinguished by their overall size distribution. They have a maximum length of 119 mm., width of 53 mm. and weight of 172 gm., (Figure 34). Four specimens are not complete. A brief summary of battered and chipped pebble attributes are as follows:

Attribute	number	range	mean	S.D.
length	13	34-119	68.7	32.2
width	13	16-53	29.2	11.7
thickness	13	6-31	14.1	5.4
weight	13	9-172	62.2	65.0

X Miscellaneous

Sample size: DiRj 14 : none
DiRi 38 : 1

Figure: 29c

Material: river cobble (1)

Description: This specimen is noteworthy for its very large size and regularly flaked bifacial edge which extends along its entire length. The largest flake scar extends back 130 mm., indicating that the specimen may have served, in part, as a cortex spall core. Another possible function, considering the straight flaked edge and size, is that it may have been held with two hands and used for chopping. A brief summary of the attributes of this specimen are as follows:

Attribute	length	width	thickness
measurement	331	152	124

Pecked and/or Ground Stone Industry

The pecked and/or ground stone industry represents a total of 1455 or 49.7% of the specimens examined in this analysis. The general breakdown of this industry has already been discussed. To recapitulate, it will be done initially by raw material type and then by further modification of that raw material. A brief discussion of what is meant or encompassed by each raw material will be given prior to its further breakdown.

I. River Cobbles N = 96

Described here are specimens made of or from river pebbles and cobbles. They have been formed by, or are a result of, pecking or hammering. On the whole, the river cobbles are of a relatively fine grain material. In the case of the hand mauls and preforms, greenstone appears to have been primarily used.

A. Pitted and Chipped Pebbles N = 66

These specimens are based on unshaped round to oval river cobbles that show evidence of use in the form of pitting of the cortex surface. On the basis of the location of this pitting, two groups are described.

1. Edge and/or End Pitted

Sample size: DiRj 14 : 11
DiRi 38 : 45

Figure: 36a-c

Figure 36: Pecked river cobbles.

Edge and/or end pitted (a-c)

Surface pitted (d-e)

Chipped and pecked preform (f)

Pipeline site

Component 2 (b)

Flood site

Component 5 (a,c,d,e,f)

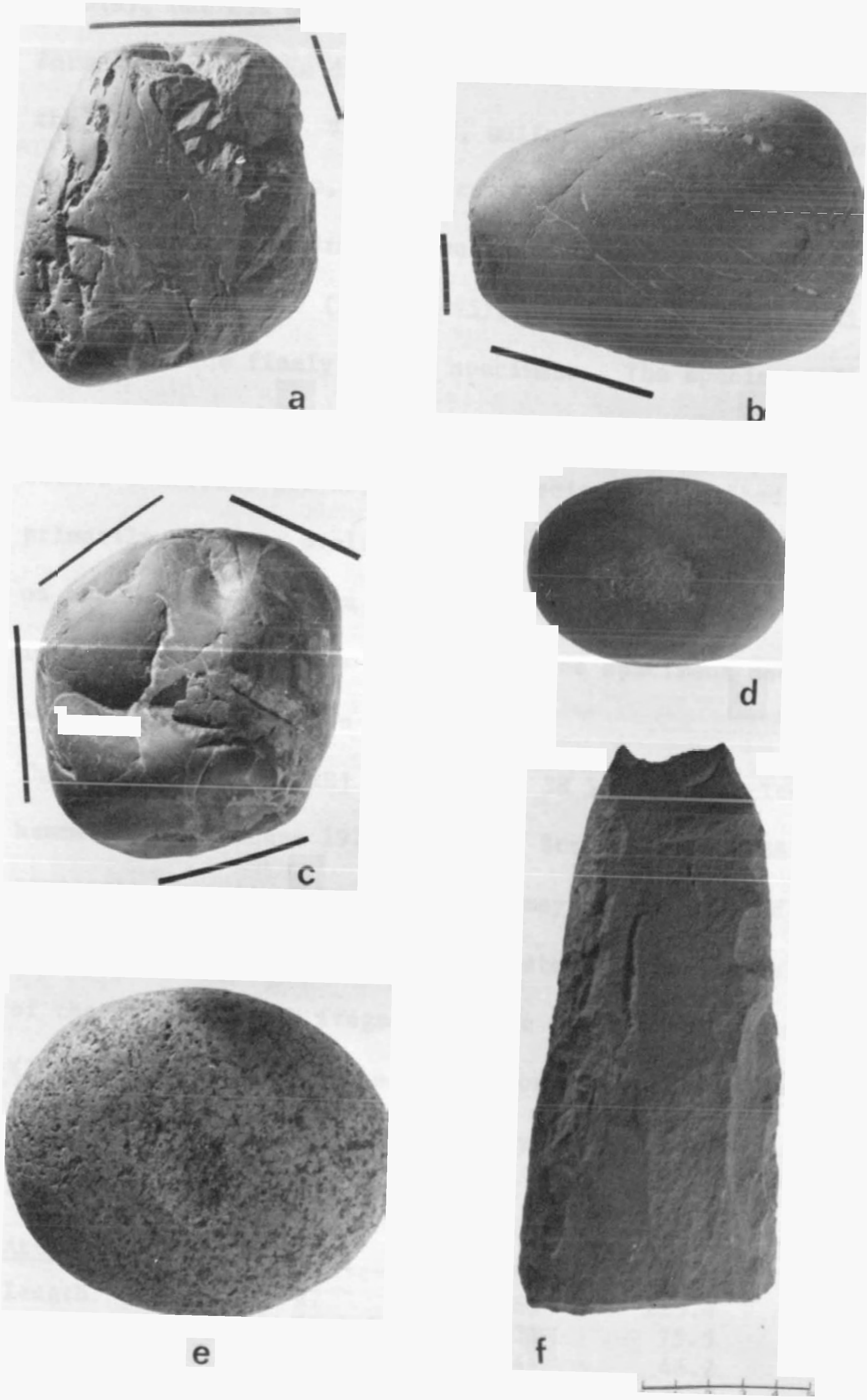


Figure 36

Description: These specimens exhibit pitting on the end(s) and/or edge(s), but not on the face. In many cases the pitting has formed a facet-like division between the pecked surface and the intact cortex. Very fine, uniform pitting, occurring on 50% of the specimens, almost resembles grinding, though microscopic examination did not confirm this. Edge-ground cobbles described by Butler (1962:44-45), initially appeared similar to some of the finely pecked specimens. The specimens do however differ in outline and location of the working edges. Whereas Butler's cobbles are oblong, the specimens described here are primarily round to oval. Also Butler's specimens are worked on the longer edges (an important point with regards to his interpretation of their use), where the specimens described here are primarily worked on the ends.

The specimens from DiRj 14 and DiRi 38 likely functioned as hammerstones (Hanson 1973:211-217); Stryd 1973:380-381; Sanger 1970:89). The finely pecked edges may be a result of finish work or of pecking relatively soft stones, such as talc. Nine of the specimens are fragments. The pitting occurs on one end (24), two ends (18), one edge (10) or two edges (10) of the complete specimens. A brief summary of edge and/or end pitted cobble attributes are as follows:

Attribute	number	range	mean	S.D.
length	47	60-165	113.4	33.8
width	47	31-131	75.5	21.2
thickness	47	17-74	46.2	14.9
weight	47	117-2354	721.7	532.9

2. Surface Pitted

Sample size: DiRj 14 : 1
DiRi 38 : 12

Figure: 36d-e

Description: Although most of these specimens (9) also exhibit end or edge pitting, the important distinguishing factor is that they are pitted on one or both faces. These specimens appear to have served as small anvil stones (Stryd 1973:381; Hanson 1973:218) as well as hammerstones. One specimen DiRi 38: 1392 is unusual in that it is a flake core that has been pitted on one face. A brief summary of surface pitted artifact attributes are as follows:

Attribute	number	range	mean	S.D.
length	11	62-160	115.9	25.2
width	11	32-93	62.0	18.8
thickness	11	30-71	42.2	14.2
weight	11	136-973	489.4	287.9

B. Chipped and Pecked Preforms

Sample size: DiRj 14 : none
DiRi 38 : 2

Figure: 36f

Description: Included here are two specimens that exhibit pitting and chipping over their surface. Although both specimens are broken, they presumably represent an in-process manufacturing stage to some preconceived form. DiRi 38: 1604 is oval in cross-section. It has been chipped on two surfaces and pecked on two edges, Figure 36f. DiRi 38: 2103 is rectangular in cross-section. Two of the surfaces are unmodified and the edges have been both chipped and pecked. Both specimens are elongated in outline. A brief summary of chipped and pecked preform attributes are as follows:

Attribute	length	width	thickness
DiRi 38: 1604	165	75	54
DiRi 38: 2103	223	87	80

C. Hand Mauls N = 11

Hand maul preforms and fragments of completed specimens were recovered from both sites. These are discussed separately.

1. Hand Maul preforms

Sample size: DiRj 14 : 2
DiRi 38 : 2

Figure: 37a,b

Description: These specimens can be identified as incipient hand maul preforms. Because of the variation, each will be briefly described. DiRj 14:81/179, consisting of two pieces, has a slightly flaring, conical shape with a relatively flat base. Most of the surface, including the base, has been pecked smooth, although one portion of the stem is only roughly chipped and a small area of cortex is still present (Figure 37a). The manufacturing technique in the form of pecking and flaking, as noted by Percy (1974:163) and illustrated by Steward (1973:52) is clearly visible.

DiRj 14:249 is based on an elongated pebble triangular in cross-section. The surface is unmodified but the base, with a bevelled edge, has been pecked flat.

DiRi 38:1223 has been chipped and pecked on two sides and has unmodified cortex on two others. The specimen is roughly conical

Figure 37: Maul preforms.

Pipeline site
Component 3/4 (a)

Flood site
Component 5 (b)

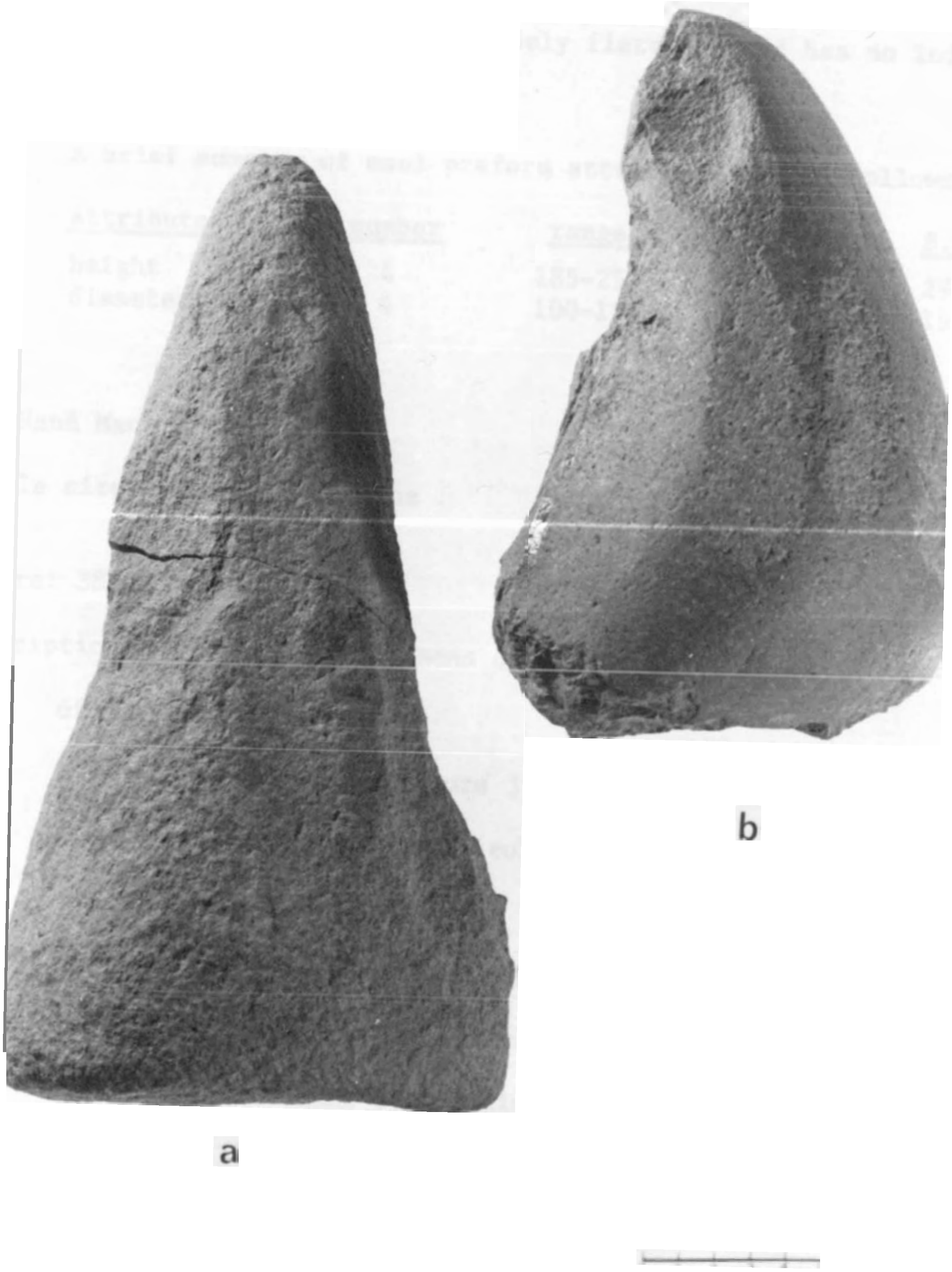


Figure 37

shaped and has a flat base. Even in this relatively unfinished state, the base shows evidence of use.

DiRi 38:2446, again conically shaped, has been roughly chipped on one side, with pitting and unmodified cortex over the remaining area. The base has been crudely flattened and has no indication of use, (Figure 37b).

A brief summary of maul preform attributes are as follows:

Attribute	number	range	mean	S.D.
height	4	185-250	207.5	29.0
diameter	4	100-130	114.3	15.4

2. Hand Maul Fragments

Sample size: DiRj 14 : none
DiRi 38 : 7

Figure: 38d-h

Description: The seven specimens described here are all fragments of formed hand mauls.

DiRi 38:249 and 1688 (Figure 38g,h) are both relatively complete nipple top mauls, but have broken bases. The surface of both has been pecked and polished. Although the bases have been broken, both show signs of use. Wear, also on both the nipple tops, is in the form of battering.

DiRi 38:2148 ,(Figure 38f) again the top portion of a nipple top maul, is relatively short and does not appear to have been used after breaking.

DiRi 38:694 is a longitudinal fragment of the upper portion of a hand maul. It may have been nipple top though this is not definite. The surfaces of the last two specimens have been pecked

Figure 38: Notched and perforated pebbles and hand maul fragments.

Bilaterally notched pebbles (a-b)

Naturally perforated pebble (c)

Hand maul fragments (d-h)

Pipeline site

Component 2 (a,b,c)

Flood site

Component 2 (h)
5 (d,e,f,g)

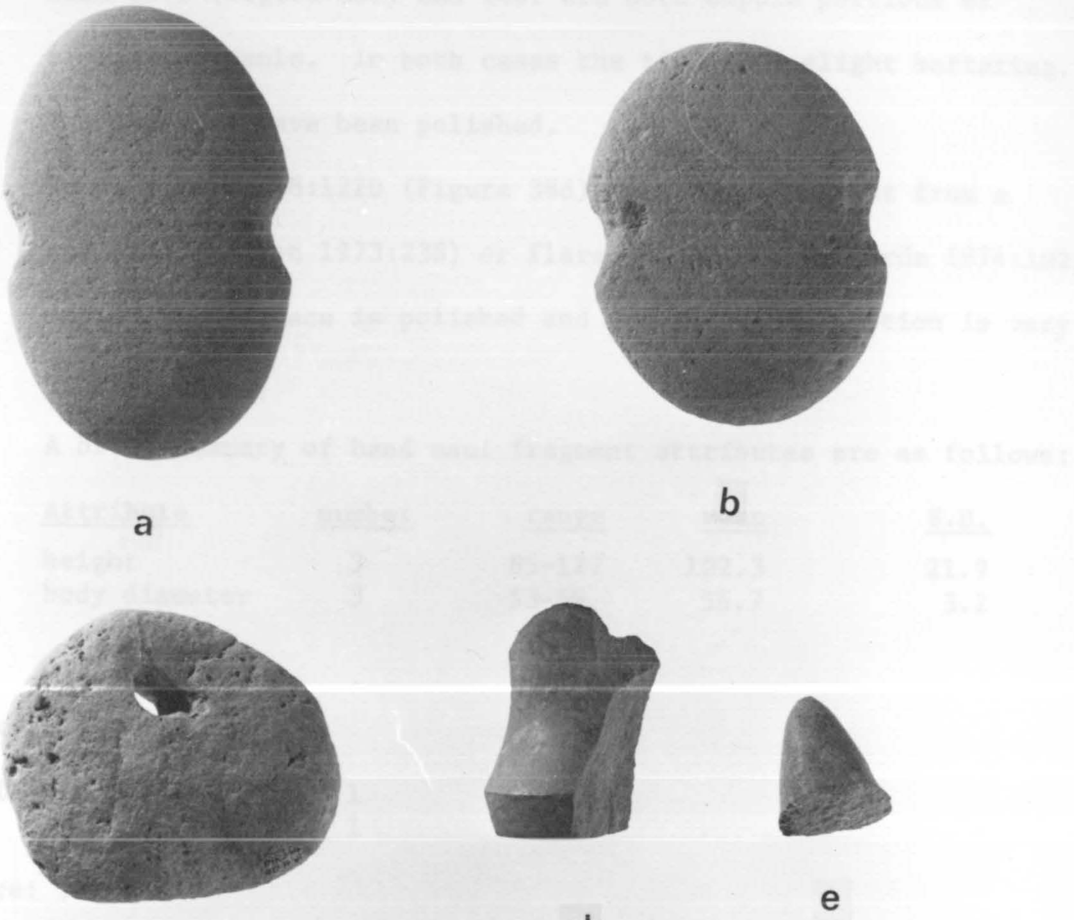


Figure 38

smooth, but not polished.

DiRi 38:2 (Figure 38e) and 1461 are both nipple portions of nipple top mauls. In both cases the tips show slight battering. The surfaces have been polished.

Finally, DiRi 38:1220 (Figure 38d) is a base fragment from a collared (Hanson 1973:238) or flared base (Crowe-Swords 1974:102) maul. The surface is polished and the flat base portion is very smooth.

A brief summary of hand maul fragment attributes are as follows:

Attribute	number	range	mean	S.D.
height	3	85-127	102.3	21.9
body diameter	3	53-59	56.7	3.2

D. Mortars

Sample size: DiRj 14 : 1
DiRi 38 : 1

Figure: 39

Description: Of the two specimens identified as mortars, DiRj 14:238, a split cobble fragment, has a saucer-shaped depression 20 mm. deep and 105 mm. in diameter pecked into its surface. Two-thirds of the perimeter is unifacially flaked and the bottom is a split cobble fracture plane. Cortex is present on the remaining edge and on the surface with the depression, Figure 39. DiRi 38:475 is a large, convoluted river cobble which has two natural depressions, one on either side. The more regular of these depressions has pitting on part of its surface, indicating advantage was taken of the natural depression for use as a mortar.

Figure 39: Mortar.

Pipeline site

Component 3

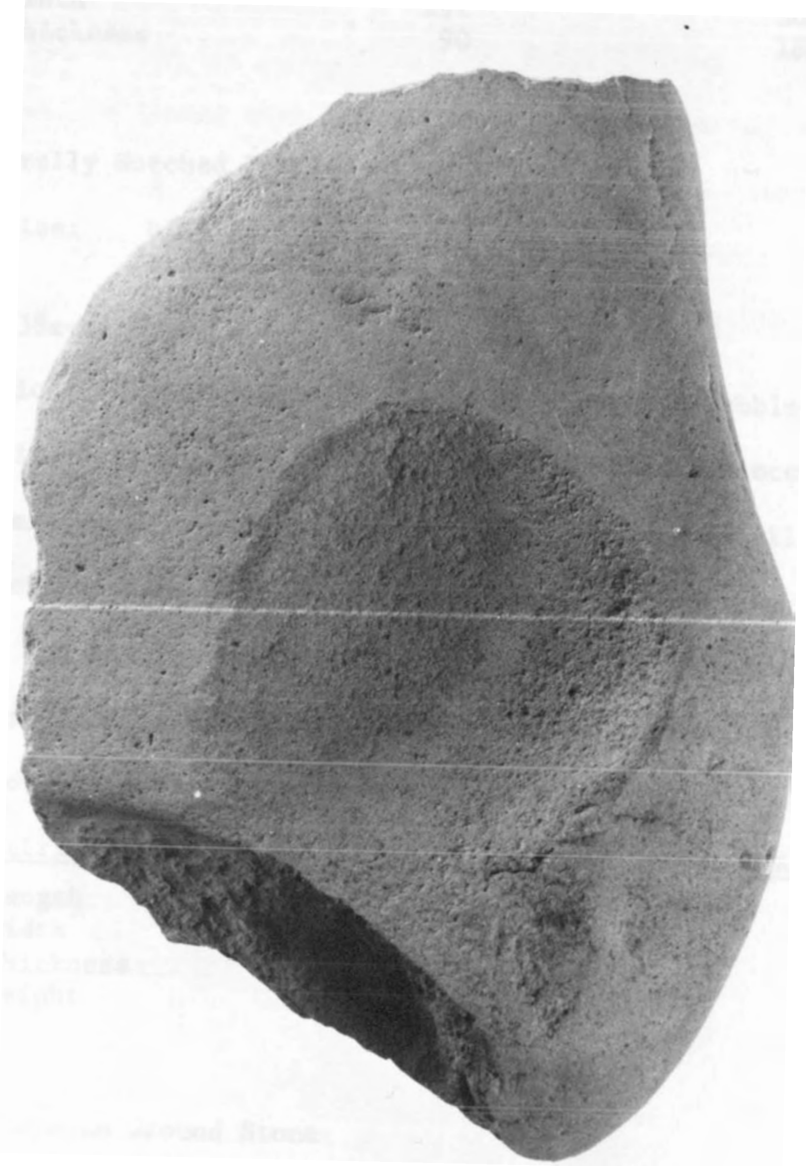


Figure 39

A brief summary of mortar attributes are as follows:

Attribute	DiRj 14:238	DiRi 38:475
length	265	385
width	192	300
thickness	90	180

E. Bilaterally Notched Pebbles

Sample size: DiRj 14 : 2
DiRi 38 : none

Figure: 38a-b

Description: These specimens, based on elongated pebbles, both exhibit bilateral notching. No other modification has occurred. The maximum depth of the side notches is 5 mm. In all cases the notches have been formed by pecking, and they are finished to a relatively smooth surface. Percy (1974:157) describes a similar specimen as a notched sinker. A brief summary of bilaterally notched pebble attributes are as follows:

Attribute	DiRj 14:370	DiRj 14:385
length	103	121
width	77	75
thickness	31	26
weight	369	382

F. Miscellaneous Ground Stone

Sample size: DiRj 14 : none
DiRi 38 : 13

Figure: none

Description: All of these pieces have been ground to some extent. Many are fragmented (10) and not of an identifiable form. Of the complete specimens, one has been edge ground and two have been surface ground. In all three cases grinding is minimal. The specimens range in length from 1.5 to 22.5 mm.

II. Abrasive stones N = 141

Necessarily linked with an extensive groundstone industry are a variety of grinding or abrasive implements. Abrasive materials most commonly used at DiRj 14 and DiRi 38 were micacious and garnetiferous schists, sandstone and siltstones. These vary in grades of grit from very coarse to very fine. Most specimens are badly fragmented and many are very corroded.

A. Edge ground N = 46

Edge ground abrasive stones are separated into two groups. One group has a very definite U- or V-shaped edge, but the edge is not facetted. These have been called "saws" and, as it is a good term to describe their function, it will be adopted here, (Loy, et al, 1974:30). The second group, all of a fine grain garnetiferous schist, exhibit a variety of edge types, unlike those of saws.

1. Saws

Sample size: DiRj 14 : none
DiRi 38 : 30

Figure: 40d-g, 41n

Description: These specimens, twenty of which are fragmentary, have one or more edges which have a consistent U-(20) or V-shaped (10) cross-section. These edges are all straight or slightly convex in outline. Of the thirty specimens, ten have also been abraded on both surfaces, and nine have abrasion on only one surface.

Figure 40: Abrasive stones.

a-c facetted
d-g abrasive saws
h-i abrasive slabs

Pipeline site

Component 3 (h)

Flood site

Component 2 (e,f,i)
3 (c,g)
5 (a,b,d)

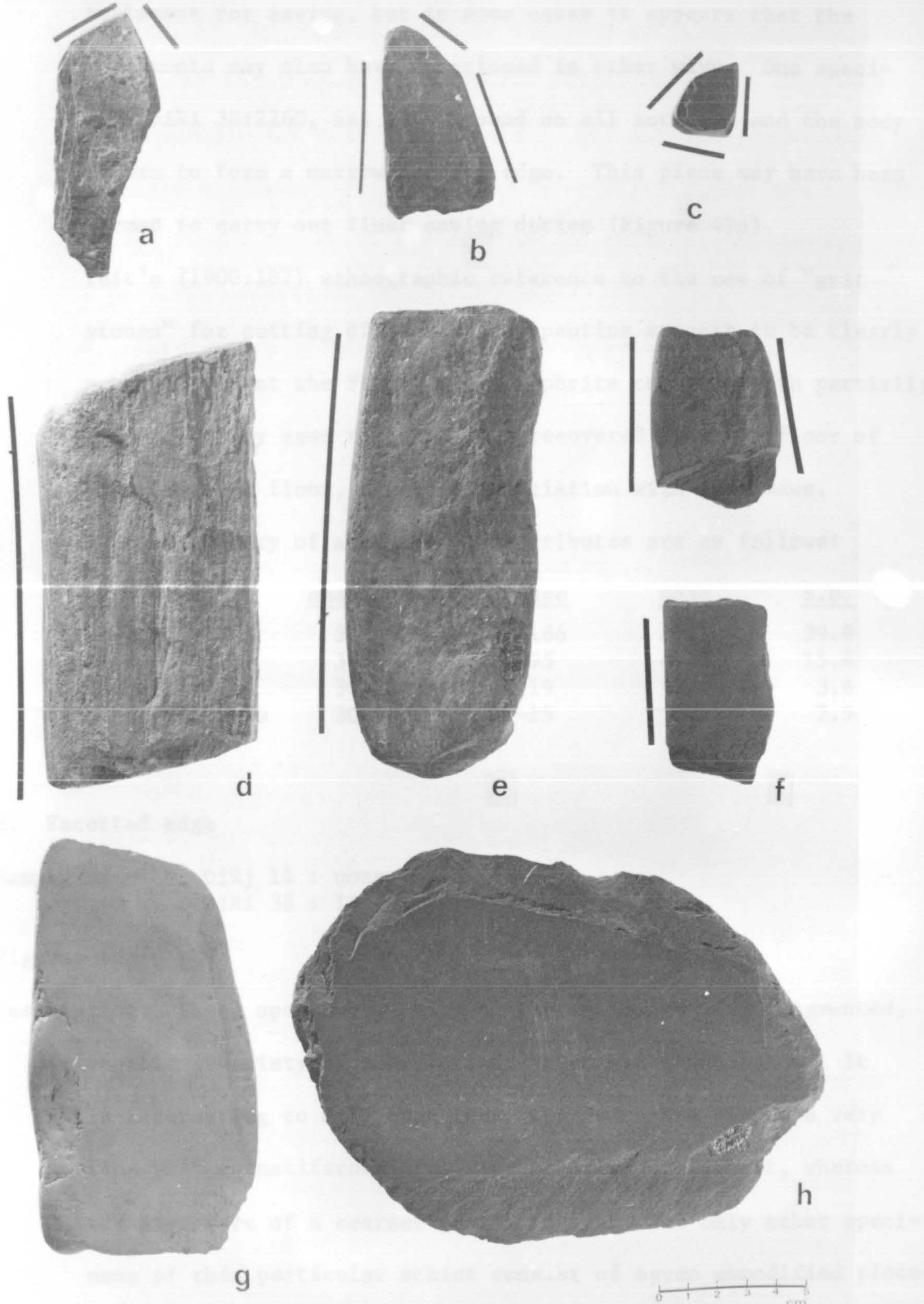


Figure 40

This surface abrasion may in part be a result of using the implement for sawing, but in some cases it appears that the implements may also have functioned in other ways. One specimen, DiRi 38:2260, has been ground on all surfaces and the body tapers to form a narrow cutting edge. This piece may have been formed to carry out finer sawing duties (Figure 41n).

Teit's (1900:182) ethnographic reference to the use of "grit stones" for cutting of jade and serpentine appears to be clearly substaniated at the Flood site. Nephrite cobbles, both partially and completely sawn through, were recovered from the floor of DiRi 38: HP#2 floor, in close association with such saws.

A brief summary of abrasive saw attributes are as follows:

Attribute	number	range	mean	S.D.
length	30	30-166	87.7	39.0
width	30	22-95	47.2	15.4
thickness	30	5-19	12.0	3.6
edge thickness	30	2-15	8.1	2.9

2. Facetted edge

Sample size: DiRj 14 : none
DiRi 38 : 16

Figure: 40a-c

Description: These specimens, which on the whole are very fragmented, exhibit a variety of edge forms. These are given below. It is interesting to note that these specimens are all of a very fine grit garnetiferous grey (14) or brown (2) schist, whereas the saws were of a coarser grained stone. The only other specimens of this particular schist consist of seven unmodified pieces included in with abrasive stones without visible wear. It is difficult to suggest a use or function for these specimens because of their fragmented nature. With respect to edge types, they resemble the edge ground talc. DiRi 38:1615 is the only complete specimen. It has two edges at right angles and a third convex side. The edges are squared and polished, suggesting a possible ornamental role.

A brief summary of facetted edge, abrasive stone attributes are as follows:

Attribute	length		width	thickness	
range	17-116		7-68	2-16	
edge type				combination	other*
number of specimens	5	2	1	3	5

* edge too damaged or fragmented to classify.

B. Abrasive slabs

Sample size: DiRj 14 : 3
DiRi 38 : 39

Figure: 40h-i

Description: These specimens exhibit varying degrees of abrasion over one (20) or both (22) surfaces. The specimens on the whole are very irregular in outline, partially due perhaps to the thin fragmented state. One specimen, DiRi 38:674 (Figure 40i) has been chipped to an oval shape. Two types of surface abrasion are present. Planar abrasion, or abrasion on a flat or slightly concave plane, predominates, being present on all of the specimens. One specimen also exhibits linear abrasion, that is, abrasion forming long narrow grooves. Abrasive grit varies in size, nine are relatively fine, the remaining thirty-three are coarse. A brief summary of abrasive slab attributes are as follows:

Attribute	number	range	mean	S.D.
length	42	18-181	81.8	43.3
width	42	7-131	53.3	29.0
thickness	42	5-31	13.7	7.2

C. Abrasives with no visible wear

Sample size: DiRj 14 : 2
DiRi 38 : 43

Figure: none

Description: These abrasives do not exhibit any form of wear as noted previously. This may be that the relatively poor state of preservation, and resulting surface corrosion, obliterated any evidence of use. It is, however, clear that all of these specimens were purposely brought to the sites. Twenty-five specimens are 60 mm. or less in maximum length and may represent corroded abrader fragments. The larger specimens may in part represent unused abrasive stones. A brief summary of the attributes of abrasive stones with no visible wear are as follows:

Attribute	number	range	mean	S.D.
length	44	21-311	75.5	54.4
width	45	9-155	43.6	29.1
thickness	45	4-55	11.2	9.8

D. Miscellaneous

Sample size: DiRj 14 : none
DiRi 38 : 1

Figure: 41o

Description: This specimen is a rectanguloid, formed piece of sandstone with a semi-circular longitudinal groove. In addition, two linear abrasion scars, (1 x 20 mm.) occur on one side. Similar implements have been described as shaft abraders or smoothers by Sanger (1970:90) and Nelson (1969:374-5). Overall measurements are 51 x 26 x 21 mm. The groove is 8 mm. in diameter and 3 mm. in depth.

III. Slate N = 950

Slate artifacts comprise a total of 32.7% of the total assemblage from DiRj 14 and DiRi 38. Through these specimens, an on site production of slate artifacts is evident. Linked with this, is the fact that slate fragments were sometimes reworked. Various groups of slate artifacts described are based on form and type of modification.

A. Points

Sample size: DiRj 14 : none
DiRi 38 : 4

Figure: 41a-d

Description: Of the four specimens, three are complete and one is a roughly shaped fragment. Because the complete specimens differ significantly and represent types, they will be described individually:

Figure 41: Slate, nephrite and sandstone artifacts.

Slate points (a-d)

Miscellaneous slate (e-h)

Nephrite point (i)

Pointed nephrite objects (j-l)

Miscellaneous nephrite object (m)

Miscellaneous abrasive stones (n-o)

Flood site

Component 1 (a,f,i,l,o)
2 (b,e,j,m,n)
5 (c,d,g,h,k)

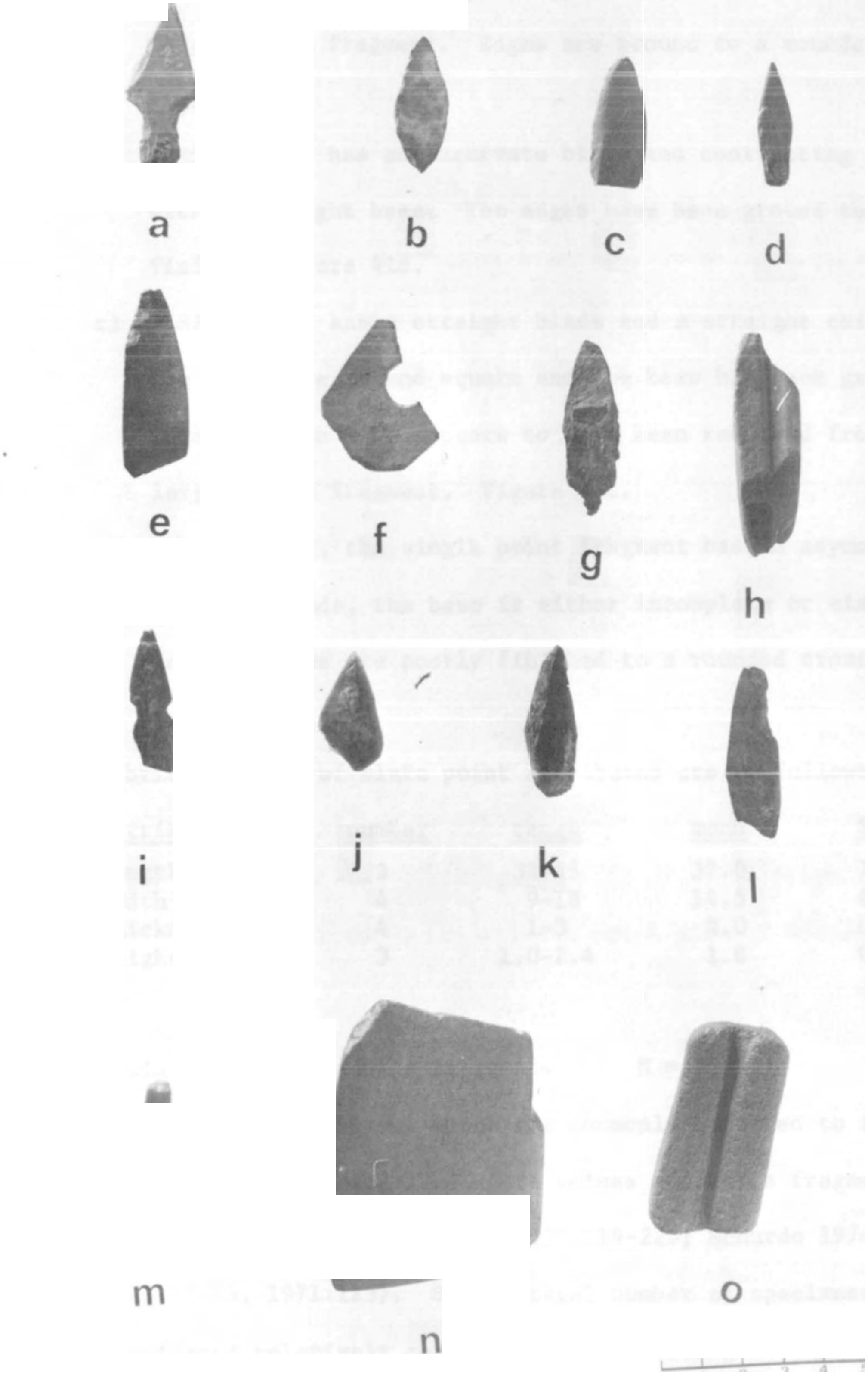


Figure 41

a) DiRi 38:412 is leaf-shaped, apparently reworked from a larger slate fragment. Edges are ground to a rounded finish. Figure 41b.

b) DiRi 38:1747 has an excurvate blade and contracting stem with a straight base. The edges have been ground to a rounded finish. Figure 41d.

c) DiRi 38:1946 has a straight blade and a straight chipped stem. The edges are ground square and the base has been ground thin. This specimen also appears to have been reworked from a larger slate fragment. Figure 41a.

d) DiRi 38:2041, the single point fragment has an asymmetric biconvex blade, the base is either incomplete or missing and the edges are poorly finished to a rounded cross-section. Figure 41c.

A brief summary of slate point attributes are as follows:

Attribute	number	range	mean	S.D.
length	3	31-45	37.0	7.0
width	4	9-18	14.5	4.4
thickness	4	1-3	2.0	0.4
weight	3	1.0-2.4	1.6	0.7

B. Ground slate knives and knife fragments N = 904

Included here are specimens which are commonly referred to in the archaeological literature as ground slate knives and knife fragments (e.g. Crowe-Swords 1974:98-105; Hanson 1973:219-225; McMurdo 1974:73-75; Mitchell 1963:73-76, 1971:113). Of the total number of specimens, only 5.6% are considered relatively complete. The remaining 94.4% are fragments. The large percentage of fragments is understandable when one considers the relative size and thickness of some of the complete specimens. One specimen, DiRi 38:1590 (A, B, C), 2135, 2137 (A, B), 2138-2140 has been reconstructed from nine separate pieces. The complete specimen measures 152 x 66 mm. and is only 2.0 mm. thick. (Figure 43g). Breakage of these specimens could be due to a number of causes, such as through use, accidental breakage, by being dropped or stepped on, or purposeful breakage, perhaps indicated by the ability to completely reconstruct a ground slate knife associated with a rock concentration and burial at DiRj 1 (von Krogh 1974:18, Plate VI-a). Crowe-Swords (1974:105) suggests fragmentation of slate knives was primarily due to use and this was most likely the major cause. The fact that slate fragments have been reworked has already been noted in discussing ground slate points. Further evidence of the reworking of larger slate fragments may stem from a general inability to reconstruct complete artifacts from fragments. This, also suggested by Crowe-Swords (1974:99), may lead us to suspect that larger fragments may have been reworked into smaller knives or other tools. The distribution of slate fragments by maximum length (Figure 42) shows the overall small size of discarded specimens.

A number of suggestions as to the function of these tools have been made. Duff (1952:66) states that ethnographically "...the older women use a steel knife with a wooden back, a close facsimile of the old ground-slate knives." Borden (1968:19) also feels that ground slate knives were utilized in fish preparation. Crowe-Swords (1974:104) suggests they were a multi-purpose tool. He feels they may have been used in the preparation of wild potatoes at the Carruthers site. However, the exact function(s) of these tools has yet to be determined,

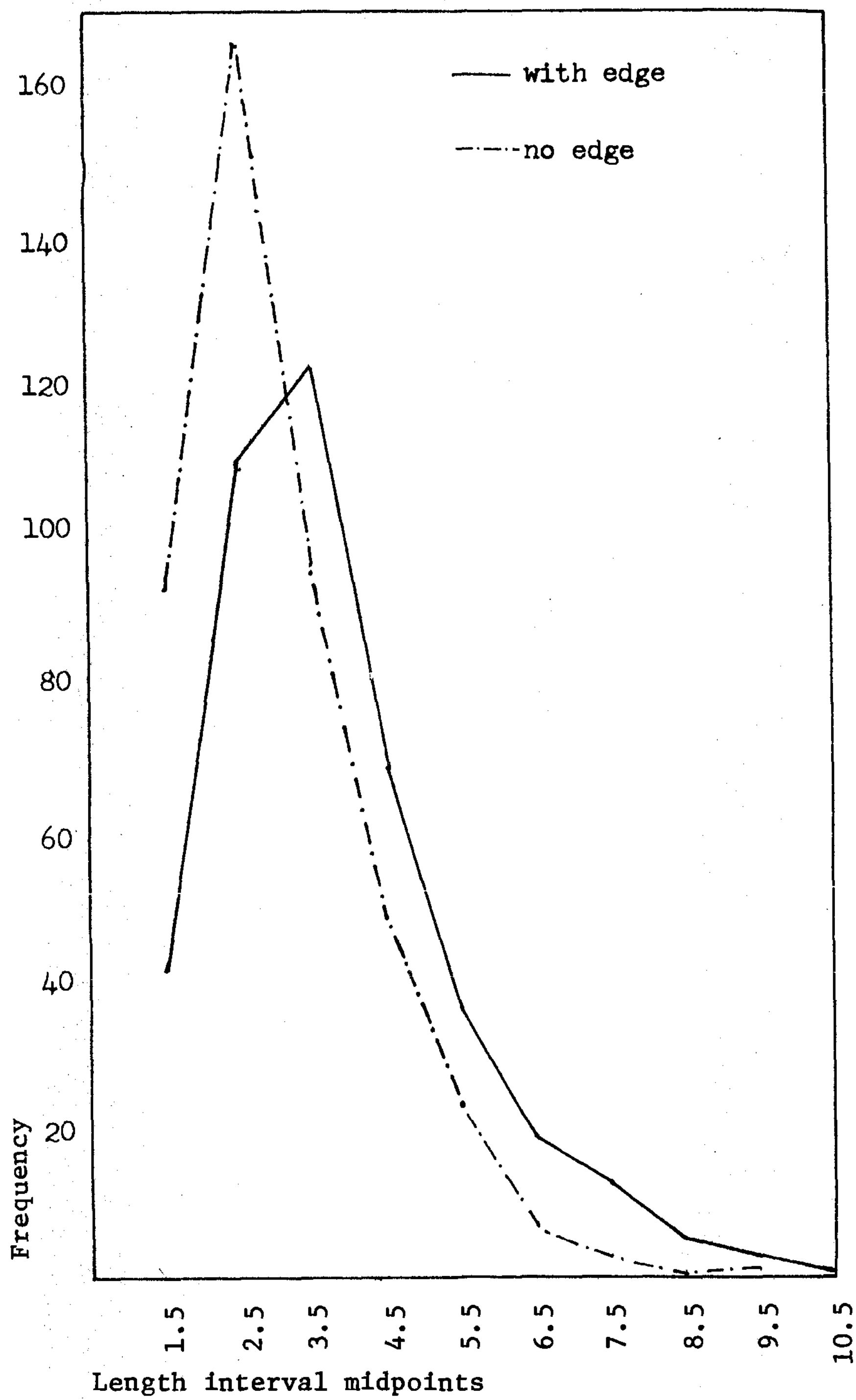


Figure 42: Maximum length distribution of ground slate fragments.

possibly from a detailed study of edge wear patterns. In discussing the ground edge styles of slate knife and knife fragments, the types identified by Crowe-Swords (1974:99) will be used. These are:

Edge Type I: One surface has been ground in a curved or rounded fashion and the other surface has been bevelled.

Edge Type II: Both surfaces have been ground in a curved or rounded fashion.

Edge Type III: One or more edges have been grounded flat to form the back of a knife.

Edge Type IV: One surface has been ground flat to the edge and the other has been ground in a curve to form the cutting edge.

Edge Type V: Both surfaces have been bevelled to form a cutting edge.

Edge Type VI: One surface has been bevelled and the other ground flat to form a cutting edge.

An additional miscellaneous type has been added for slate fragments that exhibit more than one of the edge types described above.

1. Relatively complete ground slate knives

Sample size: DiRj 14 : 4
DiRi 38 : 47

Figure: 43

Description: Included as relatively complete ground slate knives are those specimens from which it is possible to determine a length and/or width measurement of the original complete specimen. These pieces therefore have two complete sides and/or ends, as identified by the presence of ground or chipped-to-form edges. In all cases two ground surfaces are present. Twelve specimens are essentially complete, thirty are end fragments and nine are mid portions. The twelve complete specimens show distinctive

Figure 43: Ground slate knives.

Pipeline site

Component 4 (e,f)

Flood site

Component 1 (d,i)
4 (g)
5 (a,b,c,h)

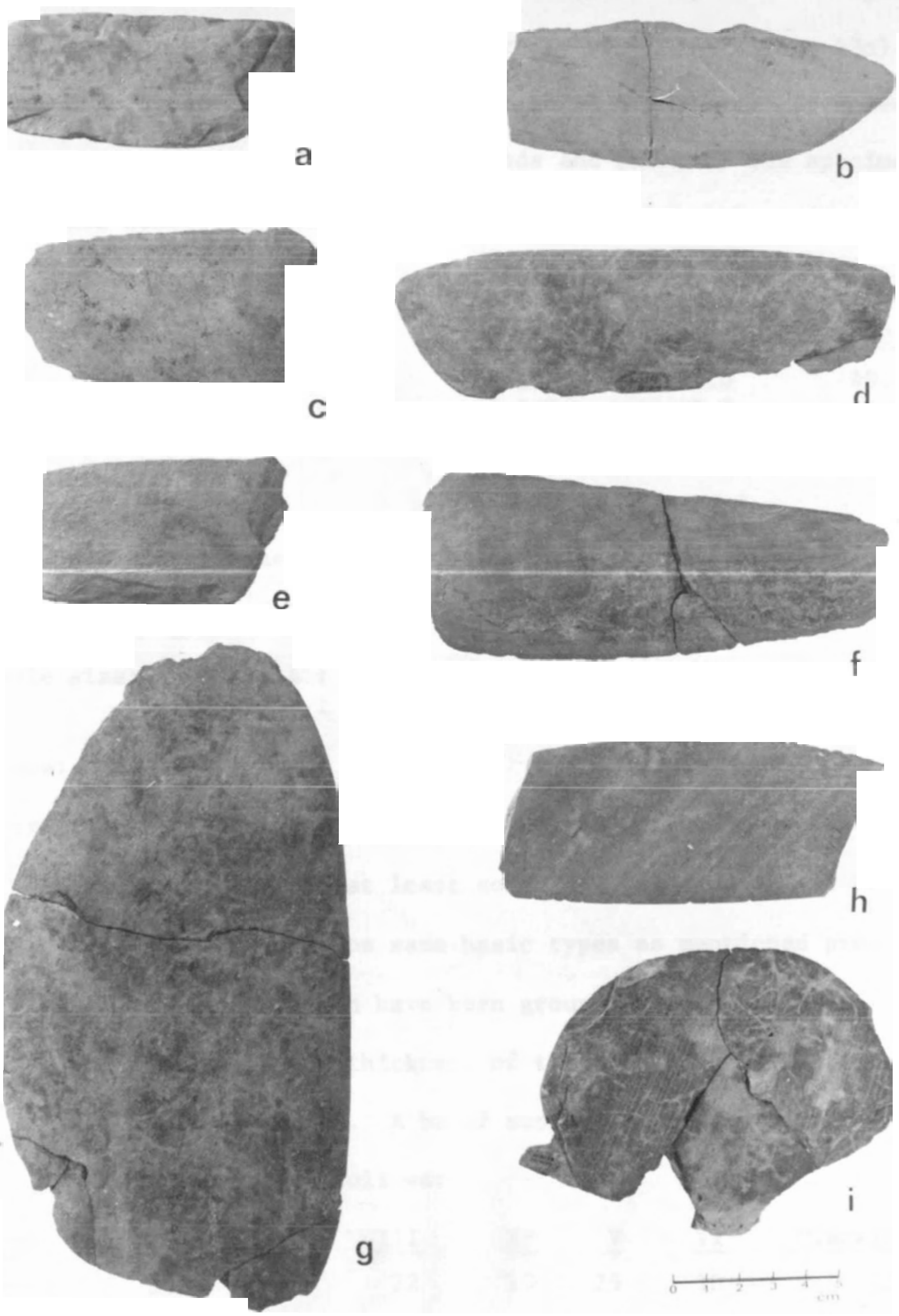


Figure 43

outlines. Seven are generally parallel-sided with squared to rounded ends, or roughly rectanguloid (Figure 43a). Three have a curved blade with a relatively straight back (Figure 43b) one thick, crudely made specimen is ulu-like (Figure 43n). Edge types are a combination of those described. As noted by Crowe-Swords (1974:101), the ends and backs of the specimens are sometimes dulled by grinding. A brief summary of ground slate knife attributes are as follows:

Attribute	number	range	mean	S.D.
length	11	66-198	116.0	40.2
width	50	33-106	53.0	14.0
thickness	51	2-6	2.8	0.7

2. Ground slate fragements N = 853

a) with an edge portion

Sample size: DiRj 14 : 7
DiRi 38 : 410

Figure: none

Description: These specimens, most probably ground slate knife fragments, exhibit at least some edge grinding in all cases. Edge forms are of the same basic types as mentioned previously. All but one specimen have been ground on both surfaces. The maximum length and thickness of the specimens is illustrated in Figure 42 and 44. A brief summary of ground slate fragment edge types are as follows:

Type	I	II	III	IV	V	VI	Miscellaneous
Number	33	248	72	17	25	10	12
%	7.9	59.5	17.3	4.1	6.0	2.4	2.8

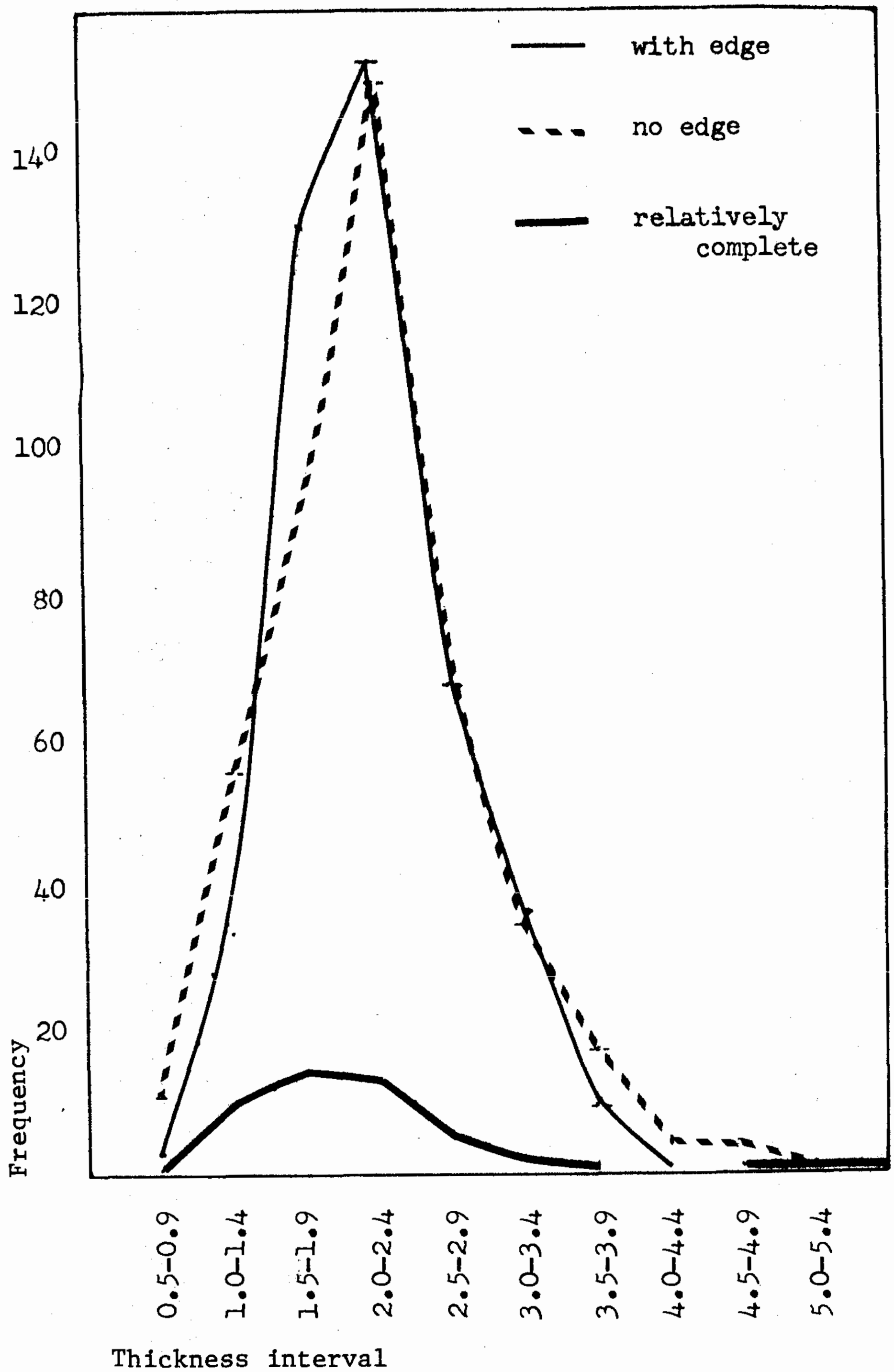


Figure 44 : Ground slate thickness distribution.

b) without an edge portion

Sample size: DiRj 14 : 5
DiRi 38 : 431

Figure: none

Description: These specimens are ground on one (91) or both (345) surfaces, but do not exhibit edge grinding. These specimens are again most probably ground slate knife fragments, but may also include fragments resulting from the production of slate knives from raw slate. See Figure 42 and 44 for the maximum length and thickness distribution of these specimens.

D. Chipped Slate

Sample size: DiRj 14 : 10
DiRi 38 : 28

Figure: none

Description: These specimens are representative of the initial stage of the on site manufacturing of slate artifacts. As noted by Hanson (1973:218-219), the raw slate appears to have been blocked out and initially shaped by percussion, and then subsequently ground. Although the sample of chipped slate is relatively small, it shows a wide range in modification. Briefly, this can be summarized as minimal abrasion on one (13) or both (4) surfaces, minimal edge abrasion (2) and finally those specimens that have only been chipped (19). The relatively small sample of these specimens may be explained in that slate does not occur naturally at the site. It would therefore have to necessarily have been brought in from a source. The result appears to be relatively little waste of the raw material. A brief summary of chipped slate attributes are as follows:

Attribute	number	range	mean	S.D.
length	38	20-142	59.8	26.5
width	38	11-85	37.6	18.7
thickness	38	13-130	53.8	28.7

D. Miscellaneous Ground Slate

Sample size: DiRj 14 : none
DiRi 38 : 4

Figure: 41e-h

Description: As these specimens differ considerably, a brief description of each will be given.

a) DiRi 38:982, though broken, has the remnant of a biconically drilled hole, 9.8 mm. in diameter, through it. Both surfaces are ground and the intact edges are of the Type III style. Figure 41f. (30 x 29 x 2 mm.)

b) DiRi 38:214, irregular in outline, has been ground on all surfaces to a semicircular cross-section. Two grooves, along the longitudinal axis, have been ground into the base and one side. A thin segment has been broken off the flat base. Figure 41h. (55 x 16 x 9 mm.)

c) DiRi 38:1368 has Type III edges on both sides, and the Type II edge to the base. The other end is broken, and may once have been pointed. The complete end is at an angle to the longitudinal axis. In outline it is generally leaf shaped. Figure 41e. (48 x 15 x 2 mm.)

d) DiRi 38:2845 is point shaped in outline, but is relatively thick and only edge ground. The surface is very irregular. A small "stem" has been formed by cut-abrasion at the base.

Figure 41g. (44 x 14 x 5.5 mm.)

IV Talc N = 148

Talc is a soft stone, with a hardness of 1-2 and a specific gravity of 2.7-2.8. It is formed from hot water alteration of magnesium silicate minerals and can vary in color from a white powder, to very light green, green-grey or black (Loy, et al, 1974b:35). Steatite, a massive,compact cryptocrystalline rock, and soapstone, a talcose rock which is very soft and easily sawn, are both varieties of talc (Leaming 1973:75). Two talc deposits in the Fraser Canyon area are atthe confluence of the Nahatlatch and Fraser Rivers, nine miles north of Boston Bar and in the Coquihalla River Valley, northeast of Hope. These and other talc deposits are listed by Leaming (1973:71).

Artifacts described here primarily entail varieties of talc, though a few specimens of an unknown, but very soft, stone have also been included. Unmodified talc specimens are on the whole very small fragments. These are included with the debitage.

A. Edge ground

Sample size: DiRj 14 : none
DiRi 38 : 61

Figure: 45i-m

Description: These specimens uniformly exhibit edge grinding and a lack of surface grinding. Twenty-five are considered complete, in that they have relatively intact edges. On the basis of overall size, two groups are evident. There is, however, little difference between these groups other than size. Figure 46

Figure 45: Pecked and edge or surface ground talc.

Pecked talc (a-c)

Surface ground talc (d-h)

Edge ground talc (i-m)

Flood site

Component 1 (h)
2 (b,c,f,g,l)
4 (i,k,m)
5 (a,d,e,j)

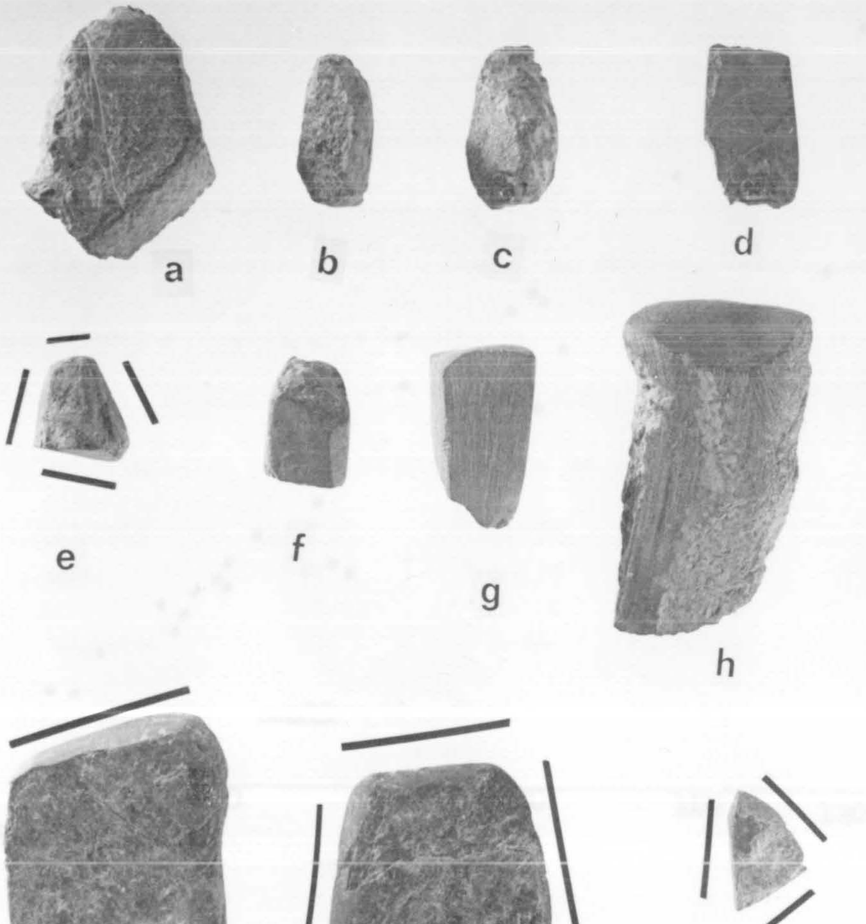


Figure 45

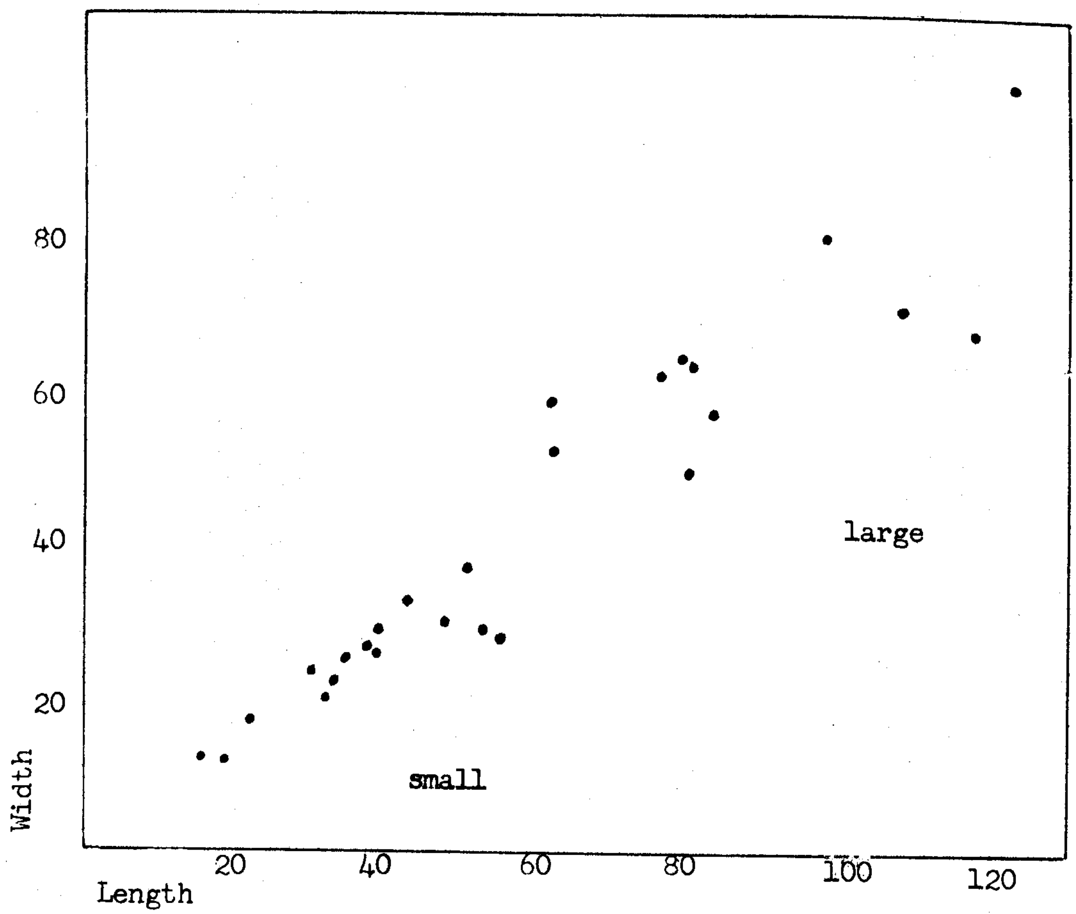


Figure 46: Length-width measurements of complete edge ground talc specimens.

gives the length-width measurements.

Thirty-six fragments can not be adequately placed into either of these groups. One fragment, DiRi 38:1492 is unusual in that it has a serrated edge formed by narrow grooves cut perpendicular to a V-shaped ground edge. The edge forms are a result of planar abrasion in all cases. In outline, the complete specimens are roughly rectangular (4), triangular (7), oval (8), round (1) semicircular (1) and irregular (3). A brief summary of edge ground talc attributes are as follows:

Attribute	number	range	mean	S.D.
length	25	16-122	58.8	30.7
width	25	12-102	43.0	24.1
thickness	25	4-34	14.0	9.6

Edge type:	Squared	V-shaped	U-shaped	bevelled	fragmented
as single edge type	26	6	2	5	5
as multiple edge type	11	4	6	8	1

B. Surface ground talc N = 42

These specimens are separated into two groups, those that only exhibit surface abrasion and those that also have biconically drilled perforations or show evidence of having drill scars.

1. Surface ground

Sample size: DiRj 14 : none
DiRi 38 : 36

Figure: 45d-h

Description: These specimens all exhibit surface abrasion and, in most cases, at least some edge abrasion. In six specimens it is evident that pecking, as indicated by surface pitting, preceded abrasion. Four specimens also exhibit linear abrasion in the form of narrow grooves along the longitudinal axis. One specimen DiRi 38:341 is shaped like a small adze with a single bevel bit. The butt end is broken or unfinished. The extreme softness of this piece precludes its use as an actual adze. It may thus have served a decorative purpose, or perhaps as a child's toy. Twenty-six specimens are relatively complete. A brief summary of surface ground talc attributes are as follows:

Attribute	number	range	mean	S.D.
length	26	10-95	38.6	21.5
width	26	3-65	21.0	13.4
thickness	26	2-51	12.8	11.9

2. Surface ground and drilled

Sample size: DiRj 14 : none
DiRi 38 : 6

Figure: 47f; 48a-e

Description: These specimens, as well as being surface ground also exhibit one or more drill scars. The reason why these specimens were drilled is not entirely clear. One (DiRi 38:1445, 2545) has three biconically drilled perforations as well as two other drill scars (Figure 47f). Two specimens (DiRi 38:1634 and 2013) may have been intended as perforated pendants (Figure 48c,e) and DiRi 38:1097 as a bead(?) (Figure 48d). Of the remaining two specimens, one is semicircular with a flat base. Into this base, a shallow depression has been drilled (Figure 48b). Finally DiRi 38:1018 is rectangular in outline, oval in cross-section

Figure 47: Soft stone artifacts.

Beads (a-b)

Pipe fragments (c-e,j)

Surface ground and drilled (f)

Pendants (g-i)

Carvings (k-n)

Pipe preforms (o-p)

Pipeline site

Component 4 (n)

Flood site

Component 2 (a,e,f,h)
4 (j)
5 (b,c,d,g,i,k,l,m,o,p)

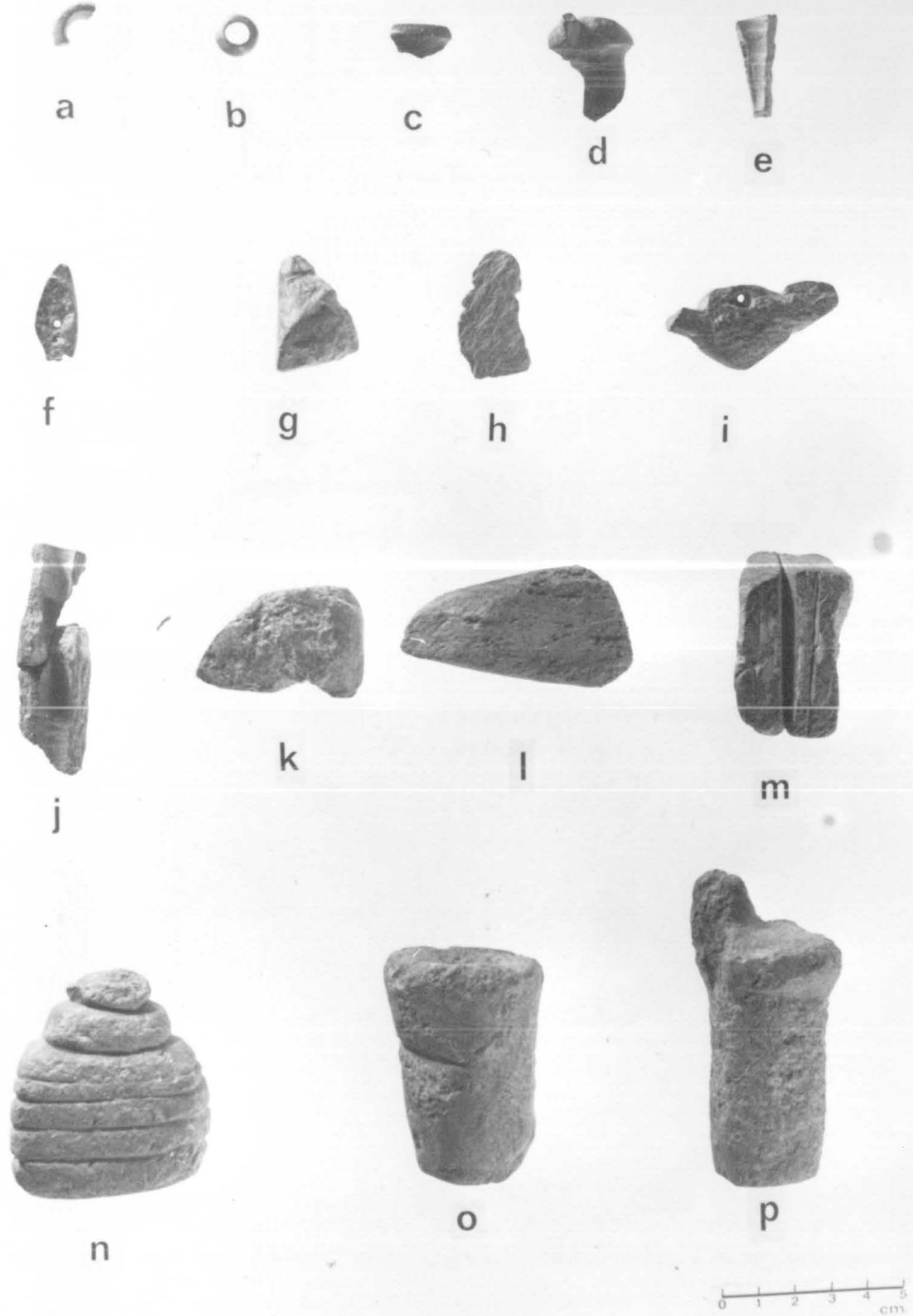


Figure 47

Figure 48: Soft stone artifacts. (Actual size)

Surface ground and drilled (a-e)

Pipe fragments (f-h)

Flood site

Component 2 (b,c,f)
5 (a,d,e,g,h)

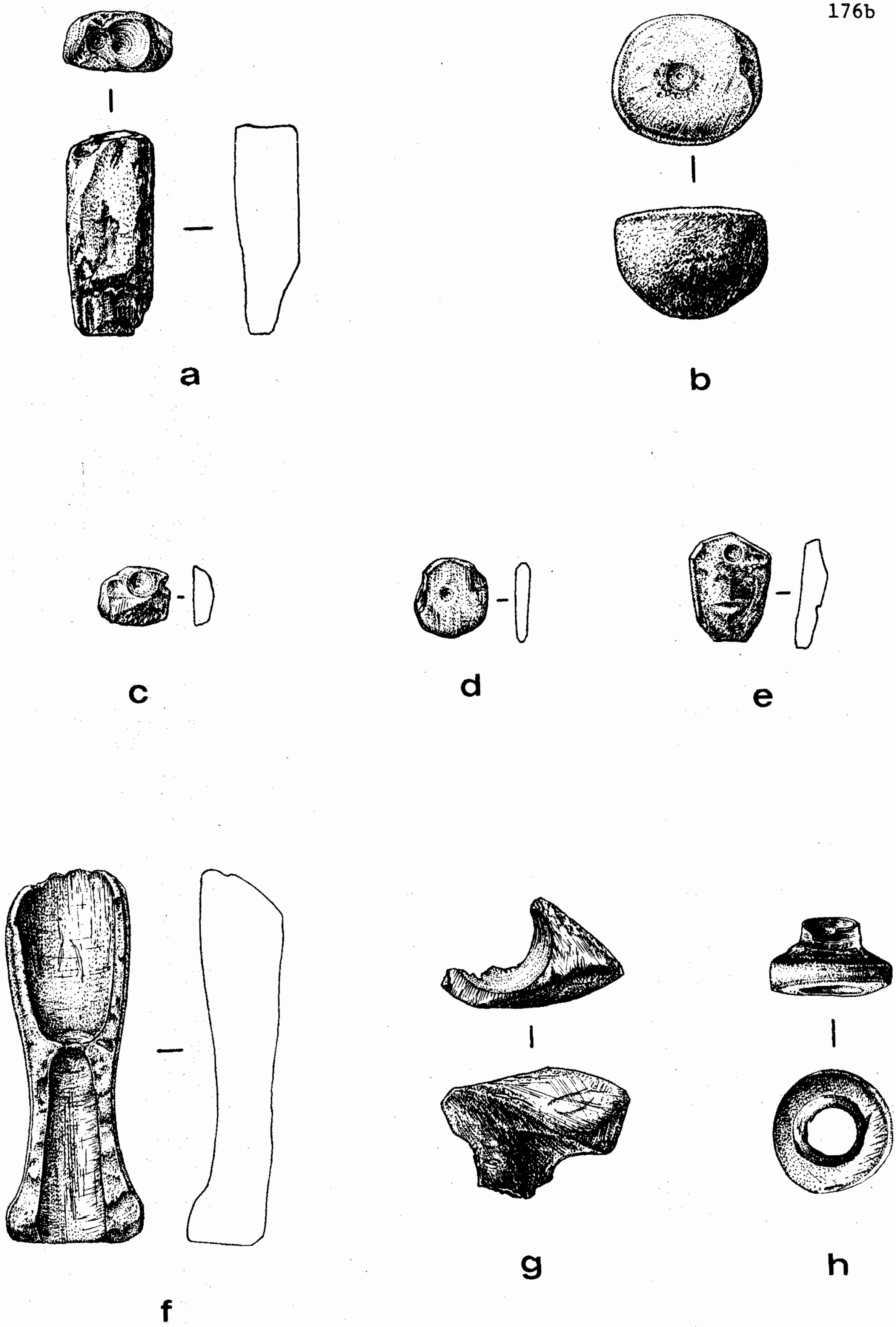


Figure 48

and has one end that exhibits two relatively deep (6mm.) drill scars. (Figure 48a). A brief summary of ground and drilled talc attributes are as follows:

Attribute	number	range	mean	S.D.
length	6	12-36	20.1	10.6
width	6	10-24	14.7	4.9
thickness	6	3-20	8.0	6.5

C. Pecked talc

Sample size: DiRj 14 : none
DiRi 38 : 16

Figure: 45a-c

Description: These specimens exhibit modification primarily in the form of surface pitting. In addition, eight specimens also have scars indicating they have been sawn. These specimens are clearly indicative of the on site working of talc and are representative of an initial shaping stage of soft stone implement production. Shapes of the individual pieces vary with the degree of modification and fragmentation. A brief summary of pecked talc attributes are as follows:

Attribute	number	range	mean	S.D.
length	16	22-98	51.3	24.4
width	16	11-48	28.2	12.2
thickness	16	7-25	14.4	5.6

D. Talc pipes N = 8

The eight specimens described below represent various stages of on site manufacturing of talc pipes. All of these specimens appear to be of a tubular variety (Sanger 1970:90). Teit (1930:42) describes the manufacture of pipes among the Coeur D'Alene:

> "Pipes were of soapstone. The stone was cut with quartz crystals, arrowstones or animal's teeth, filed into shape with knives and files and drilled with perforators."

A similar technique may have been used in the Hope-Yale locality.

1. Pipe preforms

Sample size: DiRj 14 : none
DiRi 38 : 2

Figure: 47o-p

Description: These specimens are formed to a regular cylindrical shape with worked ends. DiRi 38:271 (Figure 47p) is pecked with only very little surface abrasion. DiRi 38:1958 (Figure 47o) is surface ground with a number of linear abrasion grooves. Both ends have been pecked, forming shallow depressions which may have served as a base for the later drilling of perforating holes. Even though neither specimen has actually been drilled, it is suggested that these specimens were undergoing preliminary preparation of pipe manufacturing. A brief summary of pipe preform attributes are as follows:

Attribute	DiRi 38:271	DiRi 38:1958
length	85	58
width	32	40
thickness	28	38

2. Pipe fragments

Sample size: DiRj 14 : none
DiRi 38 : 7

Figure: 47c-e,j

Description: Unfortunately no complete pipes were recovered during the excavations. The fragments included here all exhibit bowl and/or stem drilling. Surface finish varies from very rough (1), to smoothed (4), to a high polish (2). Only one specimen, DiRi 38:1934, is complete enough for typological distinction (Figure 48f). It is very similar to tubular pipes described and illustrated by Sanger (1970:75,90) and Mitchell (1963: Figure 13b). It is interesting to note that the formed biface, DiRi 38:1418, a drill and from the same component as DiRi 38:1934 , fits exactly into the stem portion of the pipe fragment. This exact fit is more than suggestive that this drill, or one identical to it, may have been used in boring the pipe stem. Unfortunately, wear patterns on these two pieces do not confirm this speculation.

Decoration, in the form of incised lines and/or formed protrusions on the pipe bowl rim, is present on three specimens. DiRi 38: 1592 has such a protrusion on which a biconvex eye-like form has been scratched (Figure 48g). Incised lines, when they occur, are irregular and unpatterned, occurring on bowl fragments. The three base fragments are all of an expanding with rim type, Figure 48h. Pipe bowl lips are of a straight (3) or rimmed (2) style. DiRi 38:1749 is a pipe stem base fragment that has been ground flat at the break. This reworked piece may have thus served as a bead or other decorative object, Figure 48h. A brief summary of pipe fragment attributes are as follows:

Attribute	number	range	mean	S.D.
maximum length	1	(66.0) -	-	-
maximum width	2	22-33	27.5	7.8
estimated diameter bowl	4	17-18	17.8	0.5
estimated diameter mouthpiece	3	11-12	11.7	0.6

E. Pendants

Sample size: DiRj 14 : none
DiRi 38 : 9

Figure: 47g-i ; 49a-f

Description: Pendants, defined as objects or ornaments which have been girdled, grooved or perforated (Loy, et al, 1974:24), can be of a wide variety of shapes and forms. As the nine specimens recovered reflect this variation, each will be briefly described.

a) DiRi 38:452 is a perforated pendant with a bird-like design and polished finish. A shallow depression has been drilled into the "beak" area, Figure 49a. The perforation is biconically drilled at an angle, from one side to the base. This specimen is reminiscent of a larger figurine recovered by Hanson (1973:240 Figure 76d) at the Katz site. (31 x 20 x 18 mm.)

b) DiRi 38:1084, a biconically drilled pendant, has a rough, perhaps unfinished surface. One end has been broken. Although a few lines and grooves are cut into the surface, no identifiable pattern is apparent. Figure 47i. (50 x 23 x 12 mm.)

c) DiRi 38:1682, a biconically perforated pendant with a smoothed surface, is triangular in cross-section. It is unusual in that it has many grooves cut perpendicular to the edges. Figure 49b. (30 x 21 x 18 mm.)

d) DiRi 38:455 is a flat, unfinished specimen. It has grooves cut into its edges, possibly to facilitate suspension. Figure 47h. (35 x 17 x 3.5 mm.)

Figure 49: Soft stone pendants and carvings. (Actual size)

Pendants (a-f)

Carvings (g-h)

Flood site

Component 2 (a,b,c,d,f)
4 (h)
5 (e,g)

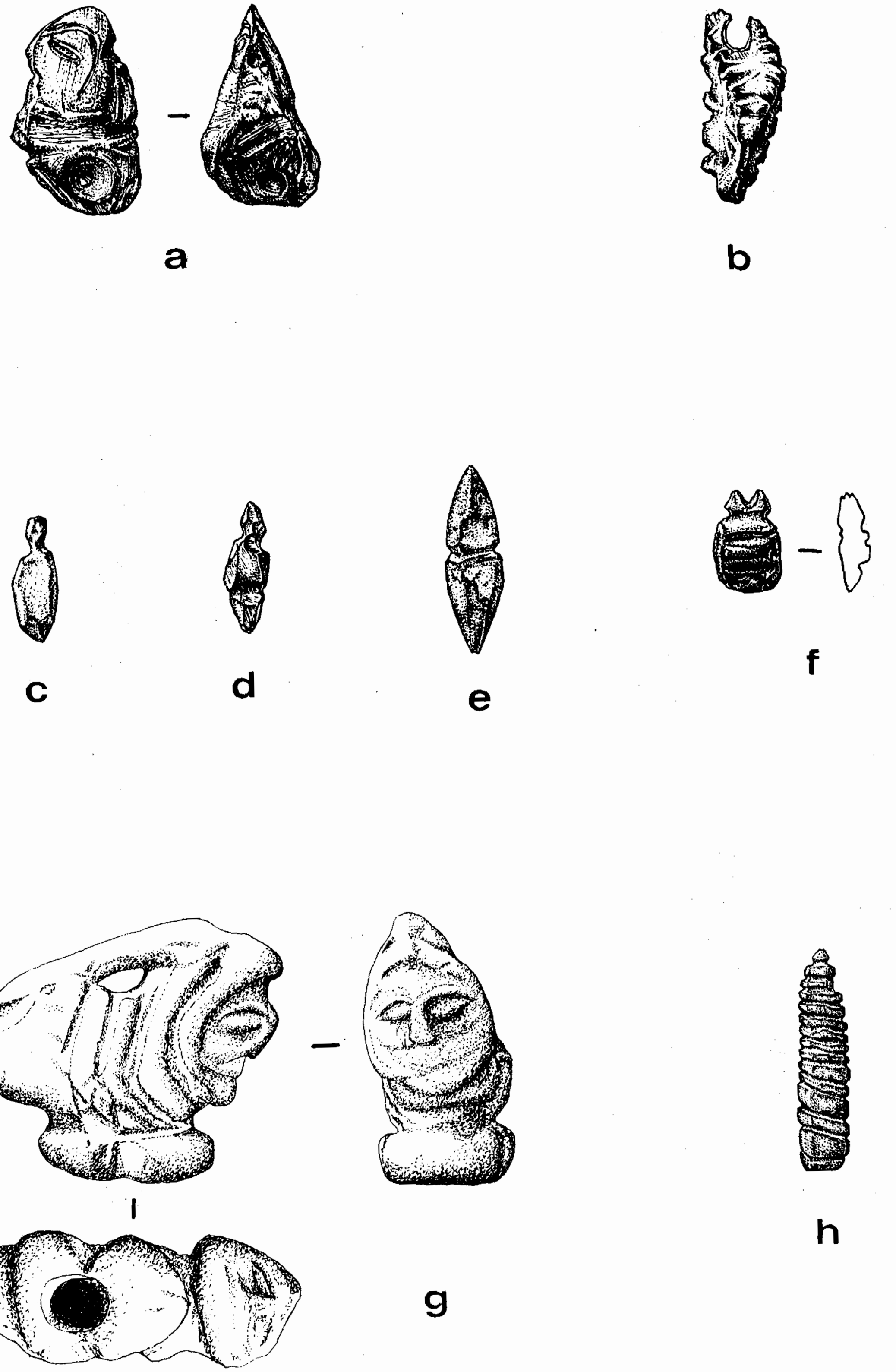


Figure 49

e) DiRi 38:1136, a girdled pendant with a smoothed surface, is pyramidal in shape. It has a possibly facial design on one surface. Figure 47g. (31 x 25 x 18 mm.)

f) DiRi 38:783 is a small girdled pendant with an incised and pecked design and a smoothed finish, Figure 49f. (15 x 11 x 5 mm.)

g) DiRi 38:1681 is a small girdled pendant with a relatively rough, unfinished surface. No design is evident, Figure 49c. (19 x 11 x 4 mm.)

h) DiRi 38:1517 has two girdling rings. The surface is smoothed but with no visible design, Figure 49d. (19 x 7 x 5 mm.)

i) DiRi 38:574 is bipointed in outline, oval in cross-section and girdled. The specimen has a smoothed surface, Figure 49e. (28 x 9 x 5 mm.)

F. Beads

Sample size: DiRj 14 : none
DiRi 38 : 2

Figure: 47a,b

Description: The two examples of stone beads are cylindrical with a relatively large perforating hole. One specimen is complete, and has a tapered perforation and quite irregular ends. It is possible that this specimen may represent a portion of a tubular pipe stem that has been roughly reworked into a bead, Figure 47b. The other specimen is a fragment, Figure 47a. A brief summary of bead attributes are as follows:

Attribute	DiRi 38:2000	DiRi 38:1763
thickness	11	15
outside diameter	6-7*	9
inside diameter	7*	9

*estimated assuming symmetry

G. Carvings

Samples size: DiRj 14 : 1
DiRi 38 : 10

Figure: 49g-h; 50

Description: These specimens, though few in number, show a wide diversity in form. As explained by Duff (1975:15), the real meaning of stone carvings or sculptures is impossible to know when the carver leaves no explanation. A brief description of each specimen will however be given.

a) DiRj 14:429 is a ringed object with six grooved rings encircling its rectangular outline. The base, which is flat and smooth, appears as though it may have been used as a pestal. The finish is generally smooth, Figure 47n. (57 x 51 x 33 mm.)

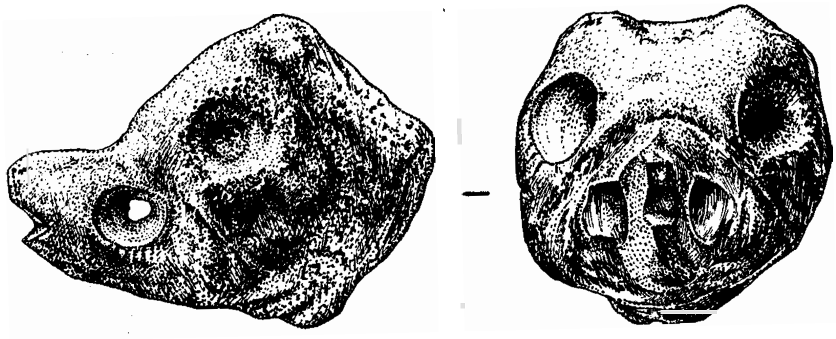
b) DiRi 38:1410, a slender elongated ringed object, has four encircling grooves at the top, followed by a spiral groove which encircles the piece ten times. The surface is smooth and there is no visible wear. Figure 49h. (34 x 7 x 4 mm.)

c) DiRi 38:1823, a complete anthropomorphic carving, Figure 49g, was included by Wilson Duff (1975) in the "Images Stone B.C." collection. Duff (1975:170) writes the specimen has an "...expressive face which is very difficult to see, but

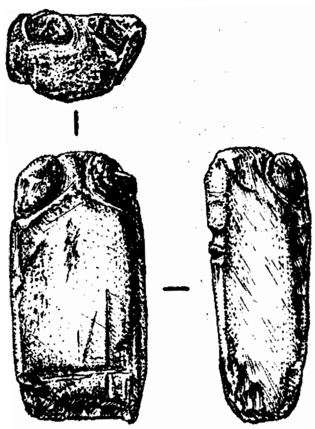
Figure 50: Soft stone carvings. (Actual size)

Flood site

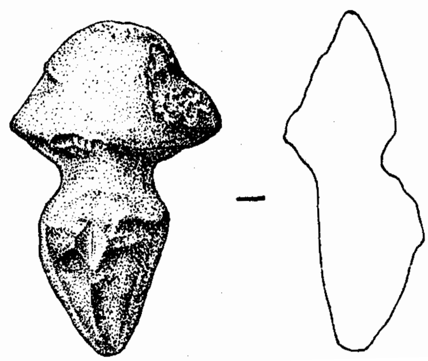
Component 2 (b)
5 (a,c,d,e)



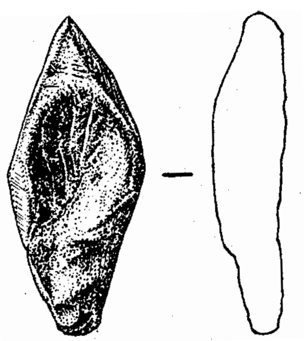
a



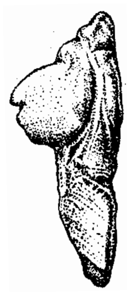
b



c



d



e

Figure 50

worth the effort." The body is ribbed and has a perforation, possibly for suspension, towards the top edge. The base is a round-rimmed platform with two V-notches, one on either side. Drilled into the base, is a hole 7 mm. in diameter and 11 mm. deep. Wear, in the form of polish, though not well defined, occurs on all parts of the base platform and in the basally drilled hole and upper portion of the carved perforation. This piece may have had limited functional use as a bow drill bearing, similar to a specimen described by Stryd (1974:376). (48 x 40 x 2.0 mm.)

d) DiRi 38:1739 is a small, possibly antrhopomorphic, carving, The facial area is defined by a humanoid profile, though no well defined features are present. The specimen has been smoothed, but not polished. Figure 50e. (35 x 14 x 15 mm.)

e) DiRi 38:1637 quite clearly portrays the head of a small "bear". The two eyes are represented by drilled depressions 11 mm. in diameter and with a maximum depth of 6 mm. Through the snout is a biconically drilled perforation. Much of the surface has been pecked to shape, and in this way two "ears" have been formed. The specimen is incomplete and a encircling ring about the neck appears just before a rough broken surface, where this specimen appears to have broken from a larger piece. Figure 50a. (57 x 42 x 42 mm.)

f) DiRi 38:449 is a complete zoomorphic carving. Little is present in the form of decoration other than two large bulging "eyes" and a grooved line, possibly delineating the "head" area. The opposite end of the rectangular body has been pitted and, on the surface near the pitting, are some linear abraded grooves. Figure 50b. (36 x 19 x 12 mm.)

g) DiRi 38:1544 is a fragment, consisting of a zoomorphic "head" broken off at the "shoulder." The surface has been smoothed and has no features other than two small "ears" at the top of the shaped "head." Figure 50c. (44 x 26 x 15 mm.)

h) DiRi 38:1709 is a small vessel-like object, diamond-shaped in outline with an oval depression in the center. The surface has been smoothed and has no decoration. Figure 50d. (42 x 19 x 9 mm.)

i) DiRi 38:7 has been shaped and smoothed on all surfaces. It is triangular in cross-section and tapers from a squared end by way of a convex edge to a point. There is no decoration. Figure 47k. (47 x 30 x 22 mm.)

j) DiRi 38:173 is similar to the previous specimen in form, but very unlike all the other specimens in that it is not made from talc, but rather some other type of soft stone. This specimen is made from a red-colored, fine granular rock. It has undergone considerable corrosion towards the thick end. This specimen has been included here, even though it is not of talc, because it is another type of modified soft stone. Figure 47l. (61 x 32 x 20 mm.)

k) DiRi:2396 is very irregular in shape and outline. It has four distinct V-shaped grooves cut into its surface. The largest of these extends across one face and two ends. This is flanked by two parallel grooves on the face. The remaining three grooves occur one on each side. Two sides are concavely abraded at an angle to the longitudinal axis. Both ends exhibit pitting. Figure 47m. (47 x 31 x 24 mm.)

V. Nephrite

Included here under the general heading of "nephrite" are objects of jadite, nephrite and serpentine. Jadite and nephrite, often included together under the generic name of jade, are two distinctly different materials.

All three materials are found in the Hope-Yale locality, specifically in the beds of the Fraser and Coquihalla Rivers. Leaming (1973:71) gives more detailed descriptions of these and other locations.

On the whole, these materials span a range of hardness from 3-4 to 7.0. They can and sometimes do, look similar to each other and archaeologically, in the assemblages described here, were modified using the same general techniques. By far the largest number of implements described here are nephrite, less are of jadite and very few of serpentine. Specific gravity is of most use in determining the raw material type, however, it was difficult using equipment on hand, to accurately determine the specific gravity of the many small specimens. For the larger specimens, this data is provided. From it we clearly see that two sawn cobbles are serpentine, the two others fall in the range for nephrite. Few tools or tool fragments, however, appear to be made from serpentine. Refer to Loy, et al. (1974b) and Kirkaldy (1963) for more specific descriptions of these three materials.

Within the nephrite group of artifacts we can again trace the on site manufacturing of implements. Present are sawn nephrite cobbles, chipped nephrite, nephrite preforms, finished nephrite tools, tool fragments as well as reworked nephrite fragments, all part of the manufacturing process. Unmodified nephrite, as represented by two cobbles and numerous small fragments, are not included in this analysis, but rather with the debitage.

A. Nephrite Point

Sample size: DiRj 14 : none
DiRi 38 : 1

Figure: 41i

Description: The single nephrite point is leaf-shaped, with a ground, flat base. Two side notches have been ground into the edges of the point, just below the midline. The blade edges are ground to a rounded finish. (35 x 10 x 2 mm.; neck width 8 mm.)

B. Adze Blades

The adze blades described here are roughly rectanguloid in outline, have a butt, with a bit on the opposite end. Similar specimens have also been termed celts (Mitchell 1971:113) or chisels (Loy, et al 1974b:7). Distinctions of these types have been made on the basis of edge types. In the groups here, the specific edge type, either single or double bevelled, will be given. However, the primary criteria for separating these specimens into three groups is on an overall size distribution. Figure 51 shows the length-width measurements. Adze blade bit types are shown in Figure 52.

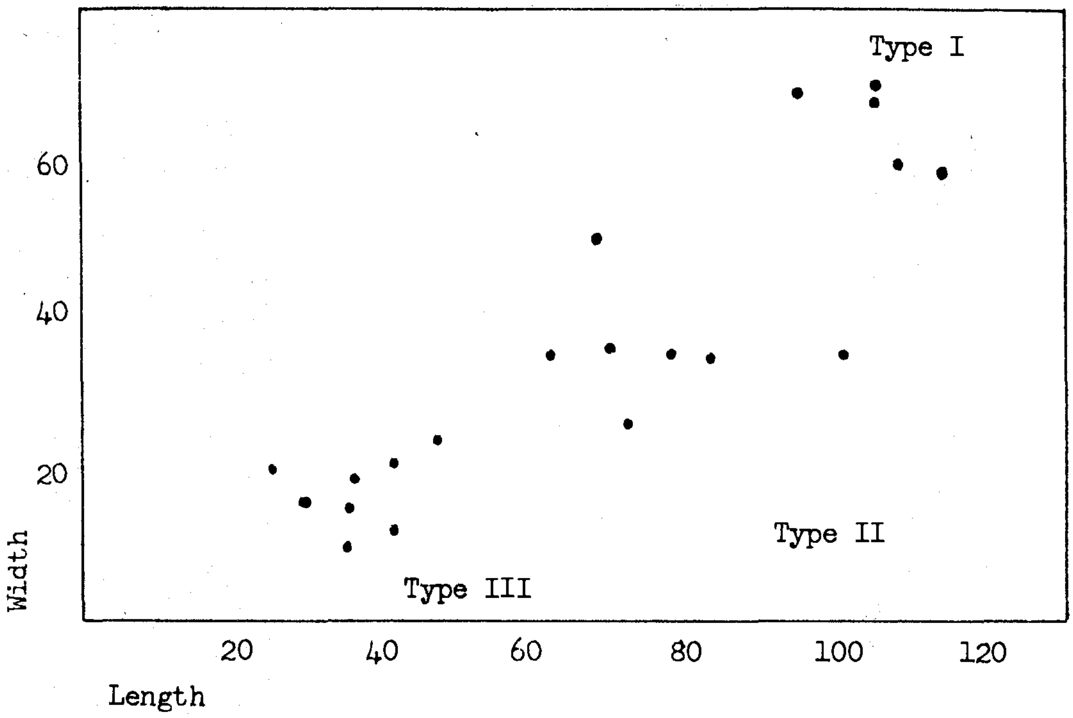


Figure 51: Length-width measurements of adze blades.

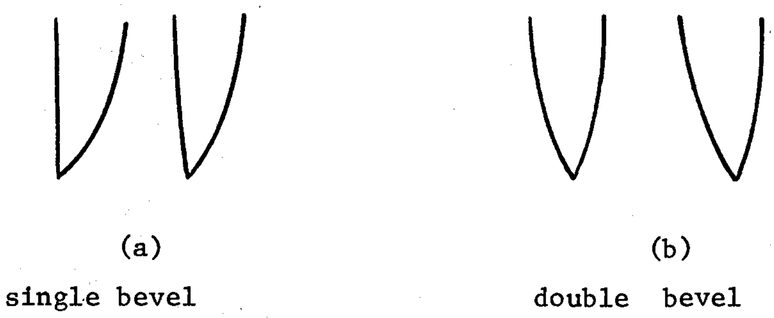


Figure 52: Adze blade bit types.

1. Adze Blades - Type I

Sample size: DiRj 14 : none
DiRi 38 : 5

Figure: 53k-m

Description: All of these specimens are uniformly large and broad. Four specimens are essentially complete. All of these are completely surface ground and have slightly to very convex butt outlines. The unfinished specimen exhibits very many fracture plains, and may have been heavily end battered. Four specimens have been made from pebbles, one has been sawn from a larger piece of nephrite. In all cases the bit is essentially perpendicular to the longitudinal axis. Bit forms are single bevelled (3) and double bevelled (2). A brief summary of Type I adze blade attributes are as follows:

Attribute	number	range	mean	S.D.
length	5	95-114	105.4	6.9
width	5	59-70	65.2	5.3
thickness	5	14-20	15.8	2.5
bit width	4	60-70	66.8	4.6
poll width	4	32-54	45.3	9.6
specific gravity	5	2.95-3.38	3.09	0.2

2. Adze blades - Type II

Sample size: DiRj 14 : 2
DiRi 38 : 5

Figure: 53g-j

Description: These adze blades are again isolated on a clear typological distinction reflected in their overall size. The bit portions are perpendicular (3) or at an angle (4) to the longitudinal axis. Bit types have a single bevel (2) or a double bevel (5). Butt ends are squared (2) or rounded (5). Four

Figure 53: Adze blades.

a-f Type III
g-j Type II
k-m Type I

Pipeline site

Component 2 (h,i)

Flood site

Component 1 (a,b,c,g)
2 (k,l)
5 (d,e,f,j,m)

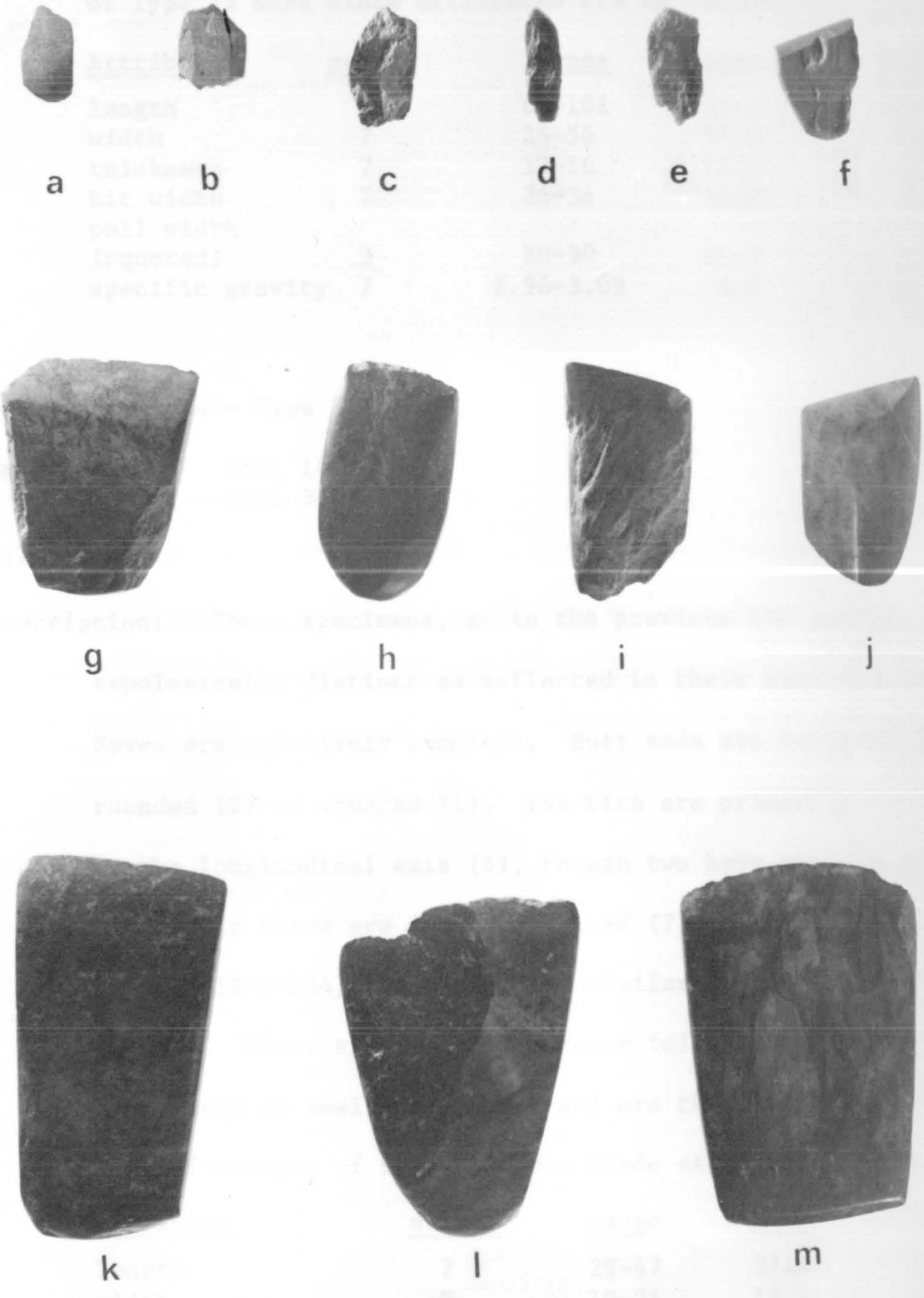


Figure 53

specimens are made from pebbles, two have been sawn from a larger block and one is unclear as to origin. A brief summary of Type II adze blade attributes are as follows:

Attribute	number	range	mean	S.D.
length	7	62-101	76.3	12.8
width	7	26-56	37.0	9.1
thickness	7	12-16	12.4	1.9
bit width	7	26-56	36.0	9.7
poll width (squared)	3	20-30	24.7	5.0
specific gravity	7	2.96-3.09	3.0	0.1

3. Adze blades - Type III

Sample size: DiRj 14 : 1
DiRi 38 : 7

Figure: 53a-f

Description: These specimens, as in the previous two groups, are typologically distinct as reflected in their size distribution. Seven are relatively complete. Butt ends are battered (5), rounded (2) or squared (1). The bits are primarily at an angle to the longitudinal axis (6), though two have perpendicular bits. Bit forms are double bevelled (7) and single bevelled (1). Hanson (1973:234) has classified similar specimens as nephrite chisels. These specimens do however follow a general continuum from large to small adze forms and are therefore included here. A brief summary of type III adze blade attributes are as follows:

Attribute	number	range	mean	S.D.
length	7	29-47	37.9	5.9
width	8	10-24	17.1	4.7
thickness	8	3-9	5.0	2.1
bit width	8	10-24	14.5	4.8
poll width (squared)	1 (9.0)	-	-	-

4. Adze fragments

Sample size: DiRj 14 : none
DiRi 38 : 6

Figure: none

Description: These specimens, one poll fragment and six bit fragments, are all identifiable as portions of adzes. All would be from Types I or II. A summary of the range of adze fragment measurements are as follows:

Attribute	length	width	thickness
range	17-65	5-35	6-16

C. Chipped and ground nephrite

The use of percussion on nephrite pebbles for thinning or for obtaining primary or secondary flakes for further modification has already been noted by Hanson (1973:230). The specimens included here reflect this process.

1. Pebbles and pebble fragments

Sample size: DiRj 14 : 1
DiRi 38 : 9

Figure: none

Description: Included here are nephrite pebbles and large nephrite spalls that have been chipped, battered and ground. They include pebbles (5), large cortex flakes (3) and two pieces not clearly identifiable to either type. The pebbles exhibit edge grinding (2) or surface grinding (3). One of these DiRi 38:189, has been edge ground forming a narrow bit. The butt end has been battered, possibly in use as a wedge. DiRj 14:261 may be an adze preform. DiRi 38:2263, a thin oval pebble, is chipped and battered to a rectangular shape. Three specimens are cortical fragments that have been ground on their ventral face. All of these specimens very likely represent implements in the process of further modification. A brief summary of chipped nephrite pebble and pebble fragment attributes are as follows:

Attribute	number	range	mean	S.D.
length	10	67-132	98.0	21.6
width	10	37-77	55.0	11.8
thickness	10	12-32	22.0	6.9

2. Pointed nephrite implements

Sample size: DiRj 14 : none
DiRi 38 : 3

Figure: 41j,k,l

Description: Of the three specimens, two are pointed and one can be interpolated to form a point. All are made on thin nephrite chips. DiRi 38:2253 (Figure 41j) is a adze bit fragment that has been reworked to form a sharp point. A brief summary of pointed nephrite implement attributes are as follows:

Attribute	number	range	mean	S.D.
length	3	29-41	35.7	6.1
width	3	13-18	14.7	2.9
thickness	3	-	4.0	0.0

3. Bits on chips

Sample size: DiRj 14 : 1
DiRi 38 : 6

Figure: none

Description: All these specimens exhibit a ground bit along one edge or portion thereof. All are based on thin chips with essentially unground surfaces and irregular outlines. Although some of the specimens may represent the remains of fragmented adze blades, their common irregular shape tends to indicate they may have been nephrite chips utilized,having a ground "bit" on one edge. A brief summary of the attributes of bits on chips are as follows:

Attribute	number	range	mean	S.D.
length	7	30-72	48.3	16.5
width	7	19-44	26.7	9.7
thickness	7	3-10	5.6	2.5

D. Sawn Nephrite Cobbles

Sample size: DiRj 14 - none
DiRi 38 : 4

Figure: 54

Description: These four cobbles all exhibit evidence of having been sawn. Three, all elongated cobbles, have been sawn partially through from two sides, and then broken to complete the sectioning. Steward (1973:42-43) illustrates this process. Two are extensively burned. One has also been heavily abraded on one end and chipped on the other. DiRi 38:1067 (Figure 43b) has a deep saw cut into one side and a shallow, narrow saw scar on another side. Both faces have been ground to some extent and both ends have been extensively battered. A brief summary of sawn nephrite cobble attributes are as follows:

Attribute	DiRi 38:	588	1067	1687	2442
length		150	166	295	180
width		42	106	93	77
thickness		42	84	57	45
specific gravity		3.18	3.02	2.64	2.66

Figure 54: Sawn nephrite cobbles.

Flood site

Component 2 (b,c)
5 (a)

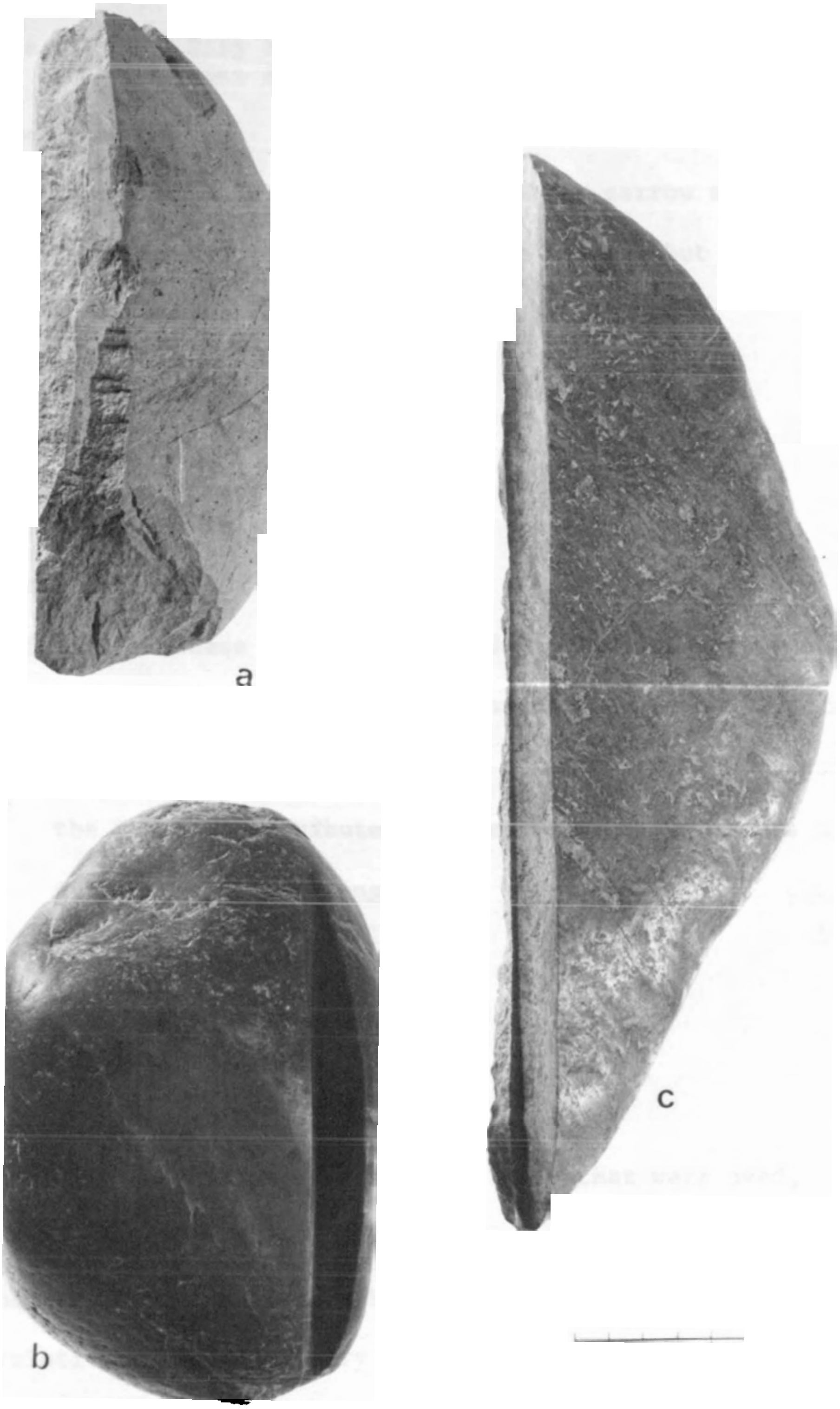


Figure 54

E. Miscellaneous

Sample size: DiRj 14 : none
DiRi 38 : 1

Figure: 41m

Description: DiRi 38:1396 is a long, thin, narrow specimen, rectangular in cross-section. Both ends are broken, but the specimen does taper slightly. (35 x 8 x 4 mm.)

F. Ground nephrite fragments

Sample size: DiRj 14 : 9
DiRi 38 : 57

Figure: none

Description: These specimens include a wide variety of nephrite fragments that show evidence of having been sawn or ground. No further sub-division has been attempted. A brief summary of the range of attributes for nephrite fragments are as follows:

Attribute	length	width	thickness
range	13-167	5-152	1-26

Miscellaneous Stone

Included in this section are specimens that were used, or may have been used, but which were not chipped, pecked or ground, as in the previous two industries. As reflected by the number of specimens encompassed, this is a relatively minor industry, but since the specimens do not occur naturally in the fluvial deposits, they would have to have been purposefully gathered.

I. Quartz Crystals N = 4

The reduction of quartz crystals in various ways is evident in the assemblages from both the Flood and Pipeline sites and the modified specimens have been grouped with formed bifaces, unifacially retouched flakes, utilized flakes, bipolar flaked implements and waste flakes. The usefulness of this raw material is likely linked to the extreme hardness, 7 on the Mohs scale (Loy, et al 1974b:27). Grouped here are quartz crystals that have been unmodified or have been utilized.

A. Clusters

Sample size: DiRj 14 : none
DiRi 38 : 2

Figure: none

Description: These two specimens of quartz crystals clusters consist of very small crystals (10 mm. in maximum length). It is unlikely that they were suitable for tool manufacture and they were most likely collected for their aesthetic value alone. A brief summary of quartz cluster attributes are as follows:

Attribute	length	width	thickness
DiRi 38:1765	15	14	19
DiRi 38:1923	33	29	17

B. Utilized Crystals

Sample size: DiRj 14 : 1
DiRi 38 : 1

Figure: none

Description: These specimens exhibit wear in the form of crushing, chipping and limited polish on the distal (tip) end. Hanson (1973:184) recovered similar specimens. Hill-Tout (1899:515-516) notes the use of crystals, in particular quartz and agate (?) crystals, for cutting nephrite and serpentine. He writes:

> "Having selected a suitable boulder, the stone-cutter would fasten two strips of wood together at a distance of about half an inch apart...This he laid upon the surface of his block for holding his crystal in place and keeping his line straight, the cutting utensil working to and fro between the parallel bars or strips. When the groove is sufficiently deep to hold the cutter in place, this apparatus is thrown aside and the cutting is continued without its aid. Water is used throughout this process to keep the cut clean and open...I have attempted cutting the jade block with an agate crystal myself; and though the process was not so rapid as with the sandstone grinder, the crystal soon cuts into the stone..."

As no study has been carried out on the wear pattern that develops from such cutting, it is uncertain whether these two specimens were in fact used for cutting or in some other way. (28 x 12 x 7 mm. and 25 x 13 x 8 mm.). A brief summary of quartz crystal attributes are as follows:

Attribute	length	width	thickness
DiRj 14:346	28	12	8
DiRi 38:1375	25	13	7

II. Naturally Perforated Pebbles

Sample size: DiRj 14 : 1
DiRi 38 : 1

Figure: 38c

Description: The two specimens included here both exhibit natural perforations. No modification or wear is present. The natural perforation of these specimens suggests their possible use as stone sinkers (Percy 1974:159; Steward 1973:78). A brief summary of naturally perforated pebble attributes are as follows:

Attribute	length	width	thickness	weight
DiRj 14:427	88	76	25	238
DiRi 38:2719	108	75	41	407

III. Ochre

Sample size: DiRj 14 : 3
DiRi 38 : 30

Figure: none

Description: Evidence for the use of pigments at the Flood and Pipeline sites is provided by the recovered ochre samples as well as many ochre stained pebbles and flakes. Included here are only actual ochre samples. The colors can be grouped as light yellow (14), dark yellow (1), light red (5) and dark red (13). Most specimens are irregular (30) fragments. Three show surface modification in the form of smoothing.

Faunal Remains

The faunal remains from both the Flood and Pipeline sites were very minimal with regards to prehistoric specimens. All specimens recovered were examined and identified, where possible, by J. Williams (1975 pers. comm.). The only identifiable specimens recovered from the Pipeline site included portions of at least three individuals of the species Bostaurus (cow), all of which were immature. These individuals were all found in recently deposited garbage within the housepit depression, and not linked to the identified cultural components. Other faunal material from the Pipeline site, associated with the prehistoric components, consists of thirteen non-identifiable fragments of calcined bone and one piece of shell, possibly clam or mussel.

Faunal remains from the Flood site included five recent or historic specimens. Two of these were sawn and three were identified as being Bostaurus. These specimens were all related to the surface or recently deposited debris within the housepit, but not linked with the identified cultural components. Three prehistoric specimens consisted of non-identifiable calcined bone fragments.

One reason for the negligible faunal remains at the two sites is likely related to the overall damp and acidic soil conditions. Acidic soil conditions appear to prevail in the Hope-Yale locality, as indicated by soil tests at the Katz site (Hanson 1973:259) and the Flood site (Blacklaws 1975), and by the overall poor preservation of organics in the locality.

CHAPTER VI

DISCUSSION

The Sample

The cultural materials recovered from the Pipeline and Flood sites are completely biased towards those artifacts which could survive the damp and acidic soil conditions. Also, the size and composition of the sample is of course, related to : 1) the extent of excavation as it relates to any one discrete occupation, 2) the quantity of material related to a particular occupation component and 3) the probable seasonal occupation of housepit structures. Because each component was not randomly sampled, specific statements cannot be made in comparing them. Problems were also encountered while test excavating the two sites. At the Pipeline site, the housepit was found to be much smaller than the actual surface depression and the excavation units were far too large, in relation to the feature, to recover a meaningful sample. A sample design, similar to the one since outlined by Blake (1974:14-15), would have been more applicable, as the recovery of cultural items of all types was of prime importance and the complete excavation of the housepit feature was not possible. At the Flood site, excavations were extended from the excavation of one housepit, to include a second housepit and the identification of a third housepit, as well as the recovery of a considerable quantity of material from a pre-housepit or non-housepit component. Because seven discrete occupation components were recovered and isolated from the two sites, as well as two components of mixed materials, and since specific statements cannot be made in comparing the components due to the specific sampling method used, the components will be discussed and compared only in general terms.

Difficulties also arise in making inter-site comparisons with previous work in the Hope-Yale locality. Borden (1959; 1961a,b; 1968a,b) has published only very preliminary reports, one of which briefly outlines a cultural sequence as identified from the Milliken and the Esilao sites. However, no details are given on specific numbers of tool types nor is a concise list of all of the artifacts present in each of the outlined phases presented. With respect to other work, comparisons are difficult to make with the Esilao village report (Mitchell 1963), as adequate descriptions and the absolute number of specimens of many of the artifact types recovered are not given. Comparisons are equally difficult to make with the Katz site report (Hanson 1973) since that assemblage has been simply divided into Zone A and Zone B deposits. Zone B represents a discrete occupation component, namely the pre-housepit occupation of the site. Zone A, however, includes all of "...the geologic and cultural materials associated with the construction, the occupancy and the eventual disintegration of the pithouses..." (Hanson 1973:68). Included in this, then, is topsoil and rootmat deposits, a broad layer of mixed roof collapse materials, a layer of silty clay capping the roof as well as floor deposits. Much of this zone represents mixed deposits, mixed with displaced Zone B deposits through the construction, occupancy and eventual collapse of the housepit structure. The specific description of floor zone deposits would have represented discrete occupation components, components with which closer comparisons could have been made. Even though specific statements on inter-site comparisons cannot be made, these comparisons will again be discussed and dealt with on general terms.

On-site tool manufacture

As noted by Hanson (1973) regarding the Katz site assemblage, the assemblages described in this thesis also provide evidence for considerable on site tool manufacturing. This is perhaps somewhat less evident in the Pipeline site assemblage, as it is relatively small and primarily restricted to chipped stone implements. It is from the larger, more varied Flood site collection that a wider range of on-site tool manufacturing can be demonstrated. Both the Flood and Pipeline sites have ample evidence of on-site stone chipping, indicated by a quantity of chipped stone material in all stages of manufacture, as well as an abundance of chipping debitage. Some implements, such as cortex spalls, were very likely produced along the banks of the Fraser River, where an abundance of raw material in the form of river cobbles is to be found. The few cortex spall cores recovered at the Flood and Pipeline sites, as well as at the Katz site (Hanson 1973:263), does in no way account for the vast numbers of cortex spalls present. It is, however, in the pecked and/or ground stone industry that the most clear examples of on-site manufacturing can be demonstrated. In this industry tools used specifically to form other artifacts and specimens at an intermediary stage, as well as finished tools are present. An example is in the working of nephrite. From the floor zone of Housepit #2 at the Flood site, sandstone saws, sawn nephrite blocks, abrasive slabs and completed nephrite artifacts were recovered. Similarly, the steps in the production of talc, slate and some river cobble artifacts (ie. hand mauls) can also be demonstrated. In the preceding Chapter, the stages in the production of finished tools can be more closely observed.

The foregoing has demonstrated the fact that considerable on-site manufacturing of implements was taking place at these sites, particularly at the Flood site. The tool inventory associated with housepit floor zones exhibit specimens required year round as well as some which may have been of a more seasonal nature. Ham (1975:211-214), in examining the Canyon Shuswap, suggested there was evidence for activities other than habitation, food storage and hunting and butchering in housepits. These additional activities include food processing, the processing of raw materials such as wood, bone and hides, as well as the manufacture and maintenance of stone tools. Although a functional analysis of tools was not conducted at the Flood and Pipeline site, these activities can be inferred to some extent. Evidence for food processing, represented by fire broken rock and hearths is present, as is evidence for the maintenance and manufacture of stone tools. Thus, tools used throughout the year, may have been stored to some extent, repaired and manufactured during the long, relatively inactive winter months spent in housepits. This suggestion is quite feasible when the length of time for the production of a completed adze, possibly sawn from a nephrite block is considered.

Even though housepits are considered a seasonal habitation structure (Duff 1952:46; Teit 1900:194) we can expect to find tools of use throughout the year in them for the reasons already discussed. Another factor to recognize is that, at least some Tait villages were occupied year round (Duff 1952:85). If either the Pipeline or the Flood site served such a multi-seasonal purpose, this too would account for a year-round representation of artifacts. Some method other than artifact inventory must therefore be devised to determine the exact seasonality of a housepit occupation.

Tool Type Comparisons

General tool type comparisons are difficult to make in the Hope-Yale locality due to the lack of descriptive data and the concise definition of various occupation components. As has already been mentioned, there was a prolific on site tool manufacturing industry at both the Flood and the Pipeline sites, and little comparative work can be done with respect to much of this material. To do so would require a close comparative examination of all of the collections as well as a specific research design aimed at particular goals. A few tool types can, however, be singled out for specific comparisons and some general statements regarding the components can be made. No attempt will be made to ascribe functions to all of the various tool types, as Hanson (1973) and Ham (1975) have already attempted this for comparable specimens. To compare tool type functions, a functional analysis would have to be conducted, an aspect beyond the scope of this thesis.

Ground slate, the most numerous single artifact type from the Flood site, is of special interest due to its great abundance. Mitchell (1971: 56) states that ground slate occurs relatively rarely at all sites in the Gulf of Georgia region away from the Fraser River. In the Stalo area slate appears as early as the Eayem Phase, ca. 3500-1500 B.C., in the Fraser Canyon and was highly developed in the Locarno Beach Phase, ca. 1000-100 B.C., on the Fraser Delta (Borden 1968a). An earlier appearance of ground slate on the coast is reported by Carlson (1970: 115) in the Mayne Phase (3000-1000 B.C.) material, at which time its presence is termed as rare. Ground slate occurs in all later components in the Hope-Yale locality (Borden 1968a; Hanson 1973; von Krogh 1974) as well as sites to the west (Borden 1968a, 1970; Charlton 1972; Crowe-Swords 1974). In the Lytton-Lillooet-Kamloops locality (Stryd 1973; Wilson 1974a) and in the central Washington area (Nelson 1969; Warren 1968), ground slate occurs only rarely.

The mere presence and great abundance of ground slate knives and knife fragments may be related to the salmon resource base, but as previously mentioned, the exact function of these tools has not been clearly defined. It is interesting to note a difference in thickness between the Locarno Beach slate, which was thick and heavy, and the Eayem and Marpole slate which were a more uniform thickness, generally between 2-3 mm. (Borden 1970:103). At the St. Mungo site, Boehm (1973: 123) found that earlier slate tended to be thicker, but nonetheless the frequency distribution of thickness formed a unimodal curve, with a mean of 2.7 mm., standard deviation of 1.1 mm. and a range of 1.5-6.6 mm. A more extensive study on ground slate and slate fragments was conducted by Crowe-Swords (1974) in the examination of nearly 2500 ground slate specimens from the Carruthers site. When Crowe-Swords (1974:103,106) plotted out the maximum thickness of ground slate fragments, a bimodal curve was formed, with large peaks occurring at 2.0 mm. and 3.0 mm., and a third smaller peak, at 4.0 mm. This is quite different from the unimodal curve resulting from the thickness distribution of ground slate fragments from the Floods and Pipeline sites, which has a single modal peak at 2.0-2.4, Figure 44. Exactly why slate thickness from the Carruthers site forms a bimodal curve while that described here is unimodal is not clear. Obviously a detailed study of this tool, its manufacture, use and breakage must be carried out to clarify the many questions that arise concerning it.

A prolific, and more unique, industry, represented primarily at the Flood site, is that of working soft stone, or more specifically, talc. Earlier, Duff (1956) carried out a detailed study of stone sculpture, including soapstone objects, in the Gulf Islands and along the Fraser River basin. From this work he found that a Lower Fraser sub-area, extending from the mouth of the Fraser River up to about Yale, was evidently the main development center of stone-sculpture in this region. Duff (1956:99) writes:

> "It was a region of experimentation and elaboration of types. It drew strongly on the region up-river for soapstone, and made this more and more the typical material of the developing art form."

Archaeologically little has been written on soft stone sculpture in the Hope-Yale locality. Borden (1968:16,22) notes a wide variety of ornaments and sculptures of soft stone in the Baldwin Phase material, appearing again in the Emery Phase. The Skamel Phase (Borden 1968:16) apparently lacked a soft stone sculpturing industry, and it occurs only rarely at the Pipeline site (one specimen) and the Katz site (ten excavated specimens) (Hanson 1973). From the Flood site, 149 specimens of soft stone were recovered, all modified to some degree and representing mant stages in the process of manufacturing soapstone implements. These specimens do not, however, resemble specimens from the Gulf Islands that have been grouped as the Gulf Island Complex artifacts (Duff 1956b; Mitchell 1971:115, 134; McMurdo 1974:75-79). Until further descriptive work comes forth, little comparative work can be undertaken with respect to soft stone at other sites in the Hope-Yale locality.

The coastal type woodworking tools, represented by adze blades and hand mauls, were found at both the Flood and the Pipeline sites. These tools are a common occurrence in the area by this time period, having been present since at least Baldwin Phase times (Borden 1968a:15) in the Fraser Canyon.

Projectile points have long played an important role as a diagnostic characteristic of an assemblage, and they are an important consideration when making comparisons. Unfortunately only a very small sample of complete points were recovered from the two sites in question, thirty-one from the Flood and nine from the Pipeline site. These forty points display a wide variety of forms; leaf-shaped, pentagonal, shouldered, stemmed, side notched, corner notched and basally notched. As the sites in question were apparently not occupied long enough to allow for an evolution of point types to occur in situ, another explanation for this multiplicity of point types must exist. Stryd (1973:48) reasoned that functional specialization was probably one factor. This is supported by Teit (1900: 241-243), who describes several types of ethnographic Thompson arrows and arrow points, each for a specific task. For example, the points of war arrows were usually barbed, while those used for hunting were leaf shaped. Teit (1900:241) also notes that many arrow points, when found, were used. These were believed to have been made by the Raven, and may account for typologically older specimens appearing in a more recent assemblage. These examples may or may not be factors in the diversity of point forms from the Flood and Pipeline sites, but they do illustrate possibilities.

Before going on and making comparisons between point forms, another attribute of projectile points should be mentioned, specifically neck widths. Various researchers have suggested an association between projectile point neck width and the diameter of the shaft to which the point was attached, a narrow shaft would be associated with arrows, and wider shafts with the use of darts or spears, (Sanger 1970:107; Stryd 1973:50; Corliss 1972). With a sample of 304 points, Stryd (1973:50) was able to demonstrate a bimodal distribution of neck widths, with peaks occurring at 8 mm. and 16 mm. and the low point between peaks at 12 mm. From closer examination, Stryd concluded that the neck widths for arrow points and dart points were only slightly overlapping. Unfortunately with only thirty-four specimens from which neck width can be measured, a concise statement regarding arrow and non-arrow use at the Flood and Pipeline site could not be arrived at. Figure 55 shows projectile point neck widths from the two sites.

Inter-site comparisons of projectile point types are very difficult to make when dealing with the Flood and Pipeline sites. This is largely due to the very poor workmanship involved in the shaping of the points. Many are crudely battered and chipped flakes which end up with a stem or being notched and a pointed tip in an appropriate place. A few specimens are, however, well made and lend themselves more readily to comparison. No doubt the crudely made points are an important trait of the assemblages and cannot be neglected, however, as yet I have not come across specimens of a comparable nature.

The sample of projectile points, when distributed over seven discrete occupation components and two mixed components (Table XIV) is far too small to attempt any form of concise inter-site comparison. Small stemmed points, as well as leaf-shaped and pentagonal points, appear to occur in all Fraser Canyon Phases since at least Baldwin times (Borden 1968a; U.B.C. Laboratory Collection). Various forms of notched

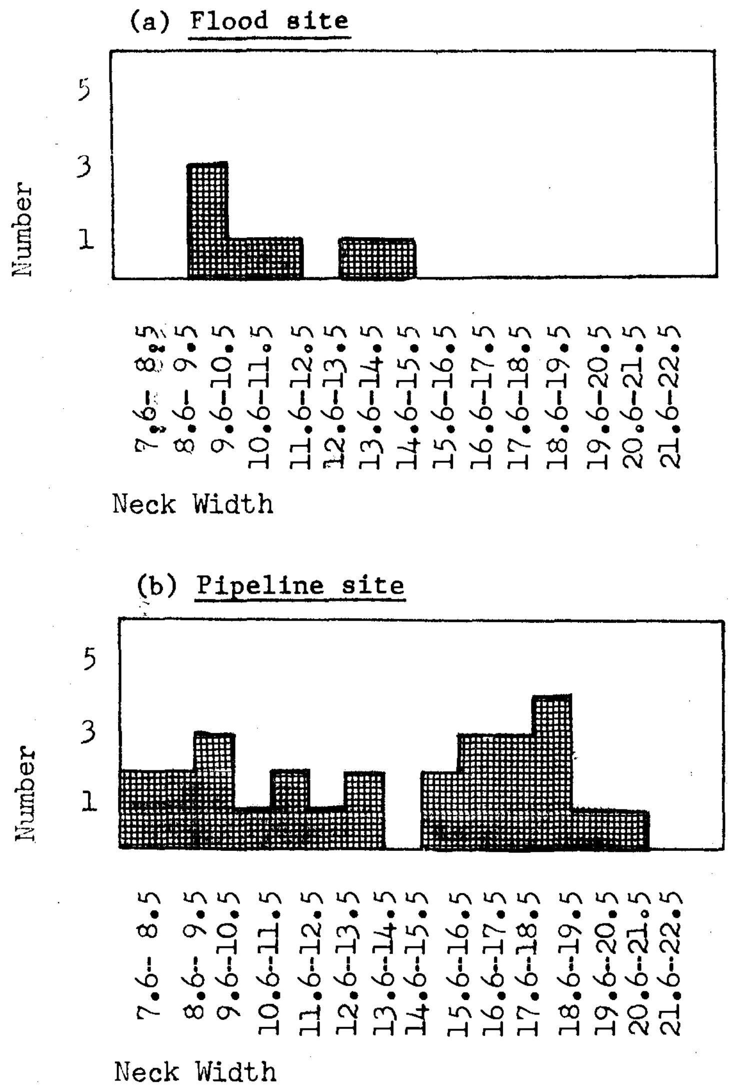


Figure 55: Projectile point neck widths.

points were apparently introduced during the Skamel Phase (Borden 1968a:16) and since then these forms have persisted up to historic times (U.B.C. Laboratory Collection). As notched varieties occur in both the Pipeline and Flood site components, they would therefore appear to post-date the Baldwin Phase.

Point forms which Borden (1968a:16) considers characteristic of the Skamel Phase are "...diagonally corner-notched triangular projectile points, that is, barbed arrowheads with expanding stems." From the U.B.C. Laboratory Collection, and as noted by Hanson (1973:274), basally-notched barbed points can be included with these. Projectile points comparable to the Skamel type were also recovered from the Pipeline site (Figure 22a,j,k). Notably, none were recovered from the Flood site.

A final aspect to consider, with respect to chipped stone, is the use of cryptocrystalline stones. Borden (1968a:16) noted that Skamel Phase appears to mark the introduction of the use of "...many fine cryptocrystalline stones that seem to have been unknown to their predecessors..." The use of this raw material is evident at both the Flood and Pipeline sites, though the use of it is not extensive. Comparatively, more cryptocrystalline specimens are to be found in the Pipeline site components.

Temporal Significance of Housepit Forms

An important question concerning housepit depressions is that of temporal significance of construction design. Previously, von Krogh (1975b) suggested that there did in fact appear to be temporal significance to at least some degree with respect to housepit construction in the Hope-Yale locality. While additional ethnographic research on hearths has modified these earlier views, the conclusion remains the same.

Workers in neighbouring areas have also addressed this question. In the Lochnore-Nesikep locality, Sanger (1966:20) once suggested that housepit depth could be correlated with time. He later revised this view and felt a more practical approach would seem more reasonable (Sanger 1971:114). By this approach, Sanger viewed housepit attributes in reference to such considerations as the insulating value of the soil of house walls and the depth of easily excavated soil. Working near Lillooet, Stryd (1973:75-76) concurred with Sanger's (1971: 114) conclusions, and also felt structural attributes of housepits had no temporal significance. Rather, structural attributes were more a function of the srrounding soil conditions. Stryd (1973:76) writes:

> "Housepit depth, the slope of the pit wall, and the need for one or more steps in the wall all reflect the hardness and thickness of the various strata encountered in the original excavation of the housepit."

Supporting the view of temporal significance in housepit construction is work by Grabert (1970:1974) and Nelson (1969). Concerning housepit forms in the Okanagan Valley, Grabert (1974:71) writes:

> "...there appears to be a progression of housepit form from deep, large and steep-walled, to circular concave, shallow, to rectangular, shallow and small in the early historic period."

In the Arrow Lakes vicinity, Turnbull (1973:138-139) found similar house types as those described by Grabert (1974). Turnbull described one form as being characterized by steep walls while the other is saucer-shaped. No reference is made as to possible temporal significance, and Turnbull (1973:138) felt the difference between the two may have been a functional one, the saucer-shaped house being more temporary. At the Vantage Locale, in central Washington, Nelson (1969:99) described three house types characteristic of the local Cayuse Phase. Nelson felt these house types were representative of changes in form through time. The three basic house types, designated, from early to late, Types I, II and III by Nelson (1969:99), are summarized below:

Type I	- a deeply excavated structure possessing an interior bench which traverses the entire house wall. - considerable variation in size and outline - bench and floor are level - other features occur erratically - a major defining feature of the Cayuse I subphase
Type II	- possess vertical walls and a level floor - no bench present - depth no greater than 5 feet - other features variable - abundant during Cayuse II and III subphases
Type III	- simple, saucer-shaped structure with sloping walls and a more or less level floor - outline round to slightly oval - size is variable - characteristic of the Late Cayuse III subphase

Nelson (1969:70,85) approximated the dates of the various Cayuse Phases as follows:

Cayuse III	terminates	- early historic times
	begins	- 1600-1700 A.D.
Cayuse II	terminates	- 1600 A.D.
	begins	- 600-1300 A.D.
Cayuse I	terminates	- 600-1300 A.D.
	begins	- prior to 250 A.D.

The evidence on housepit construction in the Hope-Yale locality is not abundant, yet a succession of house types similar to Nelson's types appears to exist. Nelson's Type I, is represented at the Katz site, the Pipeline site and at the Flood site: Housepit #1. Possibly another example of this house type exists at the Maurer site, near Agassiz. Type II, is represented at the Flood site by Housepit #2. Finally, Type III is represented at Esilao village (Mitchell 1963). With this very small sample, little can be conjectured on intra- or inter-site housepit variation. No doubt the size, and perhaps shape, of a housepit was also related to the family size and needs as well as to a particular style. Nonetheless, distinctive forms are evident and more work will be required to expand on this subject. As it stands to date, there appears to be a succession of housepit types, and, as noted by Nelson, this succession appears to suggest a tendency towards structural simplification of housepit interiors. This does not, however, imply a simplification of the outer superstructure, for which little, if any, evidence has been recovered to date.

Nelson (1969:59) speculates that the winter housepit village pattern diffused from the Canadian Plateau into the Columbia Plateau perhaps as early as 500 B.C. but definitely by 100 B.C. and 100 A.D. In the Canadian Plateau the earliest housepit forms described by Grabert (1971:155), dated to 750 B.C. (I -2032), and by Turnbull (1973:109), dated between 1300 B.C. and 500 B.C., were without an encircling bench. As noted earlier, a number of examples of this housepit form exist in the Hope-Yale locality. The earliest example of this house form in British Columbia discovered to date, may be the Maurer site structure. Other early examples are those found at Lochnore Creek, dating approximately 750 B.C. (Sanger 1970: 27; 104) and at the Katz site (Hanson 1973). As noted by Hanson (1973: 288) the significance of this shared trait during the first millennium B.C. is a problem for future research. It does however suggest that early housepits in the Columbia Plateau may not have been derived from southeastern British Columbia.

Radiocarbon Dates

Three charcoal samples, two from the Flood site and one from the Pipeline site, were sent to Gakushuin University, Japan, for radiocarbon assay. These samples were recovered during the course of excavations, at the Flood site from features #11 and #23, and at the Pipeline site from feature #1. The features from the Flood site are clearly associated with specific occupation components. This is unfortunately not the case with the single sample from the Pipeline site. This sample was selected by the Archaeological Sites Advisory Board, while the entire collection was in their care, and before the occupation components were defined. It comes from a large hearth area away from the three major occupation components as described for the housepit feature. The hearth appears to be more recent than the initial occupation of the housepit, and most likely coincides with the occupation component #2. No diagnostic artifacts were found associated with the hearth area, with which a comparative association could be made. In any case, on the basis of overall typological examination of the cultural assemblage, the Pipeline site would appear to be older than the single date would indicate. The individual radiocarbon estimates are listed in Table XVII. Figure 56 shows these dates, taken to a two sigma standard deviation, in relation to ten other radiocarbon estimates from the Hope-Yale locality.

Table XVII

Radiocarbon assay of Charcoal Samples

Code No.	Site	Component	Feature	Age(B.P.)*	
1. GaK-5429	Flood	2	11	1300±100	A.D.620
2. GaK-5430	Flood	1	23	2310±150	360 B.C.
3. GaK-5432	Pipeline	1-3(?)	1	1580±80	A.D.370

*The calculation of ages is based on the Libby's half life of C-14, 5570 years, and indicated ± errors are the years corresponding to the standard deviations (one sigma) of beta rays counting statistical errors.

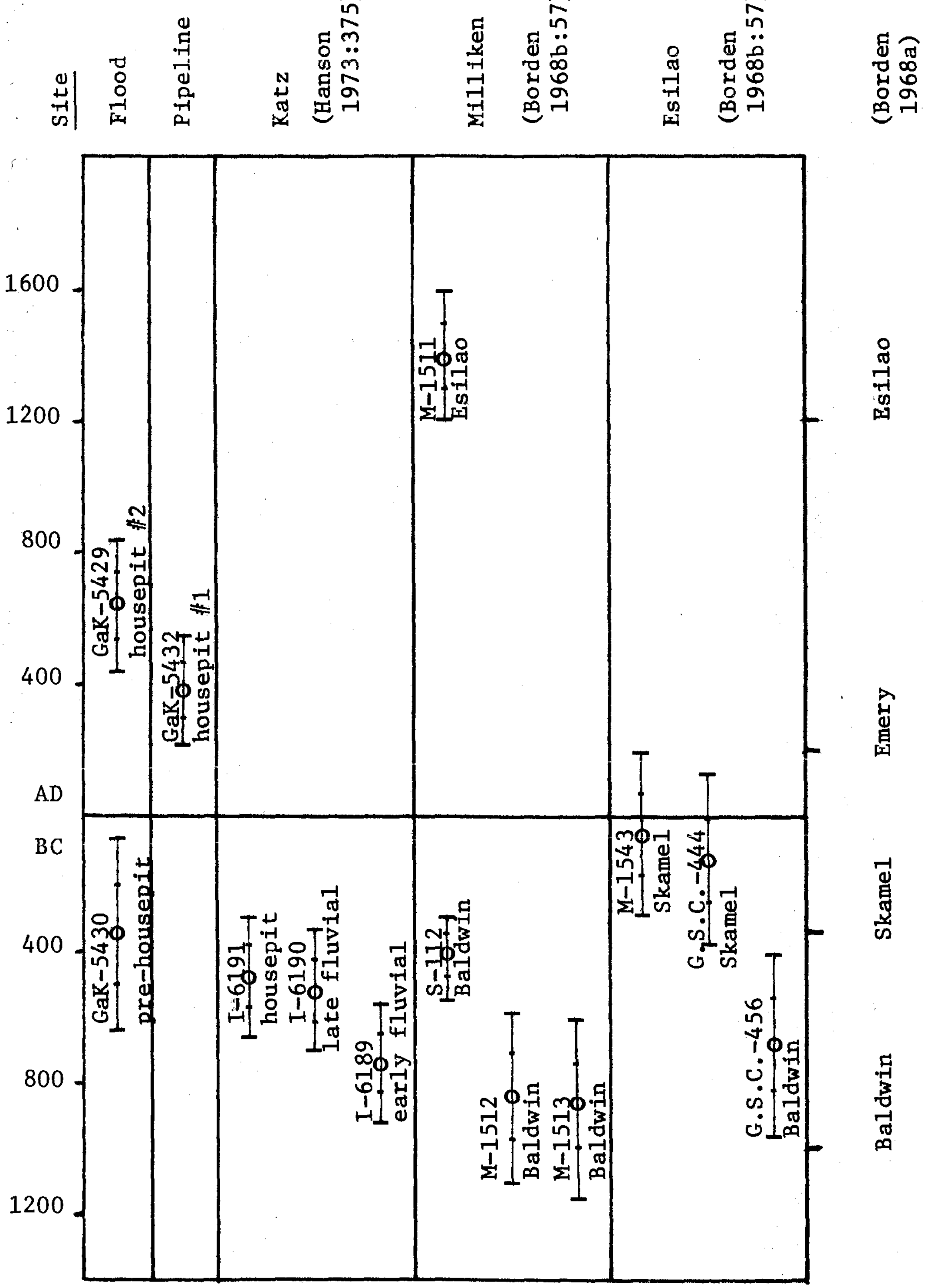


Figure 56: Comparison of radiocarbon estimates; taken to two standard deviations.

Comparative Analysis - Flood and Pipeline sites

In an effort to compare the different assemblages and components recovered from the Flood and Pipeline sites, in light of sampling differences, an average-link cluster analysis using Jaccard's coefficient of association program was utilized (Bonham-Carter 1967). Using 80 variables (see Table XVIII) selected from the artifact types as identified from the various assemblages and components, this technique clustered unweighted paired groups of positive attributes, the resulting levels of association being plotted out as a distance coefficient (i.e. 1 - Jaccard's coefficient) in dendrogram form.

This program was run twice, once for all of the individual assemblages from the Flood and Pipeline sites (Figure 57) and once for all of the components from the two sites (Figure 58). The results from both of these runs were very similar. In examining the dendrogram sketch for cultural assemblages, the Flood site is separated into two groups, but is consistently separate from the Pipeline site. Also, the three assemblages corresponding to the major occupation components from the Flood site are closely grouped, to the top of the sketch, Figure 57. Perhaps one reason assemblages DiRi38:6,7 and 9 are so far removed from the bulk of the Flood site assemblages is because of the relatively low artifact yield from each of these. This in turn would not necessarily reflect the actual variation in the respective assemblages. The assemblages from the Pipeline site are also grouped together. Assemblages from both sites corresponding to mixed assemblages are generally scattered throughout the sequence. They too, however, are grouped with other assemblages from their respective sites with the exception of Flood: assemblage 8 (Housepit #3 rock fill), which is more closely linked

Table XVIII: Cluster analysis data matrix.

Card Item Number	Flood site												Pipeline site				
Component	4		2			3				1				1	2	3	
Assemblage	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
1.leaf shape point	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-
2.pentagonal point	+	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
3.single shoulder point	-	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
4.contracting stem point	+	-	-	+	+	-	-	-	+	+	+	-	-	-	+	-	-
5.straight stem point	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-
6.side notched point	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	+	-
7.corner notched point	-	+	-	-	-	-	-	-	-	+	+	-	-	-	+	-	+
8.basally notched point	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+
9.point fragments	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
10.round to oval biface	-	-	-	-	+	-	-	+	-	-	+	-	-	-	-	-	+
11.biface with long proj.	-	-	+	-	-	-	-	+	-	-	-	-	-	+	-	-	+
12.pointed biface	+	-	+	+	+	+	-	+	-	+	+	+	-	+	+	-	+
13.biface fragments	+	+	+	-	+	-	-	+	-	+	-	+	+	-	+	+	+
14.unformed bifaces	+	-	-	-	+	-	-	-	-	+	-	+	+	+	+	-	+
15.pointed unifaces	-	+	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-
16.concave unifaces	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-
17.round to oval uniface	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	+
18.straight edge uniface	+	+	+	+	+	-	-	-	-	+	+	+	+	+	+	-	+
19.convex edge uniface	-	+	-	+	+	-	-	-	-	+	+	+	-	+	-	-	+
20.concave edge uniface	-	-	+	-	+	-	-	+	-	+	-	+	+	+	-	-	+
21.unformed pointed uniface	-	-	-	-	+	-	-	+	-	+	-	+	-	+	+	+	+
22.mult. concavities and pts.	+	+	-	-	+	-	-	+	-	-	-	+	+	-	+	-	-
23.retouched flakes	+	+	+	+	+	-	-	+	-	+	+	+	+	-	+	+	+
24.burins	-	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-
25.utilized flakes	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+
26.formed retouched spall	+	-	+	-	+	-	-	-	-	-	-	+	-	-	-	-	-
27.unformed retouched spall	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+
28.edge battered spall	+	+	+	+	+	-	-	+	-	+	+	+	+	+	+	+	+
29.polished/abraded edge spall	+	+	+	+	+	+	-	+	-	+	+	+	+	-	+	-	+
30.notched spall	+	-	+	-	+	-	-	-	-	-	-	-	+	-	-	-	-
31.spalls with no visible wear	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+
32.retouched split cobbles	+	-	-	+	+	-	-	-	-	-	+	-	+	-	-	-	+
33.utilized split cobbles	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	+
34.large unidirectional cores	+	+	-	+	+	-	+	+	-	+	+	-	+	+	+	-	+
35.small unidirectional cores	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+
36.unidirectional core frags.	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	-	-
37.multidirectional cores	+	+	+	+	+	-	+	+	+	+	+	+	-	-	+	+	+
38.multidirectional core frags.	+	+	+	+	+	-	+	+	+	+	+	+	+	-	-	-	+
39.randomly flaked cobbles	+	+	+	-	+	-	-	-	-	+	+	+	+	-	+	+	+
40.bipolar implements	+	+	+	+	+	-	-	-	+	+	+	+	+	+	+	-	+

continued.....

continued--

Table XVIII:

Card Item Number	Flood site												Pipeline site				
Component	4	2			3					1			1	2	3		
Assemblage	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
41.bipolar fragments	+	+	+	+	+	+	-	-	-	+	+	+	+	+	+	-	+
42.uni-and bi- flaked cobbles	+	-	+	-	-	-	-	+	-	+	+	-	+	-	+	-	+
43.battered and chipped cob.	-	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+
44.battered and chipped peb.	+	-	+	+	+	-	-	-	+	+	+	+	+	-	-	-	+
45.edge pitted and chipped	+	+	+	+	+	-	-	+	+	+	+	+	-	-	+	-	+
46.surface pitted and chipped	+	+	+	+	+	-	-	+	-	-	-	-	-	-	-	-	+
47.pitted and chipped preforms	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
48.maul fragments and preforms	-	+	+	-	+	-	-	+	-	-	+	-	-	-	-	+	-
49.mortars	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
50.bilaterally notched pebbles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
51.miscellaneous ground stone	-	+	+	+	+	+	-	-	-	+	+	+	-	-	-	-	-
52.abrasive saw	+	+	+	+	+	+	-	-	-	+	+	+	-	-	-	-	-
53.facetted abrasive stone	+	+	+	-	+	+	-	-	-	-	+	+	-	-	-	-	-
54.abrasive slabs	+	+	+	-	+	+	-	+	-	+	+	+	+	-	+	-	-
55.abrasives - no wear	+	+	+	+	+	-	-	+	-	+	+	+	-	-	+	+	-
56.slate points	-	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-
57.slate knives	+	+	+	+	+	-	-	-	+	+	+	+	+	-	-	-	+
58.slate fragments	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
59.chipped slate	+	+	+	+	+	-	-	+	+	+	+	+	+	-	+	+	+
60.miscellaneous slate	-	-	+	-	-	-	-	-	-	+	-	+	-	-	-	-	-
61.edge ground talc	+	+	+	+	+	-	-	+	-	+	+	+	-	-	-	-	-
62.surface ground talc	+	+	+	+	+	-	-	-	-	-	+	+	-	-	-	-	-
63.surface ground and drilled	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
64.pecked soft stone	-	-	+	+	+	+	-	-	-	+	+	+	-	-	-	-	-
65.pipe preforms	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-
66.pipe fragments	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
67.pendants	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
68.beads	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
69.carvings	+	+	+	-	+	-	+	-	-	-	+	-	-	-	-	-	-
70.nephrite point	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
71.adze blade I	+	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
72.adze blade II	+	-	+	-	-	-	-	-	+	+	-	-	-	-	+	-	-
73.adze blade III	-	-	-	+	+	-	-	-	-	+	-	-	-	+	-	-	-
74.adze fragments	-	-	+	+	-	-	-	+	-	+	-	-	-	-	-	-	-
75.worked nephrite fragments	-	+	+	+	+	+	-	-	+	+	+	-	+	+	-	-	-
76.sawn nephrite cobbles	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
77.nephrite tool fragments	+	+	+	+	+	-	-	+	-	+	+	+	+	+	+	-	+
78.ocher	+	+	+	+	+	-	-	-	+	+	+	+	+	-	-	-	-
79.quartz crystals	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	+
80.naturally perforated pebble	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-

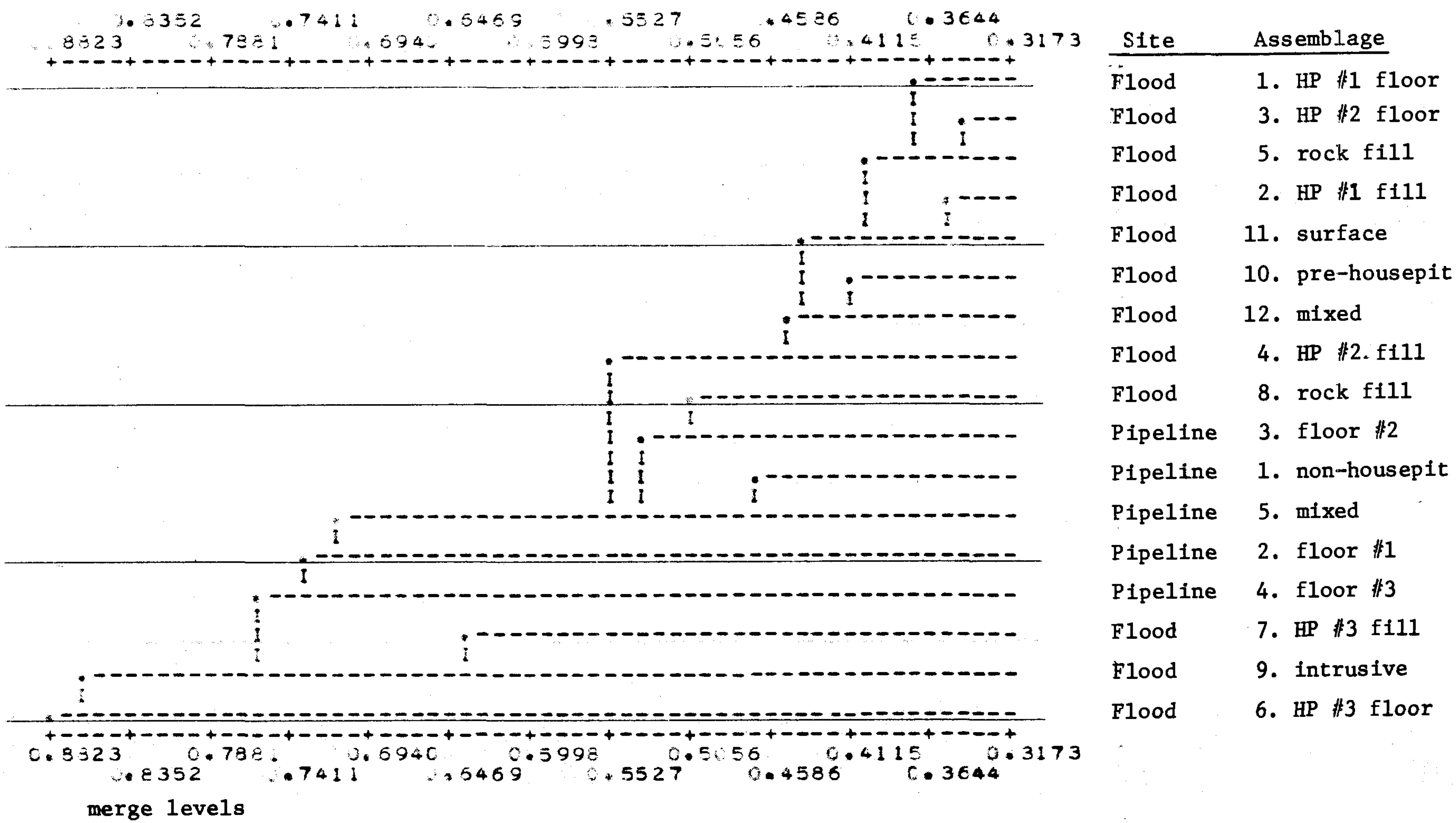


Figure 57: Dendrogram compiled from artifact/assemblage data from the Flood and Pipeline sites.

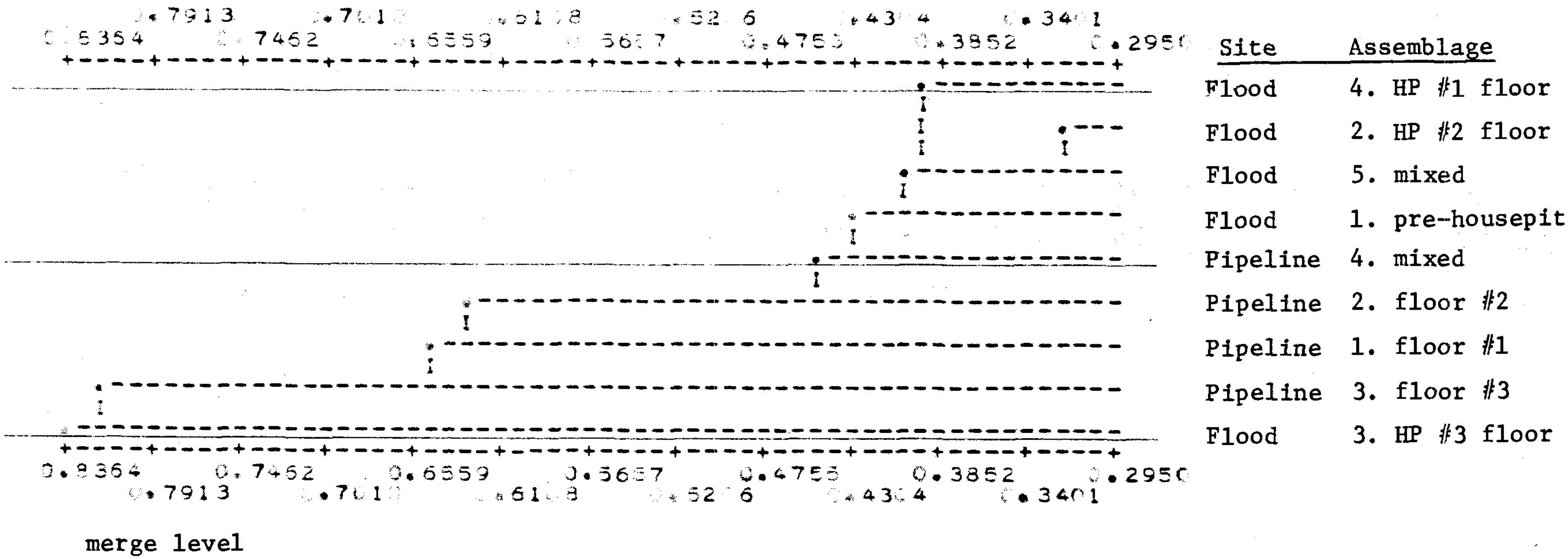


Figure 58: Dendrogram compiled from artifact/component data from the Pipeline and Flood sites.

with the Pipeline: assemblage 3 (occupation floor 2).

In Figure 58 the level of association plotted for the various artifact components is illustrated. Here too we see a close grouping of the assemblages from the Flood and the Pipeline sites. The only exception is component 3 from the Flood site. As already mentioned, the reason for this component being so far removed from the bulk of the Flood site components is likely due to the small sample of artifacts recovered (13).

A result of this work was to demonstrate the general homogeneity of the cultural deposits from the Flood and Pipeline sites, yet these two cultural deposits differ significantly from each other. This is again clearly illustrated in Figure 59a, which shows the cumulative diagrams for the seven occupation components, the assemblages of which have been broken into three general categories 1) pecked and/or ground stone, 2) miscellaneous stone artifacts, and 3) chipped stone, corresponding to the descriptive artifact typology. The order in which these categories were placed was selected for the purpose of clarity in the illustration. Again a clear grouping of the Flood site components, all having a greater percentage of pecked and/or ground stone in the assemblages, and a grouping of the Pipeline site assemblages, all with a greater percentage of chipped stone, is evident. Figure 59b illustrates the cumulative diagram for the total assemblage from the Flood site as compared to the total assemblage from the Pipeline site.

Comparative Analysis - Hope-Yale Locality

As has already been mentioned, it is difficult to undertake comparative analysis with the previous work in the Hope-Yale locality,

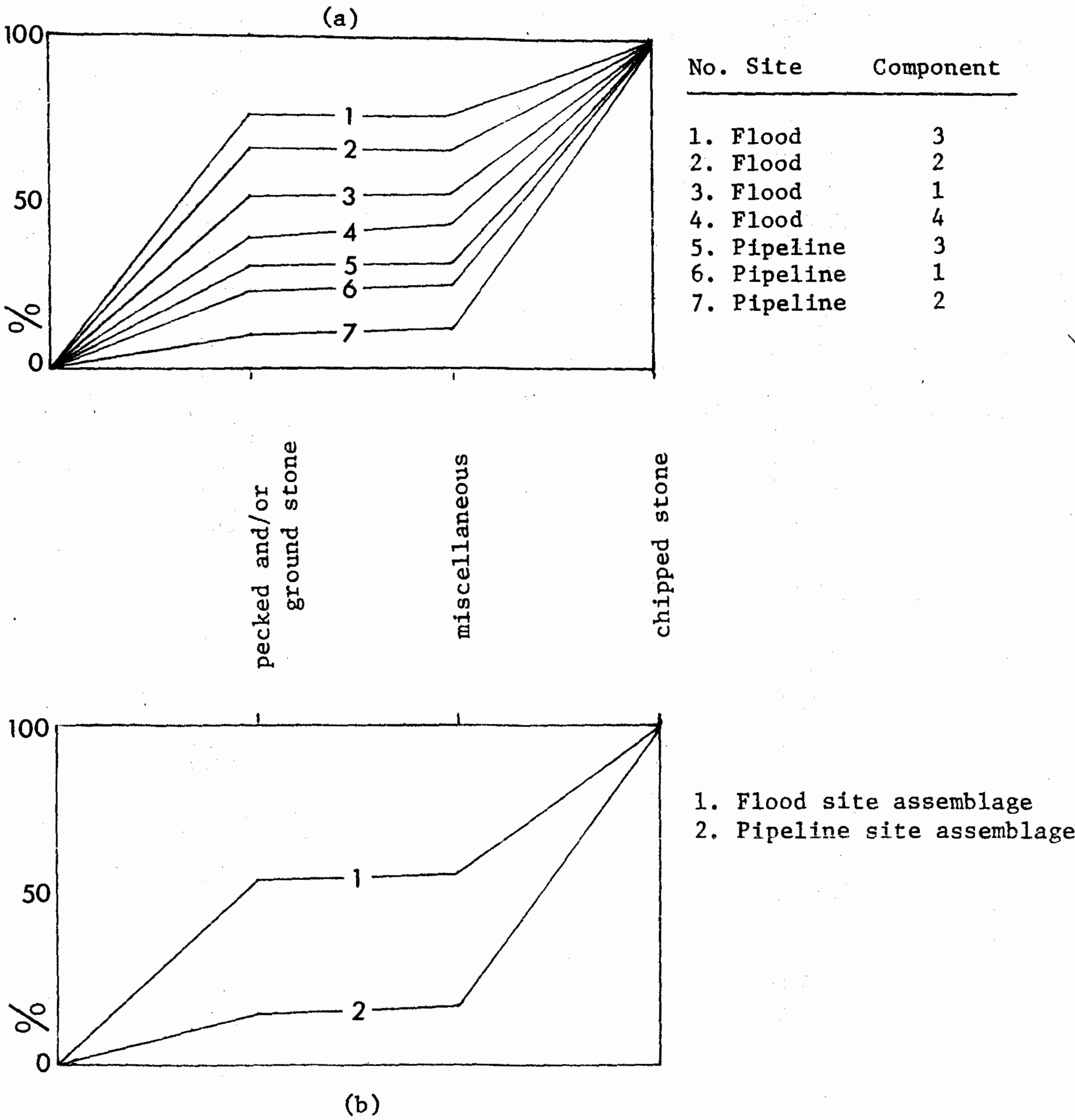


Figure 59: Cumulative diagrams ; comparing (a) the seven occupation components from the Flood and Pipeline sites, and (b) the total assemblages from the Flood and Pipeline sites.

because of the way a particular analysis was conducted or because no final reports are yet available for study. Nonetheless, some statements can be generated.

The most extensive archaeological work in the Hope-Yale locality has been that conducted by Borden (1959; 1961a,b; 1965; 1968a,b), a result of which has been the outlining of a long cultural sequence. For our purposes here, only the last four phases of this sequence are of primary concern, as it was during this time period that the assemblages from the Flood and Pipeline sites appear to fall. These four phases are briefly outlined in Table XIX. From these very brief outlines, and from the type collections on display at the University of British Columbia Archaeological Laboratory, it can be suggested, and perhaps only suggested, that site assemblages or more precisely, site occupation components, appear to fall roughly into these outlined phases. These suggestions are based on the overall composition of the various assemblages as well as available radio-carbon dates.

Table XIX

A brief outline of the last four Phases of the Fraser Canyon Sequence (Borden 1968:15-24).

Esilao Phase (ca. A.D. 1200-1808)

Characteristics: Small side-notched and barbed points, with variations such as square or sloping shoulders; end scrapers; end blades for knives, drills; abraders, many ground slate artifacts; straight or tubular stone pipeswith a trumpet shaped bowl; pithouses; aboriginal ornaments are rare but around A.D. 1800 trade objects appear; a relative scarcity of heavy woodworking tools and a virtual absence of bone and antler artifacts.

continued--

Table XIX continued--

Emery Phase (ca. A.D. 200-1200)
Characteristics: Information is sparce, but the data suggests a fusion of Skamel phase with the characteristics of the Baldwin and Marpole phases during this period; worked steatite and phyllite; both plain and zoomorphic vessels; seated human figurines; pipe smoking and effigy pipes. Borden (1968a:22) sees this phase as "...one of the richest in the long cultural history of the lower Fraser Canyon." Strong coastal influence is evident, particularly with Marpole phase.

Skamel Phase (ca. 350 B.C. - A.D. 200)
Characteristics: With the onset of the Skamel phase, and the appearance of an alien group along the Fraser River, came an abrupt end to the cultural efflorescence of the Baldwin phase. As Borden (1968a:116) states: "Virtually everything that was characteristic of the Baldwin phase vanishes. Introduced were barbed points with expanding stems; extensive use of cryptocrystalline rocks; small specialized tools such as drills and gravers, etc. and the use of semisubterranean housepits."

Baldwin Phase (ca. 1000-350 B.C.)
Characteristics: Continued development of the local chipped stone industry, projectile points similar in form to the preceding phases, but of a generally reduced size perhaps indicating the introduction of the bow and arrow during this period; mortar and pestle; sawn and ground nephrite chisels and adzes; microblades and microblade cores; ground slate; working of soft stones such as clay, shale, phyllite, steatite, lignite and graphite for the production of ornaments such as beads, pendants, rings, earspools and labrets; and small zoomorphic and anthropomorphic sculptures.

In previous work in the Hope-Yale locality, Mitchell's (1963) work at the Esilao site, dealt primarily with Esilao phase material, although also present at the site was evidence of an earlier housepit occupation, described by Mitchell (1963:59) as the lower grey loam layer, or simply lower grey deposit material.

Although Hanson (1973) did not make any direct comparisons of the Katz site material with the Fraser Canyon sequence, a more direct attempt towards this end must be made. The following suggestion is based on

Hanson's (1973) detailed report on the Katz site as well as a very brief examination of the collection, in the University of British Columbia Archaeological Laboratory. On the basis of an extensive chipped stone industry, the general presence of tool types Borden (1968a:16) outlines for Skamel, the almost total lack of a soft stone manufacturing industry so abundant in the Baldwin and Emery phases (Borden 1968a:15-22), and the temporal placement of the site on the basis of three radio-carbon dates (Figure 55), Katz perhaps most closely resembles Skamel phase material. Hanson (1973:274) makes note of corner and basally-notched barbed points in Zone A which, he states, are considered by Borden (1968a:16) to be characteristic of the Skamel hase. The fact that the Katz site apparently predates the Esilao village Skamel phase component does not alter this suggestion, as it is possible that the Katz site represents an earlier manifestation of Skamel phase material.

Pipeline site components most closely resemble the Skamel phase material. This conjecture is based on the noted predominance of chipped stone over ground stone in all of the assemblages from the Pipeline site. Related to this is the presence of corner and basally notched projectile points, the use of small specialized tools and the use of cryptocrystalline rocks, though the use of this material is not that extensive. Also present are, of course, housepits.

As has been already demonstrated, the components from the Flood site differ significantly from those of the Pipeline site. With respect to the Fraser Canyon sequence, the phase which they most closely resemble is perhaps the Emery phase, however, as the Emery phase is very poorly outlined, this can be questioned. The suggestion is based on a flourishing soft stone industry, evidence of pipe smoking, and a general continuation of Skamel phase chipped stone material but the lack of the Skamel type basally or diagonally notched points.

Very serious difficulties arise in making such comparisons. On the basis of two radiocarbon dates, the occupation components from the Flood site span a period from late Baldwin, through Skamel and into Emery phase, yet they show very little variation, quite unlike those suggested by Borden (1968a). Also, the material from the Pipeline site appears to be considerably older than the age indicated by the single radiocarbon date. These dates must therefore only be taken as a guide, and not as the absolute age determinant.

This brings into question the entire problem of the origin of the Skamel phase in the Hope-Yale locality. Borden (1968a:16) has suggested that the appearance of Skamel marks "...an abrupt end..." to the previous Baldwin phase with the intrusion of an "...alien group...". Emery phase, in turn appears as a fusion of Skamel phase with the Baldwin and Marpole phases (Borden 1968a:22). In my opinion the question as to the nature and origin of the Skamel phase has yet to be determined. From the data available, it appears as though the Baldwin phase did not end so abruptly, and it may have been contemporaneous, perhaps only minimally, for a time with the Skamel phase. It appears these two phases may then have gradually merged into what is later termed Emery phase. A concise statement concerning these phases as they are manifested at the Milliken and Esilao sites will, no doubt, be necessary to shed light on this question. When comparing Baldwin and Emery, the most pronounced differences that can be isolated at this time are the absence of microblades and microblade cores in the post-Baldwin phases. Emery also differs from Baldwin in projectile point types, Baldwin having apparently no notched varieties while Emery, following the pattern of Skamel, does. This also tends to support a merging of the Baldwin and Skamel phase material cultures.

Two other sites, though not directly in the Hope-Yale locality, should be mentioned. They are the Maurer and the Carruthers sites. The reason for this special attention is primarily because both lie along the course of the Lower Fraser River and are geographically close to the Hope-Yale locality.

The Maurer site (LeClair 1973;1976) is located near Agassiz, just west of the Hope-Yale locality. Excavations there also involved a benched housepit structure. Culturally, the assemblage from the Maurer site is quite different from any of the components from either the Flood or the Pipeline site. Most notable, perhaps, was the total lack of a pecked or ground stone industry. LeClair (1976:42) sees strong similarities between the Maurer assemblage and the Eayem phase materials as described in the Fraser Canyon sequence (Borden 1968a). Five radiocarbon dates place the occupancy of the structure between 1910-2830 B.C. Thus, both by the early dates and by a comparison of the cultural material, few similarities can be drawn between the Maurer site and the components from the Flood and Pipeline sites.

The Carruthers site, located considerably further to the west, lies on the north side of the Fraser River, east of the confluence of the Pitt and Fraser Rivers. At this time, the Carruthers site is one of the few sites excavated between the Hope-Yale locality and the coast that has been reported in detail. Chronologically, the occupation or use of the Carruthers site was estimated to date between A.D. 400 and A.D. 1200, and Crowe-Swords (1974:159) suggests a date of A.D. 800, with seasonal occupations falling 100 years on either side of this estimate. No radio-carbon estimates were submitted.

Crowe-Swords (1974:159) feels the Carruthers site was a seasonally occupied site, most likely during the fall for approximately a one month period. This short term seasonal occupation was related to a specific use or uses of the site, probably for the purpose of gathering wild potatoes, hunting and, to a lesser degree, fishing.

Even though the Carruthers site and components of the Flood site are temporally quite close, differences in the nature and duration of the occupation of the respective sites make comparisons difficult to make. On the negative side, and very likely linked to the seasonal nature of the site occupation, little stone tool manufacturing took place at the Carruthers site (Crowe-Swords 1974:85). We must therefore look to positive attributes for comparative material. Very important among chipped stone artifacts from the Carruthers site are projectile points. One type, a small triangular unstemmed point, the single most numerous variety at the Carruthers site (Crowe-Swords 1974:60), is not present at the Pipeline or Flood sites. Crowe-Swords sees a number of similarities between this point type and specimens from later assemblages on the coast, as well as point types from Esilao.

Related to the occupation and use of the Carruthers site is a very abundant slate assemblage. As has been already discussed, the width of the ground slate sample from the Carruthers site is essentially bimodal where the Flood and Pipeline site sample is unimodal. The Carruthers site also has a much more numerous and varied ground slate point assemblage. As with chipped stone, there does not appear to be on site nephrite production at the Carruthers site. Crowe-Swords (1974:123) suggests that the adze blades present were either brought from a winter village or processed elsewhere and traded to the Katzie. Another difference between the two sites is the presence of very wide trumpet pipe fragments at the Carruthers site (Crowe-Swords 1974:131). To what degree some of these differences are related to the differential seasonal occupation of the site has yet to be determined. It appears though, that the Carruthers site is likely under much stronger coastal influence, largely because of its geographic location. It would be of interest to compare a more permanent Katzie site, or winter occupation village, with the components from either the Flood or Pipeline sites.

Inter-areal Relationships

As observed by Osborne, Caldwell and Crabtree (1956:17) "...it would be absurd to reject evidence of the spread of Interior traits and influences to the Coast." This would of course be a two-way exchange, and, as already noted, influences from both the Coast and the Interior are evident in the Hope-Yale locality. Marion Smith (1956) viewed this area as being a part of a separate and distinct Middle Fraser or Foothills province, being neither coastal nor interior. The following year, Suttles (1957) published a detailed critique of Smith's (1956) article which was to "...demonstrate the dubious quality not only of her conclusions but also of her methods", (Suttles 1957:180). Yet the Hope-Yale locality does occupy a unique position with respect to coastal and interior influence. Based on a steady and abundant resource, namely the prolific supply of fish from the Fraser River, the locality was suitable for year round occupation. How then, do the cultural assemblages from the Hope-Yale locality compare to the neighbouring areas?

Of the cultural phases, or individual assemblages, as described for the Hope-Yale locality few fall into any of the types described for the neighbouring areas. To elaborate, Mitchell (1971:47) includes the Hope-Yale locality in what he describes as the general Gulf of Georgia region, yet he writes:

> "Borden's (1965:1968a) division of the Fraser Canyon archaeological material into numerous phases suggests that at the eastern edge of our area he perceives a succession of culture types for which we have as yet little or no evidence in the rest of the Gulf of Georgia region."

The few Fraser Canyon cultural phases Mitchell does place within the culture types of the Gulf of Georgia region are Pasika, Milliken and Mazama, in the Lithic culture type (1971:60), and Esilao, in the Gulf of Georgia culture type (1971:51). The description of Esilao as a Gulf of Georgia culture type component is perhaps questionable. Whereas, for example, phases such as San Juan (Carlson 1970), Helen Point III (McMurdo 1974), Stselax (Borden 1970:110-112) Rebecca Spit Fort (Mitchell 1968:20-41) and Montague Harbour III (Mitchell 1971:168-221) have only minimal quantity and variety of chipped stone, Esilao (Mitchell 1963) has considerable, and generally follows the pattern of the Hope-Yale locality. On the other hand, the placement of the Hope-Yale components into the sequences as suggested for Lytton-Lillooet-Kamloops (Stryd 1973; Wilson 1974a), or for central Washington (Nelson 1969; Warren 1968) has not even suggested. Yet strong interior affiliation does exist, as noted by Mitchell (1963:140) where, in his study of the Tait ethnographic and Esilao archaeological elements discernable to either interior or coastal affiliations, 60% of the Tait and 67% of the Esilao elements pointed to an interior affiliation.

Looking at the material culture remains from the Flood and Pipeline sites, the artifact assemblages display a number of characteristics that address this problem. Hanson (1973:288) had previously noted these, and had termed them as specifically "coastal", "interior" and "local" traits.

A trait which suggests a "coastal" affinity is the general presence of a prolific ground stone industry. As has already been discussed, the overall trend in the Gulf of Georgia area is away from chipped stone, until, by A.D. 1000 and possibly as much as 500 years earlier, chipped stone occurs only rarely (Mitchell 1971:47,61). In the Interior chipped stone predominates until historic times, and ground stone occurs only rarely. The presence of an abundant groundstone industry in all components of the Flood site can therefore be taken to represent a distinct coastal influence. Conversely, chipped stone, abundant in both the Flood and Pipeline site assemblages, and present up to historic times in the Esilao phase material, can be thought of as an Interior influence. Hanson (1973:288) lists corner and basally notched points and the use of cryptocrystalline materials as a part of this interior influence. Pithouses also very likely came from the Interior, as was suggested by a number of researchers earlier, though we do not yet know the direction of this influence. Hanson (1973:288) notes that it has not yet been determined why housepits were adopted in the Hope-Yale locality, and suggests it was either as a climatically induced adaptive response or because they were brought by another ethno-linguistic group moving into the locality, as proposed by Borden (1968a:16).

Termed here as "local" traits, are a series of tool types that are highly developed in one or more components described, but which are not necessarily specifically or uniquely local traits. By the term highly developed, each of these types occurs comparatively frequently, and is a result of extensive on-site manufacturing. Included are cortex spalls, and the nephrite, soft stone and ground slate production. Other traits, such as chipped stone, have been considered elsewhere. Perhaps the key in the defining of these "local" traits is the on-site manufacturing aspect.

From this work, it appears that these components of the Hope-Yale locality represent a marginal or transitional area to the Coast and the Interior. This status as a marginal area appears to have had a long duration in the Hope-Yale locality, extending, with the possible exception of the Skamel phase, at least as far back as the Baldwin phase. Perhaps linked with being a very marginal area, is a role as "middlemen", between the Coast and Interior. Ethnographically, most items traded were perishables and as a result little evidence of such transactions would be preserved. The spread of soapstone, from a main center of activity at Yale, to the Gulf of Georgia region may, unless new soapstone sources are discovered, be further evidence of trade between the Hope-Yale locality and the Coast. Other items possibly traded, either complete or as raw material, are slate and nephrite, common items in the Hope-Yale locality and not native to the Coast.

It is clear that much more work will be required to clarify these and other questions. Perhaps foremost is a detailed description of the Fraser Canyon sequence phases, from which more detailed comparative work can be initialed.

CHAPTER VII

SUMMARY OF CONCLUSIONS

This thesis has presented a detailed description of the cultural material recovered during excavations at the Pipeline and Flood sites during 1974. In addition, a series of cultural features, including housepits, ovens, hearths and rock alignments, were also described. Nine components, including seven discrete occupation zones and one mixed deposit from each site, were identified and the cultural material was ascribed to one of these components on the basis of a number of specific factors.

Background data, designed to acquaint the reader with the area as it exists today, as well as detailed ethnographic particulars and the extent of previous archaeological work, was outlined. From this, a number of specific questions were posed and examined in light of the recovered evidence. A summary of these follows.

Housepits, similar to those described at the Katz and Esilao sites, as well as a new variety for the Hope-Yale locality, were described. Although the sample is small, housepits in the Hope-Yale locality appear to follow a pattern outlined by Nelson (1969:99), for central Washington. If this is indeed the pattern, and if Nelson's pattern is correct, there may be evidence for temporal significance with respect to housepit form in the Hope-Yale locality.

The effect of Coastal and Interior influence on the cultural assemblages was examined. From this, it appears that influences from both areas are considerable. It was suggested that the Hope-Yale locality has been a distinctly marginal or transitional area for some time. To define the locality as either marginal - Coastal or marginal - Interior is as yet premature. An effect of this marginal position may have been important with respect to trade between the two areas.

The components from the Pipeline and the Flood site show an appreciable intra-site similarity, and inter-site difference. Comparatively, as the different components from each site did not show a great variation, it is suggested that a relatively stable existence occurred during their occupancy. Evidence for a shift in material culture, specifically with regards to the different proportions of ground and chipped stone, was discussed with respect to the Pipeline and Flood site components.

Borden (1968a:16) has suggested that a new population intruded into the Hope-Yale locality and that this was represented by the Skamel phase. The dating of the recovered components was discussed, and it was generally observed that there was an overlap in dates for the Baldwin, Skamel and Emery phase components. If this was the case, it remains to be clarified as to the exact relationship of these phases in the Hope-Yale locality and how long these phases lasted.

Problems for Future Research

Throughout this thesis a number of problems have arisen and, because of their re-occurrence in the discussion of Hope-Yale archaeology, they must be dealt with before a convincing argument can be made on any one of a number of questions. A few of the major problems are discussed below.

Much work has yet to be done to clarify the prehistoric cultural sequence as it exists in the Hope-Yale locality. A major step will be a comprehensive qualitative and quantitative account of the Fraser Canyon sequence as outlined by Borden (1968a). With a clearly and concisely described sequence of components, detailed comparative work could begin. Coupled with the detailed description of the Fraser Canyon sequence would be extensive and accurate dating of the components from other excavated sites. This would, in time, permit the formulation of accurate statements on the temporal and spatial extent of the various Hope-Yale components. With this data base, more exact Coast-Interior affinities may be detected.

As we have seen, much of the site deposit, when the excavation of a housepit is of primary concern, is mixed, a result of the construction and occupancy of the structure. To gather data from which an accurate and comparative cultural sequence can be established, we must have either excellent temporal control on each housepit excavated, or, preferably, a good stratified site. Considering the man-hours involved, the excavation of individual housepits in the Hope-Yale locality lends itself more readily to such problems as the spatial analysis of artifact types as related to one household, than to the gathering of comparative chronologic data. Thus, depending on the exact goals, perhaps less emphasis should be placed on the excavation of actual housepits and more on the surrounding site area, preferably areas undisturbed by housepit construction.

The establishment of the exact seasonal usage of a housepit structure, in light of the very poor preservation of organics in the Hope-Yale area, is not one for which a cut and dried solution can be outlined. It therefore must remain a problem until such time as a new method or means of obtaining such information can be implemented.

A very large portion of the Flood site, and as yet some of the Pipeline site, remains intact. An effort should be made to protect these remaining portions as they hold answers to the many questions that can be raised from the data presented. These cannot, and will not, all be raised here, however, a few do merit specific mention. Concerning housepit construction, what is the nature of intra-site variation? Was the entire site occupied at one time? Was the occupation continuous or intermittent? How do the components from different housepits compare or contrast? Exactly how does the early component relate to the various housepit floors? Is it actually "pre-housepit" or does it represent areas of "non-housepit" construction?

It is evident that much work has yet to be done before we will have a clear understanding of the archaeology in the Hope-Yale locality. This thesis, as are the works cited in it, is only a small and preliminary step towards that understanding. Hopefully it will be of use to the on going research, either through the data presented and the thoughts expressed herein, or to prevent later researchers from making the same errors I may have made.

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